



INDIAN CENTRE
FOR PLASTICS IN
THE ENVIRONMENT

Envis Eco-Echoes

Management of Plastics,
Polymer wastes and
Biopolymers and impact of
Plastics on the Eco-system

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Mumbai**

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**Capacity Enhancement Programme
on Management of Plastics, Polymer
Waste and Bio-Polymers, Impact of
Plastics on Eco-System**

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Ray of Hope is Visible

There is an increasing realisation, especially among the young students as well as among the Civic Authorities, about the need for appropriate Solid Waste Management system in the city for resolving, among other issues, the Dry Waste Management problems.

Civic Authorities in Mumbai have recently announced their plan for ensuring all new buildings / housing societies to setting up wet waste composting systems. In model projects in different Wards of Mumbai various NGO's are already engaged in collection of Dry Waste and segregating the same for recycling. Details of such activities have been published in several editions of this Newsletter (can be viewed in <http://icpeenvis.nic.in>).

A housing colony in the heart of New Delhi has already started a 'Zero - Waste project' to ensure that no waste generated in the colony is sent to the landfill by setting up small composting plant to treat all wet waste and planning to set up small plastics waste to fuel making plant to treat all difficult -to-recycle plastics (& other polymer) waste. Details of this project would be published shortly.

Increasing number of students - whether a Class IX student from R N Poddar School, Santacruz, Mumbai or an younger generation teacher from SNTD Women College or a Graduate student from SIES College, Navi Mumbai, are showing keen interest to keep our environment clean by creating mass awareness among the households the importance of segregation of Dry and Wet waste at the source of waste generation. Some of them had made on the survey to analyse the gravity of the situation (list available on request).

An MBA student from an elite professional institute of India - Dhirubhai Ambani International School, Mumbai has even analysed the prospect of creating Wealth from Plastics Waste. A synopsis of the student's thesis work has been published in this edition of the Newsletter. It is hoped that more and more from the younger generation would come forward with similar outlook in their mind.

It is an encouraging phenomenon that public - at least some section of it - has realised that if we do not litter and manage our waste appropriately we would be able to resolve one of the most challenging task of the urban India - Waste Management. The days will not be far off when we will be able to achieve the distinction of having nil or negligible area under landfill in our country also.

Subscription Information:

ENVIS is sent free of cost to all those interested in the information on Plastics and Environment.

Readers are welcome to send their suggestions, contributions, articles, case studies, and new developments for publication in the Newsletter to the ICPE-ENVIS address.

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Editor

Mr. T. K. Bandopadhyay

Holistic Approach to Plastic Waste Management in India

Ishan N Meswani

Dhirubhai Ambani International School, Mumbai



Plastics are synthetic materials made with hydrocarbons obtained from crude oil, natural gas or coal. At present, naphtha from oil refineries and rich gas from natural gas separation units are the primary sources of raw material for plastics. Use of plastic continues to grow rapidly due to its versatile properties and wide range of applications. Present annual global demand of plastics is more than 210 million tons, thus exceeding the combined demand for steel and aluminum in terms of volume. Demand of plastic in India today is 10 million tons annually and is likely to reach 15 million tons by the end of 2015.

Even then, the per capita usage of plastics in India will be 12 kg, well below the prevailing world average of 30 kg. Plastic products are used in virtually every field of human activity—agriculture, building and construction, medicine, automobiles, appliances, aviation, computers, electronics, sports, housewares and entertainment. The largest use of plastics is in packaging to deliver food, medicines, toiletries, cosmetics and hygiene products to consumers safely and efficiently. Due to the growing use of plastics, post-consumer plastic waste has also rapidly grown.

As most plastic products are resistant to corrosion and bacterial degradation, the waste accumulates unless it is diverted to alternative usages. As a student, I wanted to understand the issue in details and undertook several visits to plastic waste collection centers, plastic recycling units, and suppliers of technology converting waste into fuel. The simplest method of eliminating plastic waste is by reusing the plastic product. For example, large carry-bags and bottles made of plastic can be reused. Such reuse represents a highly sustainable and environmentally friendly option for plastic waste reduction.

