ICPE
INDIAN CENTRE FOR PLASTICS IN THE ENVIRONMENT

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Eco-Echoes

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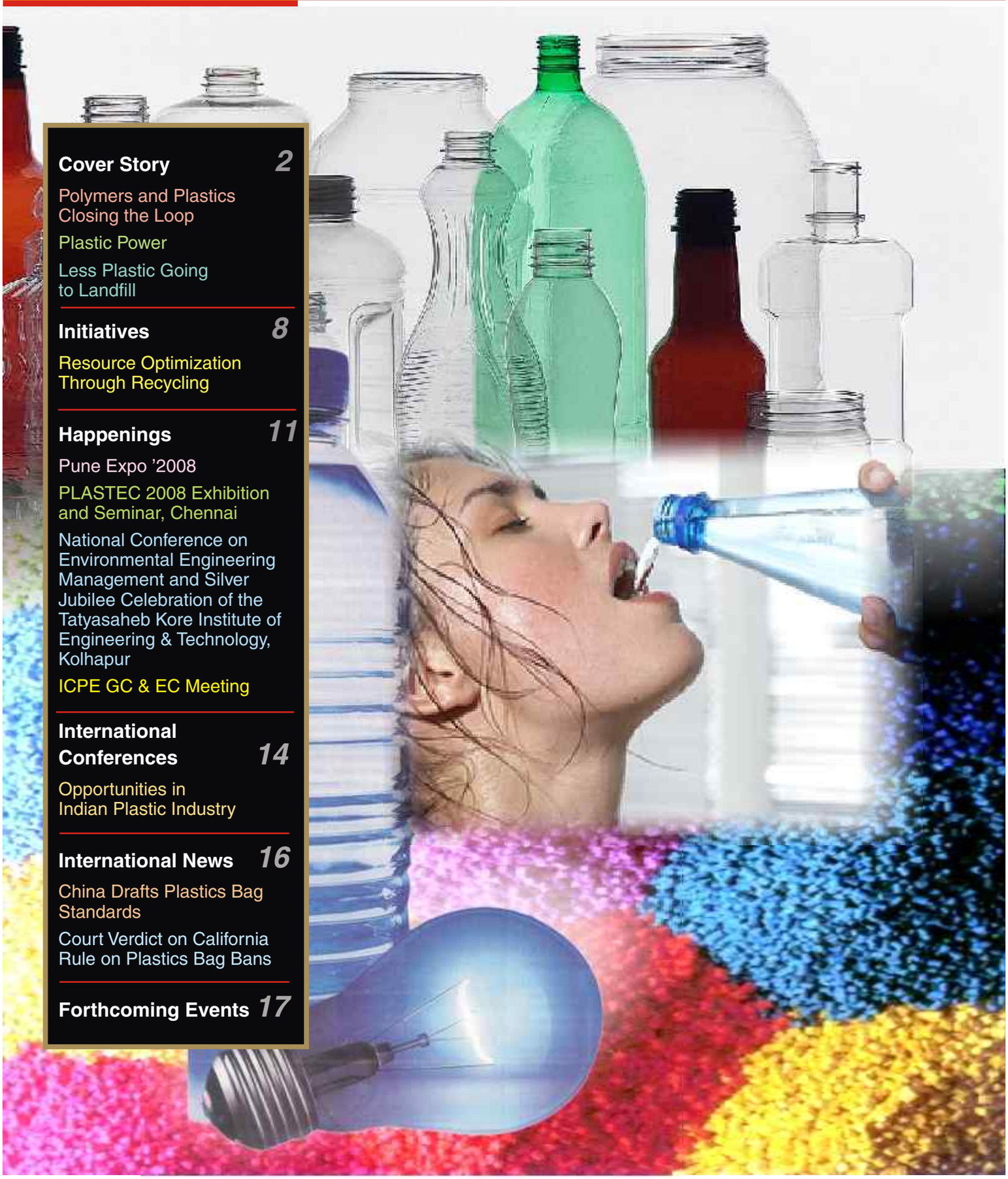

There are times when load shedding is welcome

Eco-friendly plastics have enabled the Automobile Industry to design downsized, light-weight, fuel efficient vehicles which also cause less pollution. Plastics help in improving fuel efficiency conserving precious fuel to the tune of above 20% for the same capacity and in ensuring a cleaner environment.

SAVE ENERGY · USE PLASTICS · PROTECT THE ENVIRONMENT

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ICPE

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Eco-Echoes

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Editorial

We received encouraging feedback on the last issue of new-look Eco-Echoes. This gives us strength to continue bringing forward to you important environmental issues, news and happenings with respect to plastics. We expect to receive your continuous feedback and suggestions.

Our endeavor to publish articles focusing on the benefits of plastics and the scientific solutions available for various environmental and waste management problems related to plastics will continue. Eco-Echoes would give more emphasis to publish case studies mostly at national level and also covering international studies.

Current issue of Eco-Echoes contains a contribution from a leading international magazine. We trust that readers would find this informative. We would invite similar contributions from individuals as well as from institutes / organizations / associations and other sources for publishing in our Newsletter for creating wider mass education and awareness.

Our mailing list includes Policy Makers, Pollution Control Boards of all states, various Government Departments, Educational Institutions, Civic Authorities, various NGOs etc. Any suggestion for forwarding our Newsletter to specific / new readers may please be intimated to us.

T. K. Bandopadhyay

Editor

Polymers and plastics -

Closing the loop

Despite the negative publicity over plastics waste, polymer recovery is increasing across Europe, reports ***Jan-Erik Johansson***

Plastics litter has been headline news in recent months. Reducing the amount of waste going to landfill is an important way of tackling this issue.

The good news is that in Europe the amount of waste plastics going to landfill has fallen steadily since 1999. Overall recovery of plastics waste in the EU-25, plus Norway and Switzerland, reached 50% in 2006, according to a recent report by PlasticsEurope.[1]

Total recovery rates, which include recycling as well as energy recovery, are up from 47% in 2005. What this means is that we are now recovering the same amount of plastics as are putting into landfill (C&I 2008,**3**,7)

An important element of the UK's strategy to evade landfill is to promote recycling . Recycling of end-of-life plastics stood at 15.7% in the UK in 2006, compared with an average of 19.7% across the EU-25, plus Norway and Switzerland.

