

**Analysis on Future Trends of Plastic Recycling in Sri Lanka**

**By**

**Dinusha Nishad Jayageeth Chandrasekera Jayaweera Gunaratna**

**This thesis was submitted to the Department of Chemistry of  
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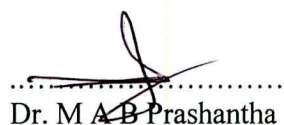
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## DECLARATION

I hereby declare that this project was conducted by me under the supervisions of Dr. M A B Prashantha and Dr. A D U S Amarasinghe, as a partial fulfillment of the requirements of the Master of Science degree in Polymer Science & Technology and the content of this thesis is true and correct to the best of my knowledge and belief.

  
.....  
Mr. D N J C J Gunaratna

  
.....  
Dr. M A B Prashantha

Project Supervisor,  
University of Sri Jayewardenepura,  
Gangodawila,  
Nugegoda,  
Sri Lanka.

  
.....  
Dr. A D U S Amarasinghe

23/12/2013  
.....  
Date

Project Supervisor,  
University of Moratuwa,  
Katubedda,  
Sri Lanka.

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**D N J C J Gunaratna**

### **ABSTRACT**

The annual plastic inflow, outflow and the consumption patterns in Sri Lanka was studied from year 1995 to year 2011 in order to analyze their future trends. Fluctuations in the above patterns were observed with forecasting values till year 2025. It was observed that Polyethylene (PE) would be the highest consumed plastic material where Polystyrene (PS) would be the least consumed in year 2025. Further it was observed that out of 430000 tons of plastics imported 310000 tons (72.09%) would be consumed in year 2025.

In order to analyze the future trend of plastic waste in Sri Lanka, a questionnaire survey was carried out from more commonly disposed plastic items producers. Using its statistical data estimated values for the wasted quantities of Low density Polyethylene (LDPE), High density Polyethylene (HDPE), Polypropylene (PP), Polystyrene (PS), Polyethylene terephthalate (PET), and Polycarbonate (PC) were calculated from year 1995 to 2011. Based on these values their future trends were analyzed. It was observed though Polyethylene (PE) would be the highest consumed plastic material in year 2025 Polypropylene (PP) would generate the highest waste quantity while Polycarbonate (PC) generating the least. Further it was noted that, out of 310000 tons of plastics consumed around 220000 tons (70.99%) would be wasted in year 2025. Since the quantity of plastics imports would be 430000 tons in year 2025 it was deduced that 51.16% of imported plastics would be wasted. Since half of the quantity of plastics imported is wasted, it was noted that a major recycling process should be in force in future.

To analyze the future trends of plastic recycling in Sri Lanka, the current position of waste plastic collectors and the strength of the recycling industry were studied along with the recycling quantities from 2007 to 2011. This was done by carrying out another questionnaire survey along with a field observation from ten randomly selected plastic waste collectors and recyclers registered with Central Environmental Authority. The study indicated that, under the current strength of the recycling industry the recycling quantity which was 10000 tons in year 1995 would reach a quantity of 170000 tons (77.27% of the wasted) in year 2025. But it was observed that around 50000 tons (22.73% of the wasted) would still not be recycled. In the meantime the theme of the green environment concept and our achievement towards it was studied. Therefore in order to achieve the theme of the green environment concept in year 2025 or before that, it was exploded to see the future long term and short term recycling trends. During the survey since it was observed that the recycling industry is facing lot of issues related to its future development, increasing the future quantity of recycling and the strength of the recycling industry via finding solutions to these issues was identified as the main and the most crucial long term future recycling trend to achieve the theme of the green environment concept in year 2025. Meanwhile, providing assistance by the government to develop and function the National Post Consumer Plastic Waste Management Project (NPCPWMP) at its maximum strength and implementing a strategic plan to introduce plastic recycling at Provincial Councils level were identified as short term recycling trends to achieve the theme of the green environment concept before year 2025.

It indicated further, though the recycling industry is made to function at its maximum strength still a major portion of collected plastic waste will be dumped back to

municipal solid waste dumping sites. It was observed that this portion would be the plastics which are derived from polymers and monomers that often cannot be separated and returned to their virgin states (mixed plastics). Based on the dumping quantities of mixed plastic waste from year 2007 to year 2011 the future trend of dumping of mixed plastic waste was analyzed. Hence it was observed that around 55000 tons (25% of the wasted) of mixed plastic waste would be dumped in year 2025. Therefore converting mixed plastic waste into valuable petroleum fuels was identified as a timely solution to eliminate mixed plastic waste from Sri Lankan soil.

Hence, increasing the future quantity of recycling and the strength of the recycling industry by treating the issues of the recyclers and the recycling industry with suggested solutions, make functioning the National Post Consumer Plastic Waste Management Project (NPCPWMP) at its maximum strength, implementing a strategic plan to introduce plastic recycling at Provincial Councils level and converting mixed plastic waste into valuable petroleum fuels were identified as timely solutions to eliminate plastic waste from Sri Lankan soil in year 2025 or before that.

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## DEDICATION

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To my beloved parents, Amitha, Vimala, my sister Madusha, my friends, and  
all of my teachers whose unconditional love and support have given me  
strength, determination, and fortitude to accomplish any goal.

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## ACRONYMS

<b>Term</b>	<b>Description</b>
ABS	Acrylonitrile Styrene Butadiene
CEA	Central Environmental Authority
C	Collectors
FRP	Fibre Reinforced Plastics
GNP	Gross National Product
HS Code	Harmonized System Code
HDPE	High-density polyethylene
IR	Infra-Red
Las	Local Authorities
LDPE	Low-density polyethylene
MSW	Municipal Solid Waste
PC	Polycarbonate
PET	Polythene terephthalate
PP	Polypropylene
PS	Polystyrene
PVC	Polyvinyl chloride
R	Recyclers
T	Tons
W	Watt

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