However health, sanitation and durability issues can limit the viability of safely reusing certain products. A serious challenge for plastic waste management in India is posed by household waste. Among the difficulties are the high costs and challenges of collection and segregation of waste. The quantity of waste generated varies for different cities and households. Most of the plastic waste is collected from the point of generation to the landfill sites and is recycled. While an average Indian household waste has 10% plastic, the same is reduced to 6% at the disposal site. The street dumping has 9% plastic waste. At the disposable site further collection of waste happens

leaving less than 1% of plastic waste at the site. This process of collection of plastic waste is carried out in the informal sector by unskilled waste collectors. An estimated 3 million waste collectors are involved in these activities and forms the backbone of solid waste management activities in Indian cities and towns. They supply partly segregated waste to dealers and aggregators who in turn supplies these to the recycling units spread across the country. A profitable and energy-efficient way of handling plastic waste is to recycle it. There are various technologies available to recycle plastic waste and to convert it to useful new products. Mechanical recycling is the simplest and most common method. In mechanical recycling, plastic wastes are cleaned, sorted, shredded and converted into granules or flakes. These flakes are then mixed with virgin materials and converted to useful but non-critical products.



PET Bottle Collection & Shredding Unit at Bandra, Mumbai managed by NGO - FORCE



Dry Waste Segregation site at Suraksha Garden - A Ward, Mumbai

For mechanical recycling to become efficient, it is necessary to have clean and segregated plastic waste. The significant part of post-consumer plastic waste that cannot be segregated can be used in cement kilns for its calorific value or be converted to liquid hydrocarbon by pyrolysis. Mixed plastic waste can also be used with bitumen in road construction. Mixed plastic waste can be burnt (co-processed) in the high temperature condition of cement kilns. Since the calorific value of most commonly found mixed plastics waste (PE&PP) is about twice that of high-calorie content coal, plastic becomes a good substitute despite the marginally higher costs.

In India this has been demonstrated by a joint project by ACC & ICPE as an environmentally safe and viable option. Plastic waste can be converted to liquid fuel by pyrolysis. In this process, output consists of different types of liquid fuel, gaseous products and residual solid. Wherever Mechanical Recycling is not feasible, these processes – co-processing in cement kiln or pyrolysis in hydrocarbon fuel (and gases) - could be adopted. These processes do not require adequate cleaning and can handle mixed plastics waste.



Mixed Plastics Waste being dried before feeding into the reactor



Small Size Pyrolysis Plant - 50 Kg Batch



Hydrocarbon Fuel Produced from Pyrolysis Plant

In India nearly 4.5 million tons of mixed plastic waste each year with an estimated value in excess of a billion dollars is found in the Municipal Solid Waste stream. It is estimated that around 7500 units spread across the country recycle 3.6 million tons of plastic waste. Since collection, cleaning and sorting of plastic wastes are highly labor-intensive processes, approximately 1.6 million people are directly and indirectly associated with these activities. Most of the plastic waste is collected by unskilled laborers and moved through a chain of collection centers, dealers and wholesalers of waste, finally reaching the recyclers.

With no adequate infrastructure for solid waste handling in Indian cities and towns, and a compulsive littering habit, the cost of collection and aggregation of mixed plastic waste in India will remain prohibitive. It is therefore imperative that India;

- (i) initiate an extensive awareness program for consumers and households to address the issue of littering, and
- (ii) create the necessary infrastructure for efficient collection and handling. It is also necessary to implement "bin culture" so that the cost of collection and segregation of mixed plastic waste is reduced. Both the government and private sector industries need to work together to reduce the adverse effect of plastic waste by promoting the reuse of products and the recycling of waste. An infrastructure that allows for efficient collection and handling of plastic waste is central to managing the growing plastic waste.



Medium Size Continuous Pyrolysis Plant - 3 MTD

2nd Specialty Films and Flexible Packaging Global Conference 2013

Chemicals & Petrochemicals Manufacturers Association (CPMA) along with ElitePlus Business Services Pvt. Ltd. organized 2nd two day Specialty Films and Flexible Packaging Global Conference 2013 at Hotel Grand Hyatt in Mumbai on 29th/30th August 2013. The conference was attended by Approx 700 participants (including speakers, session chairmen and media) representing 337 Companies from over 21 Countries.