The plastic recycling industry is growing strongly in the UK. This expansion of plastic recycling is not only mandated by European waste management legislation, but also sparked by rising prices for virgin materials and improved waste collection and sorting technologies.

To move away from exporting plastics packaging waste for treatment overseas, more PET recycling capacities are springing up in the UK. The world's largest bottle recycling facility is currently being built, not at Coca Cola's headquarters in Atlanta, Georgia, but in Hemswell, Lincolnshire (C&I 2007, **18**, 10). It can

In brief

- **Overall recovery of plastics waste in the EU-25, plus Norway and Switzerland, reached 50% in 2006**
- **More than 70% of the UK's plastics waste is landfilled, compared with less than 10% in Switzerland, Denmark, Sweden and Austria**
- **The world's largest bottle recycling facility is being built in Lincolnshire, UK**

deal with PET (drinks) and HDPE (milk) bottles and is expected to come on stream commercially later this year. It will be capable of handling up to 100,000t of mixed plastic bottles annually.

PET bottle collection grew to see 40% of all PET bottles in Europe collected for recycling in 2006. The recovered PET (rPET) is partly made into polyester fibres for the textile industry; for example, it takes 25 two litre PET bottles to make one 'fleece' garment. Another option is polyester sheets, but as recycling grows, these markets become saturated. This makes it increasingly interesting to close the loop and turn PET into drinks bottles again.

A number of approaches have been developed for producing food grade rPET. In a multi-layer system, for instance, recycled material is covered with or sandwiched between virgin materials. But the use of rPET for direct food contacts is expanding, not least because drinks producers such as Coca Cola are facing pressure from consumers to use recycled materials.

Mechanically, food-grade rPET can be produced through a super-cleaning process, for example, involving a hot wash using caustic soda and low foaming detergents. Typically, a decontamination process follows either before or after extrusion, involving heating for at least four hours at 200°C under a vacuum or in an inert atmosphere such as nitrogen.

Mechanical recycling accounted for the bulk of all plastics recycling in Europe in 2006, as 19.1% of all waste plastics went through this process, up 1.7% on 2005. The UK performed slightly below the European average, with 15.7% mechanical recycling, according to the Plastics Europe report.

In addition, the recycling of PVC window frames and other profiles is increasing exponentially and grew by 84% on 2005 levels in 2006. Collection schemes for windows and window related profiles exist in many European countries, including the UK. The PVC granules from windows frames and profiles are reused for producing new PVC construction products.

Feedstock recycling, which involves decomposing the polymers into their constituent components, is an interesting niche application. It has the advantage that it is more flexible over the composition of the feed material and more tolerant to impurities than mechanical recycling, although it is capital-intensive and requires large quantities of plastics to be economically viable.

'Recovered PET is partly made into polyester fibers for the textile industry'

One way to achieve this is a process of gasification. The long polymer chains are broken down into small molecules, for example, into synthesis gas. Syngas, consisting of carbon monoxide, carbon dioxide and hydrogen, can then be used as a basis for methanol, oxo-alcohols, ammonia and methyl formiate. These in turn serve to produce a wide range of organic chemicals - including plastics. Before repolymerisation, the matter needs to be decolourised and the contaminant removed.

Chemical recycling of plastics is also possible through pyrolysis, that is, heating the waste pellets in the absence, or near absence, of oxygen. This technology can produce a naphtha feedstock for petrochemical processing. Treating the pyrolysis gases in a catalytic converter and condenser system yields a hydrocarbon distillate comprising straight and branched chain aliphatics,cyclic aliphatic and aromatic hydrocar-

bons. Through careful condensation and fractionation, these gases can be turned into petroleum distillate. A de-sulphur unit make the process complete and turns the plastics waste into diesel.

End-of-life plastics can also be used as a reducing agent in the blast furnaces of steel and non-ferrous mills. Pellets made from mixed waste plastics partially replace coke in the production of pig iron from iron ore. The heat in the furnace breaks the plastics down into synthesis gas, which then reduces the iron to pig iron. This method has been practised on a large scale in Germany for many years.

Although promising, feedstock recycling is not very widespread. Only five countries in Europe have the capacity for feedstock recycling: Germany, Norway, Sweden, Austria and Poland. In 2006, it accounted for only 0.6% of all plastics waste treatment in the EU-25, plus Norway and Switzerland, down 1% from 2005. This is mainly due to reduced conversion in a gasification plant in Germany, but also due to the challenging economics of such technologies.

But increasing recycling is only one way of reducing landfill. Integrated waste management requires a rational and all-encompassing analysis of the environmental impact related to the different possibilities for treating waste. In 2001, a study conducted by the Netherlands - based research organisation, TNO, for PlasticsEurope forecast that mechanical recycling would be optimal at 15-20% of the plastics packaging waste volume. More recycling, the study concluded, would not reduce the environmental impact, but would increase costs by a factor of three.

'Increasing recycling is only one way of reducing landfill. Integrated waste management requires a rational and all-encompassing analysis of the environmental costs and benefits involved in the different possible waste treatments'

This is because the collection, shipment, cleaning and sorting of plastics packaging waste, which is often mixed and contaminated by dirt, generates an environmental impact itself and this can outweigh the benefits of recycling beyond a certain volume. Additionally, the required quality of the recyclate needed for a specific application may not be met, which might mean that the material cannot be put back on the market.

Today, most countries achieve around 20-30% in plastics recycling, even in the most environmentally conscious countries in Europe. This increase, compared with the TNO forecast, is a result of innovation in cleaning and sorting technology that has improved the environmental impact of recycling.

If it is difficult to get beyond 20-30% recycling, what is the most eco-efficient way to deal with the remainder? Plastics can be describe as solid oil, so landfilling them would amount to putting oil into the ground. The high energy content in plastic is too valuable to throw away and well worth recovering (see page 5).

Energy recovery from waste is relatively undeveloped in the UK, where it accounted for just 7% of plastics waste treatment in 2006, compared with 30.3% in the EU-25 (plus Norway and Switzerland), and more than 65% in countries such as Austria, Denmark, Sweden and Switzerland.

An additional efficient recovery route involves the use of solid recovered fuel (SRF). When all eco-efficiently recyclable items are removed, SRF can be prepared from the organic fraction of , for example, household waste. This mixture of wood, paper and plastics can be separated and converted into a substitute fuel. It can be used for co-combustion in cement kilns, paper mills and power plants, where it replaces coal or other solid fuels.

A combination of these different techniques is needed for eco-efficient waste management. Diverting waste from landfill is also a boon to the climate, because it reduces emission of methane, a greenhouse gas 23 times more powerful than CO_2.

References:

The compelling facts about plastics 2006, PlasticsEurope, Brussels, January 2008.

Source:
Chemistry & Industry - 24 March 2008

Plastics & polymers

Plastic power

Producing energy from plastics could be a crucial weapon in the EU's quest To reduce levels of waste going to landfill, writes ***Sean Milmo***

In brief:

- ***Due to be introduced later this year, the Eu's waste framework directive aims to reduce the amount of waste going to landfill***
- ***In 2006, nearly 20% of plastics was recycled, and 30% was recovered as energy***
- ***More energy recovered from plastics could potentially further reduce amounts being landfilled***

New EU legislation, in the form of the waste framework directive (WTD), is aiming to tighten up rules on waste management, to ensure that there is more prevention of waste. A major different that has emerged between the plastics industry and politicians is that the MEPs want to give absolute priority to recycling. The plastics sector, on the other hand, is looking for a balance between recycling and energy recovery. This would mean that as much as possible of the waste, that cannot be mechanically recycled, is turned in to energy or even into polymer feedstocks.

The legislation is due to be finally approved later this year by the Council of Ministers, representing the governments of the EU's 27 member states, and the European Parliament. The council has already reached agreement on a common position on the content of the directive. Parliament is scheduled to vote on the legislation in a second reading by the end of June.

The directive aims to clarify and define what is waste, recycling, recovery and disposal. It attempts to makes a clear distinction between recovery and disposal. As a result, the use of landfill, which is regarded as excluding any attempt at recovery, will become a last resort.

'The objective of the directive is to create the highest value out of waste, but how that highest value will be achieved can be a difficult question to resolve,' says Harald Kaeb, managing director of the European Bioplastics Association , Berlin.

The plastics industry reckons that high levels of recovery of waste can be reached by exploiting the energy content of plastics. In 2006, nearly 20% of plastics was recycled into other products or materials, while 30% or 7.4mt was recovered as energy, according to PlasticsEurope, the industry body representing polymer producers. This 30% of plastics is theoretically capable of generating nine gigawatts of energy, PlasticsEurope says. This is the equivalent of nine large power stations working at 100% efficiency with cogenerated power and steam.

Energy recovery is seen by the plastics industry as well as by much of the waste management sector, as crucial to finding environmentally positive ways of dealing with unrecycled mixed municipal solid waste. Currently, less than 40% of EU municipal waste is recycled, while nearly half is landfilled and less than a fifth is recovered for energy through incineration.

'Plastics have a high calorific value close to that of gasoline or diesel and much higher than coal or wood,' explains Jan-Erik Johansson, PlasticsEurope's regional director for North Europe. 'Plastics, accounting for 10% by weight of a mixed waste stream, can make up 30% of its calorific value.'

If amounts of waste going into landfill are to be drastically reduced – which is one aim of the directive – energy recovery appears to be the obvious major alternative. In the longer term, the plastics industry would like the use of gasification and/or pyrolysis processes so that mixed waste with a plastics content can be turned into chemical feedstocks for manufacturing polymers and other products, or into electricity or fuels. Gasification transforms the waste into syngas, comprising carbon monoxide and hydrogen, from which methanol can be made as a base feed-stock.

'Gasification will offer another route besides incineration, in energy recovery,' says Aafko Schanssema, a consumer and environmental affairs specialist at PlasticsEurope. "This form of waste management will fit into the new infrastructure of biorefineries and other facilities which will be established in Europe to provide new low-carbon sources of

energy and raw materials from biomass and other waste.'

In its common position on the waste framework directive, the council backed the use of gasification and pyrolysis. It decided, however, that incineration would only be categorised as an approved energy recovery method if the incinerator is used for both the generation of electricity and heat with an energy efficiency of at least 60%.

"This efficiency standard is not linked to the energy content of the waste or the amount of plastic in it,' says Schanssema. "The determining factor is the combination of heat and power. This suits countries like Denmark, where there are a lot of district heating systems linked to incinerators producing both steam and power. But it is not much benefit in countries like Italy, which does not have an infrastructure for heat and power facilities.'

Some MEPs want even stricter controls on the use of incineration, in the belief that as much recycling as possible should be encouraged. In particular, they wish to deter companies from avoiding recycling by resorting directly to energy recovery. 'There are some MEP colleagues who are opposed fundamentally to the idea of energy from waste plants and who will never vote for them in any shape or form,' says Caroline Jackson, a UK Conservative MEP and rapporteur on the directive for the Parliament's environment committee.

In addition to the greater emphasis on recycling, MEPs want the legislation to include targets so that EU countries are pressure to raise levels of waste preservation, re-use of products or components and of recycling. In its common position, the council ignored targets, even though Parliament had given high priority to their adoption in its first reading. 'It would be wrong to miss the opportunity to ensure that this directive does more than supply a set of definitions,' says Jackson.

She is proposing that by 2012, member states should stabilise their output of waste at 2009 levels even though municipal waste has been growing by an average of 2% per year since the mid-1990s. By 2020 the amount of household waste re-used or recycled in the EU should also be increased to a minimum of 50%.

'Gasification transforms the waste into syngas, comprising carbon monoxide and hydrogen, from which methanol can be made as a base feedstock'

MEPs want close adherence to a five stage waste management hierarchy set out in the directive. This starts with prevention of waste, then re-use, followed by recycling, after which comes recovery, and finally disposal, such as landfill.