The conference addressed one of the most vibrant sectors of Indian Consumers i.e. flexible packaging. Plastics play a very important role in the packaging sector by offering solutions to virtually every industrial and consumer activity. Flexible Packaging provides Content Protection, Anti Pilferage, Extended Shelf Life, Pleasant feel, Consumer convenience and most importantly Improved Health and Hygiene. Global packaging Industry is valued at app US\$ 695 Bn out of which Flexible plastic packaging accounts for US\$ 138 Bn.

Other form of packaging are Board, Rigid plastics, Metal and Glass. NA, WE and Asia each have app 25% share of Flexible packaging. Flexible packaging is growing at 2% pa in the developed world while growth in developing world is app 8% North America leads the usage of flexible packaging, followed by Asia. In Asia, China is by far, the largest user of flexible packaging followed by Japan and then, India. But if we look at per capita consumption of Flexible packaging, India and China have lot to cover. Present per capita flexible consumption is highest in US, UK, Japan, Germany, Australia and Switzerland.

However, India is expected to show sustained growth over the next several years as life style in India is changing and retail revolution has just begun. In India packaging is app US \$16 Bn industry out of which app US\$ 5 Bn is accounted for flexible packaging and growing at ~ 15% pa. The major segments for Flexible packaging in India are FMCG, Non-Food and PM&G i.e. Pan Masala and Gutka.

The global plastic production, which was merely 1.5 million tons in 1950, has now increased to 200 million tons in 2012.

India consumes app 10 million Mts of all plastics per year. In India Flexible packaging for consumer and sacking for Industrial products consumes app 4.0 Million MTs of polymers which is almost half of all the polymers consumed in India.

The conference addressed various issues such as Overview of Global and Domestic flexible packaging sector, Imperatives for sustainable growth, recent developments in polymer materials both in the commodity and in the specialty categories, processing technologies and surface finishing, M&A happening in packaging industry, recent developments in multilayer film structures, post-extrusion lamination, coating and adhesives, Flexible films use for security and anti-counterfeiting for a variety of food and non-food packaging applications.

The conference also addressed the most sensitive issue of sustainability and environment. During the entire conference, two major themes were constantly discussed which were Sustainability and Innovation. It was clearly brought out that the producer, consumer and local municipality coupled with a profitable business model, all have equal role to play in arriving at a sustainable solution. A lively panel discussion on '½ Waste to Wealth; ½ looked at various aspects of recycling and producing useful articles out of close to 4 million mts of waste.

The flexible films market generates annually. Presently single material plastic waste recycling is relatively easy compared to multi material plastic waste. Multi material plastic waste is generated by multilayer laminates which were essential for flexible packaging to provide barrier properties to packaging. Barrier properties are needed for packing of food products to retain aroma, freshness and prevent migration of oils etc.



Shri K.G. Ramanathan, President - GC, ICPE (Left) and Shri Vijay Merchant Member - GC, ICPE are delivering speeches during the Seminar

National News

Industry Welcomes Dismissal of PILs Demanding Ban on PET

Source: profit.ndtv.com

The PET industry has welcomed the dismissal of Public Interest Litigations (PILs) demanding ban on use of Polyethylene Terephthalate (PET) - the transparent inert universally food contact approved material - as a packaging material. The latest September 2013 order by Hyderabad High Court has provided relief not only to beverages industry but also to the profound PET user industries such as pharmaceutical products, drinking water, edible oil, milk, spices, honey, ketchup, pickles, confectioneries, etc, an industry official told PTI here.

Various NGOs have filed PILs in various high courts since around January 2013 demanding ban on PET as a packaging material for beverages. The Court orders have falsified all claims in the PIL that PET is not an inert and it contaminates the beverages, PET causes environmental hazards, etc. The courts have taken cognizance of various documents like Bureau of Indian Standards (BIS)-conforming PET as a safe material for use, The Food Safety Act (FSA) provision - use of packaging materials which conforms to BIS standards are approved for use in India for said purpose, results of the tests conducted by the Government Laboratories certified that PET conforms to BIS/FDA norms before rejecting all the PILs, the official said.

Also, the court has taken into consideration the fact that used empty PET bottles are recycled back to make value added textile products in India and it is not environmental hazard as was claimed in the PILs.