The council agreed that departure from the hierarchy may be 'necessary for specific waste streams when justified for reasons of, *inter alia*, technical feasibility, economic viability and environmental protection.'

This variable approach would appear to allow bioplastics waste, which, because of its low quantities, is being excluded from mechanical recycling processes or even, in some cases, composting operations, to bypass the hierarchy. 'Until we have higher volumes of bioplastics in the market place, the best option is for bioplastics waste to go straight to the energy recovery stage', says Kaeb.

In response to the desire of some MEPs for a mandatory hierarchy, Jackson is proposing that only after 'consultation and involvement of citizens and stakeholders' can divergence from the five-stage system take place. 'The directive must make clear that departures from the hierarchy cannot take place casually and must be done as part of an ordered process.'

However, plasticsEurope claims that such a "bureaucratic' approach will hamper the development of new processes such as gasification, in which there will be a need to switch between energy and feedstock recovery. 'There are a lot innovations taking place with technologies which can make waste management of plastics more efficient,' says Schanssema. 'The legislation should be phrased in such a way as to allow the development of the innovations of the future.'

Jackson's task is to find a compromise between what Parliament and the council wants. In return for the support of the council for its recycling target, Parliament may soften its stance on the plastics industry more of the flexibility it desires.

Sean Milmo is a freelance writer based in Essex, UK

Source:
With the permission of Neil Eisberg, Editor, Chemistry & Industry

Less plastic going to landfill

by Marina Murphy

Recovery of plastics has finally reached the 50% mark across Europe: the point where we are recycling as much plastics as we are putting into landfills. PlasticsEurope's report *The compelling facts about plastics* reveals that in 2006, half of all post-consumer plastics ending up as waste were being used again either through straight-for-ward recycling or energy recovery. Recycling rates increased to 19.7% and energy recovery rates to 30.3%. At the same time, demand for plastics increased 4% to a total of 49.5m tonnes across Europe (EU25 + Norway and Sweden).

'Improved collection and sorting techniques managed under better national schemes lead me to forecast that in 2007, growth rates for recycling and energy recovery will be similar to 2006,' says Jan-Erik Johansson of PlasticsEurope.

Seven countries, including Switzerland, Denmark, Germany, Austria, the Netherlands, Sweden and Belgium, now recycle more than 80% of their plastic waste, the ultimate goal being to divert all plastics from landfill. But half of Europe recovers less than 30% of their waste. And countries like the UK, Ireland and Greece are at the bottom end of the scale, recovering only about 20%.

The recycling rate is determined mainly by how efficiently bottles and films are collected and separated. Countries can fairly quickly improve their recycling rate by organising their collection and separation schemes, according to Johansson, but moving beyond that is difficult, he says.

Europe now produces about 25% of the total estimated worldwide plastics production of 245m tonnes. The overall turnover for the industry is more than €280bn.

Banning the bag

Australia has joined the green brigade. It plans to phase out plastic bags in supermarkets by the end of the year. This follows a recent announcement by China that it would ban the bag (C&I 2008,2,8).Several cities in the US are also in the process of enacting legislation to restrict plastic bag use, either through a charge for bags or outright bans. A number of US cities, including New York and Los Angeles, initially considered mandatory bans but finally opted in favour of voluntary measures or greater recycling.

Source: Chemistry & Industry 2008, 2, 8.

Global News

News in brief

China energy

Energy and chemicals major BP and the China Academy of Sciences are to undertake a feasibility study into a Clean Energy Commercialisation Centre, following the signing of a memorandum of understanding in August 2007. The centre would integrate individual technology projects from the academy's institute and other organisations, both outside and within China, into competitive integrated feedstock manufacturing and product distribution systems and solutions like polygeneration complexes. Technologies studies will include coal gasification, coal-to-liquds, coal-to-chemicals, carbon capture and storage, coal bed methane and underground gasification.

Fuel cells

The energy materials research group specialising in alkaline polymer fuel cells at the University of Surrey, UK, has received £292 000 funding from the UK Engineering and Physical Sciences Research Council (EPSRC), to develop low temperature fuel cells for mobile phones and laptops. Using hydroxide ion conducting alkaline polymers, rather than acidic polymers, facilitates the use of metals other than platinum as catalysts, reducing the cost.

Resource Optimization Through Recycling

Human consumption has far outstripped available resources causing a serious challenge to our future generations. Recycling as a process has been given a top priority in the world body, UNO.

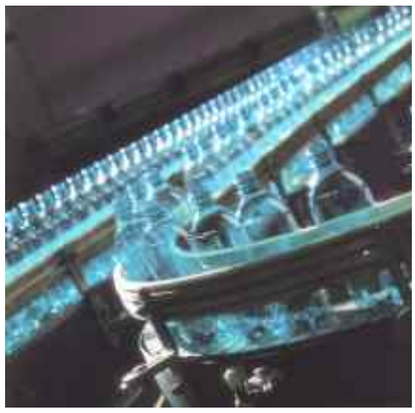
The selection of methodologies and processes for the management of plastics waste available from pre-consumer sources and end-of-life products may be approached using various strategies, all of which should include a preliminary analysis of the available recovery options.

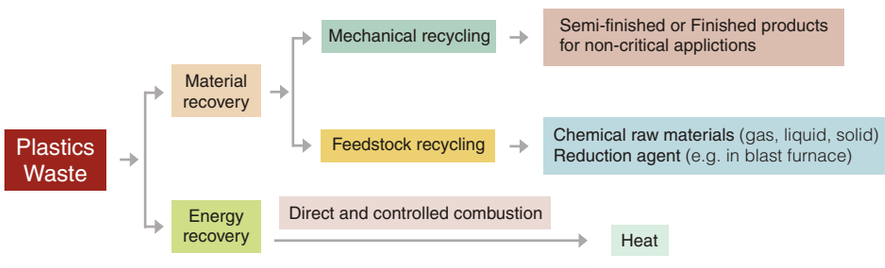
While determining the methodologies of the recovery system, it is required to make a distinction between different recovery options as below:

- Mechanical Recycling to the same or similar application
- Mechanical Recycling to new areas of applications
- Feedstock Recycling to form different products
  - Conversion to monomer
  - Fuel
  - Reducing Agent in Blast furnace for production of iron
- Energy Recovery and Incineration
  - Cement Kilns to substitute fossil fuel
  - Incineration for power generation

Prof. Alka Zadgaonkar, Head of the Department of Applied Chemistry, Raisoni College of Engineering, Nagpur and the Inventor of the Catalyst System to convert all types of Plastic Wastes into Industrial Fuel is seen in her laboratory with Dr. Umesh Zadgaonkar, her husband and facilitator for commercialising the technology.

As the recovery option depends on many prevailing circumstances, life cycle analysis may be applied to decide, depending on the type and composition of the plastic wastes, which options are environmentally more favourable and sustainable.





Conversion to Monomer:

PET and some other plastics waste are already converted to its monomer for reusing as the base material for polymerization. At least 30 - 40% of PET waste has been re-polymerized to fresh raw material.

This needs State support to augment the collection cost from all over the country.

Fuel from plastics waste:

Waste generated out of mixed plastics, co-mingled plastics and plastics material made out of a combination of different plastic materials, are generally difficult for normal recycling and are mostly abandoned in the waste stream as it is and hence creates a waste management problem.

Success has already been achieved in converting such plastics waste into industrial fuel in an environmental friendly technology in the country (Prof. (Mrs.) Alka Zadgaonkar, Nagpur and TVS-NTI, Chennai). Technologies are available from developed / other countries also. This

option has the benefit of using a mixture of different types of plastics waste, mixed together, without segregation. Elaborate cleaning / washing is also not required. Industrial fuel made out of the plastics waste is a substitute of fossil fuel. Though commercial production has already started in the country on a small scale, State support and encouragement is required for popularizing this technology among entrepreneurs for its large scale commercial utilization.

Reducing Agent in Blast furnaces for the production of iron

Successful examples are available for the use of waste plastics as a reducing agent in blast furnaces for the manufacture of iron from its ore. Use of coke in blast furnace provides only one type of reducing agent - Carbon Monoxide. In contrast, use of plastics waste provides one additional type of reducing agent - Hydrogen. The process also reduces the generation of 'ash' . A steel manufacturing facility having production capacity of 3 million tones per annum can consume 600, 000 MTs of plastics waste.

Though the technology is already in use in some developed countries, it is yet to be developed and used in our country. Government support is required for developing such technology indigenously.

Energy Recovery: Cement Kilns to substitute fossil fuel

One of the most effective methods of recycling of plastics waste for recovery of energy is its use as an alternative fuel in cement kilns. The list below gives a comparison of the calorific values of different plastic materials as compared to coal.

Polyethylene	:	46 MJ/kg
Polypropylene	:	44 MJ/kg
Polyamide(Nylons)	:	32 MJ/kg
PET	:	22 MJ/kg
Cellulose Acetate	:	16 MJ/kg
Coal	:	29 MJ/kG

The high temperature used in cement kilns gives a scope for the use of even some types of plastics waste contaminated with toxic chemicals like pesticides and some other hazardous materials. No segregation or cleaning is required for such type of disposals. Low-end plastics waste, which creates a waste management problem, may provide the vital energy to the cement industry. There are about 170 cement kilns in the country, in different zones. Even at the rate of 10 MTD of plastics waste per cement kiln, the total requirement of plastics waste for co-processing could be more than 0.5 million tons, a quantity which is more than the abandoned plastics waste in the MSW stream.

ICPE has already taken initiatives, along with industry leaders, in discussion with CPCB to develop a code of practice. Full State support is needed to formalize this mode of plastics waste recycling.

Use of plastics waste in the construction of asphalt roads

Use of plastics waste in the construction of asphalt roads has been demonstrated by at least two to three technologies in the country in the past 3 - 4 years. There is scope of using some types of low-end plastics waste without elaborate cleaning, for improving the property of tar roads by replacing bitumen to an extent of about 8 - 12%. There is a scope of reduction of cost also. Government support is required for formalizing this technology for adoption all over the country.

After the selection of various types of plastics waste for mechanical recycling or for recovery of energy, there may still remain some types of

ACC Plant at Kymore, Madhya Pradesh, India where a joint project has been initiated by ICPE and ACC for co-processing of Plastic Wastes in Cement Kiln.

MCGM is constructing an Asphalt Road with about 15% Plastic Wastes near Dadar Station in Mumbai (Prof. V. S. Agashe Road) with technical assistance from ICPE.

plastics wastes, which are heavily contaminated with different toxic chemicals or hazardous products. The best way of re-utilizing these wastes is to incinerate them, instead of dumping them diffusely on landfills. This recovers their calorific values. The choice of incinerators is very important. Modern incineration technology has answers to tackle any incineration problem without polluting the environment and in many cases,

Dry waste in a housing colony

recovering the calorific value out of the waste being incinerated.

Segregation of plastics waste at source:

Whichever form of recycling is chosen, the whole process can succeed only if an efficient solid waste collection mechanism is put in place at the first instant. The Government has already come out with The Waste Management (Handling) Rules, 2000 for this purpose. All-out efforts are required to be put to implement the Government rules on waste management.

There is a need for Government intervention / support to encourage recycling. This includes:

- Providing basic infrastructure like land, power and water at subsidized rates in identified areas, which may be called recycling parks, in each big city. Bigger cities may have more than one such park.
- Common Effluent Treatment Plants in such parks
- Tax benefits to recycling units
- Duty Relief for high technology recycling plants
- Mandate for the use of recycled products for specific non-critical application in Government Departments, Educational Institutes and in different commercial applications.
- Subsidy for the manufacture/purchase of specific recycled plastics products, viz. school benches, railway platform benches, etc.

A sincere and scientific approach to Plastics Waste Management and Recycling by all the stakeholders, namely industry, consumers and the Government, can achieve the goal of sustainable growth without damaging the environment.

Biodegradable Plastics and Bio-Polymers

The option of biodegradable plastics is required to be selected in such areas of applications where recycling is either not possible or not practicable. There are some applications where the waste generated after its use remains in the waste stream without being recycled, creating a serious waste management problem. These applications include - mulching films, nursery bags, plastic cutleries used in ships, trains etc. and which finds its way in to the sea water or the side of the rail tracks, respectively.