The claims in the PIL were dismissed by the virtue of orders passed by High Courts of Andhra Pradesh (PIL No. 44 of 2013), Uttar Pradesh (PIL No. 54857 of 2012), Madhya Pradesh (PIL No. 2509 of 2013), Punjab and Haryana

(PIL No. 2518-2013) and Karnataka (PIL No.12847/2013). All the PILs stand dismissed by the court orders. The Hyderabad High Court order is the last in the series. PET is one of the most sought after and the fastest growing durable packaging material in the world with consumption of almost 200 lakh tonnes globally for rigid packaging. Ramesh Chauhan, Chairman and Managing Director, Bisleri International, the largest consumer of PET bottles for packaging Bisleri while expressing satisfaction on the court order said:

"At last somebody up there understands the value of PET packaging and not getting misled by false propaganda about the same." He further emphasised "Infact PET and all plastics are the only packaging material which has made a unique value system for itself, to be recycled more than one time, which ensures that the ecosystem is kept free from its nuisance. I am happy to note people are awakening to facts which the industry was trying hard to express for a long time."

"PET is a globally accepted packaging material for liquor packaging both in India and abroad, it has been certified for its suitability in relation to liquor by various government laboratories of both Central as well as state governments.

"It is approved as per FDA and poses no threat to human health. At times there is an orchestrated action at the behest of rivals of PET bottles, purely for their vested interests," Radico Khaitan director K P Singh said. The judgements are based on fact that PET conforms to all regulatory compliances and defeated the repeated false claim of PET being not suitable, Manjushree Technopack managing director Vimal Kedia said.

International News

Plastics Recycling Goes Global

The International Expanded Polystyrene Alliance (INEPSA) has re-launched their website at www.epsrecycling.org with a number of new resources for people around the globe looking to recycle their expanded polystyrene (EPS) transport packaging. The site provides the contact information for worldwide organizations that provide EPS recycling assistance, as well as interesting facts about EPS and the benefits it provides as a sustainable packing material.

The new website provides information on EPS associations that have signed the International EPS Recycling Agreement, which pledges their commitment to INEPSA and the promotion and advancement of EPS recycling. Visitors to the site can easily search for their country from an alphabetical list and then contact their respective EPS association, which will provide the details on where their EPS can be recycled locally. Companies that use EPS in their packaging and service the global market will find the INEPSA website to be a valuable tool for informing their customers on the best way to responsibly dispose of their end-use EPS. In addition to providing recycling contacts, the site also contains a wealth of

information about EPS and its role in environmental stewardship. INEPSA is an international coalition formed by the EPS Industry Alliance (EPS-IA), the European Manufacturers of Expanded Polystyrene (EUMEPS) and the Asian Manufacturers of Expanded Polystyrene (AMEPS), which worked together to produce the new site. EPS is currently the only packaging material industry with such a global partnership. These associations represent the EPS industry in North America, Europe and Asia respectively.

INEPSA has a long history of sharing information and resources to facilitate the betterment of the EPS industry in their individual markets, but the launch of the new website is the first product of INEPSA collaboration.

For more information contact Diana Gentilcore at 800-607-3772 or dgentilcore@epsindustry.org.

Source : *EPS Industry Alliance*

Web site: www.epsindustry.org



Need A Planned Approach To Solve City's Transport Woes: Vision Document

The People's Vision Document (PVD), which has been submitted to the development plan (DP) department, has called for a planned, holistic approach to solve the city's transport problem, make the transport system more people friendly and sustainable, and to use it to shape development.

The PVD pointed to the limited success of the Bandra-Worli sea link, which sees less than half the daily traffic initially expected, and the huge environmental impact in implementing the coastal road plan, to make a case for not building multi-crore projects and approaching the transportation problem holistically.

The document called for a high-density mix of housing, employment and recreation options within walking/cycling distance of each other and of mass rapid transit system (MRTS) stations to induce a change towards healthier living. A secondary transport system is needed to ensure convenient and quick dispersal of large volume of commuters, it said.

The PVD said the collapse of the public transport system is encouraging more people to buy vehicles. While the total number of vehicles in Mumbai has increased by 93,432 since 2009, the number of buses, taxis and autos has increased by only 5,083 until March 2010. "An increase in the number of train coaches and BEST buses can be a simplistic solution. If public transport is made comfortable, more people will start using it," said a transport expert.

Not surprisingly, the issue of parking has got attention in the PVD. Experts said parking should be treated as usage of space and should be charged. Road congestion pricing should be introduced for access to a road/area at certain times to promote carpooling and sharing.