As the use of biodegradable plastics reduces the option for recycling, there is a pressure on the resource management.

Biodegradable plastics may be encouraged specifically for one-time, throwaway use of plastics and in some specific applications as mentioned above. Care should be taken to regulate the use of specific types of biodegradable plastics as stipulated by national and international standards.

As biodegradable plastics are still in the nascent stage, the subject may be discussed more elaborately before drawing up any national policy on this.

Bio-polymers are the specialized product required for various medical and critical applications. The usage is governed by specific requirement and regulations. The volume of bio-polymers is too low for the formulation of a national policy on the subject at this stage.

National Conference on Environmental Engineering Management and Silver Jubilee Celebration of the Tatyasaheb Kore Institute of Engineering and Technology, Kolhapur - 15th February, 2008

Mr. Sujit Banerji (second from left) the chief guest of the seminar is seen with Dr. C. R. Rao (extreme left), Principal TKIET and other dignitaries.

Mr. Sujit Banerji delivering the keynote address.

One of the most prestigious Engineering Institutes in the country had organised a Conference where distinguished experts in the field of Environmental Management took part. Mr. Sujit Banerji, President, Polymers Business, Reliance Industries Ltd. and Executive Secretary/Member-Executive Committee, ICPE, delivered the keynote address on the environmental benefits of plastics as a whole.

Mr. T. K. Bandopadhyay, Technical Manager, ICPE, participated in the planery session of the Seminar and deliberated on various Environmental Issues of Plastics and their Solutions.

A section of the audience.

ICPE GC & EC Meeting on 13th February, 2008

The Members of Governing Council and the Executive Committee of ICPE meet regularly for taking Policy Decisions on various activities to be undertaken by the Centre and for reviewing the status of the same. Seen in the picture are: Mr. K. G. Ramanathan, President Governing Council, and Mr. J. B. Kamat, Member, (representing CPMA). Others in the picture are: Mr. Arvind Mehta, Mr. Vijay Merchant, Mr. Rajiv Tolat, Mr. S. K. Sharma and Mr. J. V. Raval (Members representing Plastindia Foundation), Dr. T. K. Chakravarthy (DCPC), Mr. Rajiv Dhar (IIP), Mr. Prabuddha Dasgupta (HUL), Mr. P. K. Sahoo (CIPET) and Mr. P. V. Narayanan (Advisor, ICPE).

PLASTEC 2008 Exhibition and Seminar, Chennai

Mr. Soloman Pappaiah, famous speaker in Chennai is conducting a debate on "Are Plastics - Boon or Bane to the Environment?"

Dr. U. K. Saroop of Reliance Industries is addressing the gathering.

Chennai Plastics Manufacturers and Merchants Association organised a 4-day exhibition, PLASTEC 2008, from 21st - 24th February, 2008. ICPE participated in the exhibition, displaying the awareness material and providing information on various techniques of Plastics Recycling. The visiting public took keen interest in the information provided in the ICPE stall through display of panels and samples of recycled plastic products.

During the technical seminar, Mr. T. K. Bandopadhyay made a presentation on Environmental Issues of Plastics and Scientific Solutions. Mr. Bandopadhyay also chaired the concluding session, at the end of the Seminar, for compiling the proceedings for recommendation to the local government on various issues relating to Plastics.

ICPE Pavilion.

Unprecedented response to Plastindia 2009: 87% booked!

Online registration for PLASTINDIA 2009 has been successful. As of May 2008, PLASTINDIA 2009 is 87% booked.

The unprecedented response has been a very pleasant surprise to all associated with the mega event. Online registration, introduced for the first time, received a resounding feedback, as the first phase bookings have resulted in a near sellout situation.

The feeling is overwhelming and throws up greater responsibility on the Plastindia Foundation.

A bpreview on the bookings indicates that big players of the industry have grown bigger and are participating in a very big way.

Plastindia Foundation is making every effort to get more space from ITPO to meet the pressing demands of late bookings. As part of Plastindia Foundation's mission, the exhibition aims to promote and provide a suitable platform for SMEs in the Indian Plastics Industry, to showcase their competence and utilize the event to further their business potential. The experience of this international stage is all for their benefits.

It is hence imperative that SMEs of the Industry do not miss this great opportunity and immediately book their space at PI 2009. For on-line bookings, log on to plastindia.org at the earliest!

Pune Expo-2008
Industrial Exhibition and Seminar, Pune

Mr. Rajiv Tolat, Treasurer and Member Executive Committee is addressing the gathering.

Mr. T. K. Bandopadhyay, Sr. Technical Manager, ICPE is making a presentation in the technical seminar.

ICPE participated in the Pune Expo-2008 Industrial Exhibition and Seminar, Pune, held from 28th February-3 March, 2008. The event was jointly organised by the Mahratta Chamber of Commerce, Industries and Agriculture (MCCIA) and the Maharashtra Plastics Manufacturers' Association (MPMA).

All the top industries in Pune, including Kirloskar, Garware, Tata, Bajaj etc. participated in the exhibition.

The ICPE stall displayed, through panels and samples, the positive contribution of Plastics in daily life and the various Recycling methods of plastic to manufacture critical products of daily use.

During the technical seminar organised on 29th February, 2008. Mr. T. K. Bandopadhyay, Technical Manager, ICPE made a presentation on "Plastics - Benefits, Environmental Issues and Scientific Solutions". Mr. Rajiv Tolat, Treasurer / Member-Executive Committee, ICPE, appraised the gathering on ICPE role in the handling of environmental issues with respect to plastics.

Mr. Yamaji Malkar - Editor, Sakaal (Pune's largest circulated Marathi newspaper), who was the chief guest in the seminar, appreciated ICPE's initiatives and efforts for creating mass awareness for better Waste Management.

Appreciation

Mahabaleshwar Giristhan Nagar Parishad,
Mahabaleshwar.

ICPE along with Maharashtra Plastic Manufacturers' Association (MPMA), has been engaged in the Plastics Waste Management Activities in Mahabaleshwar area with the co-operation of local civic authorities.

The continuous effort of ICPE and MPMA brought result in the Plastics Waste Management in Mahabaleshwar area and the local authority had acknowledged the services of ICPE and MPMA in this regard.

"Opportunities in Indian Plastic Industry"

President, Plastindia Foundation, Mr. Arvind Mehta, spoke on "Opportunities in Indian Plastic Industry" during the International Petrochem Conference 2008, *organized jointly by the* ***CII*** *and the* ***Ministry of Chemicals & Fertilizers,*** *Government of India, of* ***held on 04th-05th March, 2008, At Hotel Intercontinental the Grand, Mumbai.***

Hon. Union Minister, Chemicals & Fertilisers, Mr. Ram Vilas Paswan is addressing the conference. Next to him is Mr. K. G. Ramanathan - President CPMA (and President - GC, ICPE).

Mr. Arvind Mehta, President - Plastindia Foundation is making the presentation.

Shri Ram Vilas Paswan, Minister of Chemicals and Fertilizers, was the Chief Guest at the **International Petrochem Conference-2008,** which was organized jointly by the **CII** and the **Ministry Chemicals & Fertilizers,** Government of India.

Congratulating CII for the theme chosen of the conference, **"Opportunities in Indian Petrochemical Industry"**, Mr. Arvind Mehta, President, Plastinda Foundation, thanked the conference cell committee members for giving consent for Plastindia Foundation's presentation on **"Opportunities in Indian Plastic Industry".**

Beginning on an enthusiastic note about the Indian Economy, Mr. Arvind Mehta said, "INDIA- one of the fastest growing economies of the world, is all set to attain a the premier status along with China and is a much preferred destination for overseas investors". India offers the advantages of an open economy, increasing liberalization, a stable democratic political scenario and a highly skilled work force".

"Since 1992, India has changed its economic approach from a **controlled to market driven** economy. Global integration has brought in a lot of news aspects like pragmatism, consumerism, technology-driven approach, joint ventures and foreign direct investment. This has benefitted the industrial development in the country phenomenally," he said.

Lauding the continued support from the Government, he said, "Setting of Special Economic Zones, Industry friendly policies, economic reforms, tax incentives etc. have encouraged International participation in the economic growth in India".

Previewing The Indian Plastic Industry, which has showing tremendous growth in the recent past, he said "India had taken 30 years to consume its first 500 KT of polymers, but only five years to double that figure. The total consumption of polymers for plastic applications in India in the current financial year is expected to exceed 6.5 million tons. India is projected to be the **3rd largest consumer of plastics in the world by 2010",** he emphasized.

"The Indian Plastics Industry is providing huge opportunities, in terms of raw materials and processed goods, as also in the machinery sector and for exports of finished goods," he stated.

"The Indian Polymer Industry continues to show a growth rate **of around 15% p.a.**, which is twice the GDP growth and compares very favourably with the 3% to 4% global growth. The Indian Plastic Industry

employs nearly **3.6 million** people and this workforce is expected to be around **7 million people by the next 3 years**" he said. "The Indian Plastic Industry is the 5th largest contributor to the country's exchequer, contributing about Rs. 7200 crores**,**" he added**,** speaking on the contribution of the Indian Plastics Industry.

Reflecting on exports by the Plastics Industry, he said, "Exports are growing at around 21% p.a. and the value of plastic goods exported stands at approximately USD 3.1 billion, with all indications of increase in the near future".

Speaking on the growth potential of the Plastics Industry in India, he said "The per capita consumption of plastics is around 5 kgs today as compared to the world average of 20 kgs. This is all set to double to a figure around 10 kgs by 2012. This potential will enable the industry unveil young Indian talents, encouraging competitiveness, innovation and ensure global integration".

Mr. Arvind Mehta also dwelt on the various applications that are coming to fore with the use of Plastics. "The Indian Plastic Industry has been witnessing remarkable growth due to the widening of its application spectrum and penetration of new generation polymers in all key Industry segments. The key growth sectors of the Indian Polymer industry are packaging, electronics, healthcare, telecommunication, energy savings, conservation of resources, agriculture, consumer goods, automobiles/transportation, building & construction, pharmaceuticals etc," he said.

"With the R&D base for 100 of the Fortune 500 companies being set up in India, major auto MNC's like Volvo, Ford, Chrysler etc., are sourcing high quality components and hardware from India. Hyundai Motors is a global set-up for manufacturing small cars. Hero Honda is the world's largest manufacturer of motor-bikes" he said speaking on the prospective growth in the auto sector.

"Plastics conserves resources and materials and the use of plastics foam insulation alone in homes and buildings each year will ultimately save nearly 60 million barrels of oil over other kinds of insulation" he said on the use of plastics in Housing Sector. "Plastics profile with insulation save energy and it is possible to heat homes with 3 litres of fuel instead of 23 litres," he added.

Dwelling on the use of Plastics in the Retail & Packaging Industry Mr. Arvind Mehta mentioned "Avoidable losses due to non-proper packing of various food products can be considerably reduced with proper plastic material. India's diverse demographic profile demands different kinds of packaged products which will account for close to **half the Indian plastic consumption by 2010."** he asserted.

"Some of the healthcare devices would have not been possible without plastics," he said. "Various Polymer parts find application in encapsulation, gene delivery, drug delivery, balloon catheters, feeding bottles, Optical Lenses, Disposable Syringes, UV tubes, lightweight walking aids for the physically challenged, etc." he said, citing some of the uses of Plastics in Healthcare.

Mr. Mehta emphasized the use of **Plastics in Agriculture** perceiving this as a very important sector. "India has adopted some of the newer techniques for agriculture, and Plastics have an important role to play in the Indian Agriculture sector, where the present 2% GDP growth can increase to 4%, " he said.

Speaking on the modern techniques of micro irrigation for maximum consumption of water, Mr. Mehta said, "Around 200 KT of PVC and around 50 KT of HDPE pipes are used every year in water distribution for agricultural usage. It is estimated that 50 KT of PE film alone is being used for canal lining".

"India's Agricultural Ministry has planned focused development of plasticulture to cover 17 million hectares under the micro-irrigation system which will boost the demand of plastics from 216 KT in 2006 to over 2500 KT in the next 5 years," he stated.