THE OTHER SUGGESTIONS

A few of the recommendations in the People's Vision

Document that was recently presented to the BMC to assist in the formulation of Development Plan (2014-34).

Waste Management

Decentralize waste management process to reduce dumping of waste by 90% Ensure all new buildings and societies have their own composting pits Ensure that all new constructions have garbage chutes Provide dry waste sorting sheds and biogas plants in various locations Recycle construction debris into bricks, paver blocks **Environment and Open Spaces**

Correct wrongly mapped existing land use survey to prevent mangroves, forests and other ecologically sensitive areas from being opened up for development. Such areas need to be demarcated clearly as 'protected spaces' in the ELU survey and the following DP

- Do not classify beaches as open spaces
- Map private and public open spaces clearly, and open private elite clubs and gymkhanas to the public
- Categorize open spaces into community, ward and city levels
- Make playgrounds open to the public after school hours
- New open spaces need to be created

Health

Build a dedicated tertiary-level centre for TB and MDR in addition to the Sewri TB Hospital Ensure private and charitable hospitals that avail of incentive FSI give the poor access to beds reserved for the underprivileged

Source: The Times Of India Mumbai; Date: Oct 15, 2013; Section: Times City; Page: 6

Remember the first Asphalt Road made with Plastics Waste at Dadar, Mumbai way back in 2008?
The Road has withstood 6 rainy seasons and is still in considerably good shape.



Awareness Programme at New Horizon Scholars School & Dnyan Pushpa Vidya Niketan & Junior college, Navi Mumbai in July & Sept., 2013

Awareness programme was conducted at New Horizon Scholars School, Plot no 5, Sector 13, Airoli Navi Mumbai. The sessions were conducted in the school hall on 3rd July 13, in the morning session by Ms Kalpana Andhare on behalf of NGO – Stree Mukti Sangathana. About 450 students from class 5th to 8th attended the programme in 3 sessions.

It was observed that awareness level was high and students were interested in knowing about plastics. Mr. Bandopadhyay from ICPE also spoke to students and answered their queries post session discussions.

This well known school in the area is run by D.Y. Patil Educational Academy. About 300 students from 6th to 8th std were addressed in 3 sessions. The sessions were conducted in AV/class room, accommodating around 100 students at a time. The presentations for 7th & 8th Std. were attended by the Headmaster and 3 teachers.

Ms Kalpana Andhare on behalf of NGO – Stree Mukti Sangathana had conducted the programme and Sh T V Srinivasan and Sh Sudheer Khurana of ICPE assisted.

Ms Andhare expressed her satisfaction on addressing receptive young minds.



Awareness Programme at Ryan International school, Sanpada, Navi Mumbai. on 30th August, 2013

Awareness Programme was conducted in 5 sessions in the school hall on 30th August and 3rd September 2013, covering 1046 students from class 7th to 10th. Since school has activity based curriculum, students have done projects on waste management, energy conservation etc. However, most

of them didn't know specifically how plastics are recycled. The initial plan was to speak to students up to Standard 9th. As the earlier sessions were both informative and interactive, the school requested on an additional class with Standard 10th, which were conducted the 3rd.



Awareness Programme at Anjuman Islam School, Mumbai on 13th September, 2013

ICPE Mumbai office had organised a School Awareness programme at Anjumaan Islaam School & college, CST, Mumbai on 13th September, 2013. About 80 students of Class IX and Class X attended the programme. Two teachers also were present.

Shri Tushar Bandopadhyay of ICPE conducted the sessions with the assistance of Shri Sudheer Khurana. The programme included screening of awareness films and deliberations through Power Point Presentation. Students interacted during the presentation on how they could contribute in the waste management and clean-up activities.

One of the Prof. of Anjumaan Islam College also explained the students about the importance of keeping the environment clean by adopting proper waste management practices.

The Head of the Department of Environmental Science & staff members of the school expressed their gratitude to ICPE Management for deputing its officers for organising the awareness programme for the students on the very important social issue. ICPE also distributed It's My World Booklet to School Children.



DATA SHEET

Plastics Processing Industry : An Overview

Virgin Polymer consumption in 12-13	→ 11.8 MMT
Per Capita Consumption in 12-13	→ 9.7kg
Processing Capacity	→ 30 MMT
No. of plastics machinery manufacturing units	→ ~ 200
Processing Capacity growth CARG	→ 13 % last 5 years
Investment in Machinery	→ ~ US \$ 5 Billion
No of Processing units	→ about 30,000
No of processing Machines	→ ~ 113,000
Investment required for next 5 yrs	→ ~10 Bn US\$ (Project Invest.)

Major Polymer Manufacturing Capacity

2012-13 : Capacity : 10.6 MMT Consumption : 11 MMT
 2016-17 : Capacity : 15.1 MMT Consumption : 16.5 MMT (Est.)

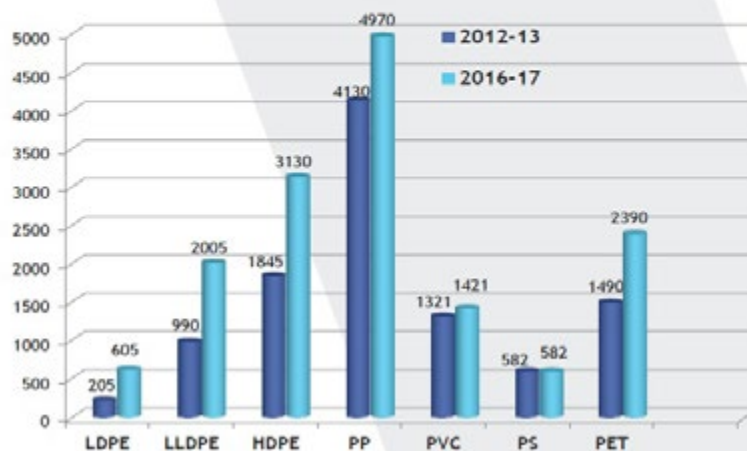


Fig. in KT

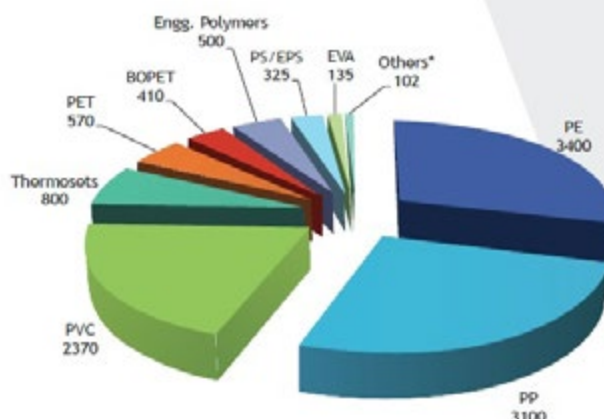
PET Capacity:

- Bottle Grade :
 2012-13 : 900 KT
 20 16-17 : 1800 KT
- For Film Appln. :
 2012-13: 410 KT

PS Capacity:

- HIPS/GPPS: 460 KT
- EPS: 120 KT

Total Polymer Consumption : 2012-13 (Thermoplastics + Thermosets)



2012-13 : 11.8 MMT
 2016-17 : 17.6 MMT (Est.)

Fig. in KT

*Others : cPVC - 75
 TPE - 15
 TPU - 12

Thermoplastic Elastomers (TPE)

- Styrenic Block Copolymers (SBCs, TPE-S)
- Thermoplastic Polyolefins (TPO/TPV)
- Thermoplastic Polyurethanes (TPU, TPE-U)
- Copolyester Elastomers (COPE, TPE-E)
- Polyamido Elastomers (TPE-A, PEBA, COPA)
- Other (including Super TPV, ETPV etc.)

**WORLD'S ICE DEPOSITORY IS MELTING
DUE TO
GLOBAL WARMING
VANISHING GLACIERS GIVE AN ALARM
NOTE FOR
MOTHER EARTH.**



Melting of Himalayan Glaciers

**PLASTICS ARE AMONG THE HIGHEST
GREEN HOUSE GAS SAVERS
&
DECREASE THE IMPACT OF
GLOBAL WARMING**

**DON'T LITTER, USE PLASTICS RESPONSIBLY, KEEP
THE MOUNTAINS CLEAN**



Plastics, Metals, Paper ...
Can be recycled into useful products.

PLASTICS ARE 100% RECYCLABLE