"Increased uses of advanced composites and other high performance plastics in almost every application, ranging from civil structures to aerospace structures, increases the need for imparting smartness" he said speaking on Polymer in smart applications.

Stressing on the role played by waste plastics, Mr. Mehta referred to the initiative by the Thaigarajar College of Engineering (TCE). "Replacing bitumen by plastic waste has had considerable savings in the cost of tar road construction, where the quality and strength of the road increases manifold, with less chances for the formation of potholes and more importantly, contributing to the safe disposal of plastics without adverse environmental effects," he affirmed.

During this presentation, Mr. Arvind Mehta also touched upon the subjects like **"Fuel from Plastic Waste"; "Polymeric Nanocomposites"** and **"Biodegradable polymers for Industrial Applications."**

Concluding the presentation, Mr. Arvind Mehta said "For the harvest of tomorrow, the seeds of change have to be sown today. Our present efforts and

China drafts plastics bag standards

An article with reference to plastic bags in China, which has taken the primary step towards implementing the new Plastic Shopping Bag Law by publishing a set of draft standards featuring measurements for acceptable types of plastic bags, labelling, instructions and inspection methods.

The article describes a ban on the production, sale and use of plastic shopping bags under 0.025 mm thick, dubbed 'ultra-thin plastic shopping bags' by the Chinese State Council (Cabinet) on 1st January, 2008 along with restriction for other types of plastic bags. The Chinese Standardization Administration published its first draft of the ban's standards on 4th February, 2008. The draft standards, drawn up following consultation with the China National Light Industry Council and the Standardization Technology Committee of National Plastic Products, comprise three separate documents, each specifying what will be acceptable for plastic bags, labelling requirements and inspection methods.

What is a plastic bag?

The first document contains the definitions, terminology, requirements, test methods, inspection regulations and other elements relating to the packaging, transportation and storage of plastic shopping bags.

The draft document describes clearly the use of plastic bags by retail and other service industries to carry any sort of item that falls within the law.

All plastic shopping bags must be more than 0.025 thick, free of bubbles, and perforations, and must primarily be clear or white in colour. The requirements also included clarity of plastic bags containing food products, less than 20 percent surface area for printing on plastic shopping bags and at least 15 percent starch to be acceptable in starch- based bags.

Physical Properties

This article also gives a brief idea about the physical properties and tests required for plastic shopping bags including the accepted chemical properties.

According to the regulations, 'During the transportation, bags must be covered to prevent machinery hitting the bags and suffering sun and rain effects'.

Instructions are however specified for the storage of plastic shopping bags in clean and dry atmosphere free from contamination as well as an expiry date for bags of not more than a year from the production date.

Identification and labeling

In China, a very detailed set of rules govern the information which must be printed on the plastic shopping bags.

Symbols representing whether the bags are degradable or reusable or otherwise, have to be shown. The bags should include every minute information, right from the precise elements required for the manufacture till the standardization code numbers giving the approved material types of plastic shopping bags. Bags must also be printed with English acronyms in the text (such as PP).

Bags used for medical purposes or for chemicals must not be reused. Bags for food usage must also carry a sign, 'Food for use', indicating that plastic may be used in direct contact with food. At the same time, food-used bags must reflect the resin colour and should not have added colour pigments.

China has also taken care about all plastic bags as a part of the consumer education campaign that all bags must carry the Chinese slogan, 'To protect the environment and conserve resources, please reuse this bag as many times as possible'.

Other safety warnings such as 'Keep away from infants and children, to avoid suffocation' must also be printed.

Court verdict on California rule on plastic bag bans

By Mike Verespej *- April 21, 2008*

OAKLAND, CALIF. (April 21, 2:05 p.m. EDT) - A California court has struck down a ban on plastic carryout bags in Oakland, saying that the city had not conducted an adequate environmental impact on the effect of the ban that went into effect on January 18, but was never enforced.

"The court finds that substantial evidence in the record supports at least a fair argument that single-use paper bags are more damaging than single-use plastics bags,"said Alameda Country Superior Court Judge, Frank Roesch, in a decision handed down on April 17. "Having concluded that, the city must conduct further environmental review" to show that the ban would not cause an adverse environmental impact," said the court.

The decision means that Oakland will not be able to implement its ban unless it challenges the decisions or conducts a further environmental impact review at an estimated cost of $125,000. The city has 10 days to contest the judge's ruling.

The ruling will effectively prevent many smaller California communities from imposing plastic bag bans because of the financial cost of conducting a full environmental review. Nearby Fairfax made its recently planned ban voluntary, after the threat of a similar lawsuit.

The Alameda Country court decision stems from a lawsuit filed on August. 3, by the Coalition to Support Plastic Bag Recycling, which argued that the California Environmental Quality Act requires public entities to document and consider the environmental impact of their decisions.

The coalition members are plastic bag manufacturers Superbag Operating Ltd., Advance Polybag Inc., Grand Packaging Inc. and Hilex Poly Co. LLC; plastic produce bag manufacturers Emerald Packaging Inc., and Crown Poly Inc.; plastic bag distributor Elkay Plastics Co. Inc. and recycler Fresh Pak Corp.

Among other things, the coalition argued that the manufacturing of paper bags generates 50 times more water pollutants than the manufacturing of plastic bags.

San Francisco is the only U.S. city with a ban on plastic carrybags. It went into effect on November 20 at grocery stores and pharmacies with more than $1million in sales.

Forthcoming Events

INDIA PACK 2008
Organised by
IIP, Mumbai
18th - 21st September, 2008
Mumbai

5th International Exhibition & Conference
Organised by
FICCI
20th - 22nd October, 2008
Mumbai

PLASTINDIA 2009
7th International Plastics Exhibition and Conference
February 4 - 9, 2009
Pragati Maidan, New Delhi
For more info:
Website : www.plastindia.org

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7TH INTERNATIONAL PLASTICS EXHIBITION & CONFERENCE

PRAGATI MAIDAN, NEW DELHI

FEBRUARY 4 - 9, 2009

For online booking visit : www.plastindia.org

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