



POLYSTYRENE FAST FACTS:

Polystyrene is made from petroleum, a non-sustainable, non-renewable, heavily polluting and fast-disappearing commodity.

The environmental impacts of polystyrene production in the categories of energy consumption, greenhouse gas effect, and total environmental effect ranks second highest, behind aluminum.¹

Polystyrene is a principle component of urban litter and marine debris. It is detrimental to wildlife that ingests it.

In 2006, some 135 tonnes of polystyrene waste were disposed of at Hong Kong landfills every day.²

Polystyrene is not biodegradable. It takes several decades to hundreds of years for polystyrene to deteriorate in the environment or in a landfill.

Polystyrene takes up more space in landfills than paper, and will eventually re-enter the environment when water or mechanical forces breach landfills.³

Used polystyrene foam food packaging is generally not accepted in plastics recycling bins in Hong Kong.

Used polystyrene foam food containers are not included in the only organized polystyrene recycling programme run by Friends of the Earth in Hong Kong. Grease contamination renders polystyrene non-recyclable.⁴

Food service polystyrene packaging is not recycled because it is not economically viable to store, transport, degrease and wash it before recycling.

Schools in Hong Kong dispose of 30 million polystyrene lunch boxes every year and only an estimated 17% of the total is collected. In 2007, there was only one contracted collector.⁴

Polystyrene contains the toxic substances Styrene and Benzene, suspected carcinogens and neurotoxins that are hazardous to humans.

Polystyrene food containers leach the toxin Styrene when they come into contact with warm food or drink, alcohol, oils and acidic foods causing human contamination and posing a health risk to people.¹

Over 100 US and Canadian, as well as some European and Asian cities, have banned polystyrene food packaging as a result of the negative impacts to humans and the environment.

References:

1. California Integrated Waste Management Board
2. Waste Reduction Group, Hong Kong Environmental Protection Department
3. Cleanup Australia
4. Friends Of the Earth Hong Kong
5. US Occupational and Health Administration



POLYSTYRENE BACKGROUND:

Polystyrene foam, commonly known by the name "Styrofoam" is formed by adding a blowing agent to polystyrene, a petroleum-based plastic material. Polystyrene foam is light-weight (about 95% air), with good insulation properties, and is used in all types of products from cups that keep beverages hot or cold to materials that protect items during shipping.

There are two widely used types of expanded polystyrene: EPS (expanded polystyrene) and XPS (extruded polystyrene). They are made from the same plastic (polystyrene), but the manufacturing processes are different. EPS begins as small plastic "beads" that are expanded and fused together, forming products such as protective packaging for electrical appliances. XPS begins as a continuous mass of molten material, which is then shaped into products such as take-out lunch boxes and trays for fresh cuts of meat at the supermarket.

XPS has little recycling ability since it is often contaminated by food, and grease that render it non-recyclable. On the other hand, in most countries, including Hong Kong, EPS waste that is not contaminated is recyclable despite difficulties involved with storage, transportation, relatively low scrap value, and negative environmental impacts.

Polystyrene is not generally collected at 'curbside' recycling bins in Hong Kong. Friends of the Earth Hong Kong has been running a "Packaging Expanded Polystyrene Recycling Programme" in Hong Kong, however, the programme is not widely publicized. Furthermore, polystyrene foam food packaging is not included in the programme due to contamination which renders it completely non-recyclable.

The Environmental Protection Department reported that in 2006, some 135 tonnes of polystyrene waste were disposed of at Hong Kong landfills every day, of which about 97 tonnes were polystyrene food and drink containers.¹

In the past, polystyrene foam was banned by cities around the world due in part to the ozone-depleting CFC gases used as blowing agents. More recent bans have been enacted because of the litter and marine debris impacts of polystyrene foam food packaging as well as overall impacts on human and environmental health.

As a result of the impacts on marine pollution and adverse effect to marine wildlife, several coastal cities across the United States, including California coastal cities such as San Francisco, Malibu, Oakland, and Huntington Beach have banned the use of polystyrene food packaging altogether.²

References:

1. Waste Reduction Group, Hong Kong Environmental Protection Department
2. Public Works Committee, Oakland City Council, Oakland, California



ENVIRONMENTAL IMPACTS OF POLYSTYRENE:

Polystyrene foam is designed for a useful life of minutes or hours, but it continues to exist in our environment for hundreds or thousands of years. Non-biodegradable food service ware, especially polystyrene foam, constitutes a large portion of litter in Hong Kong, and the cost of managing this litter is high and rising. Like any other disposable product or packaging material, the proliferated use of polystyrene foam food containers will add to the burden on disposal and the landfills.¹ Hong Kong has a serious municipal waste problem. The space of landfills will run out very soon if disposal in landfills is used as the sole measure in waste treatment.

Polystyrene foam presents unique management issues because of its lightweight nature, floatability, and prevalence to be blown from disposal sites even when disposed of properly. The lightweight and buoyant polystyrene travels easily through gutters and storm drains, eventually reaching the ocean. Plastic from urban runoff is the largest source of marine debris worldwide. Pollution of waterways and waterfront negatively affects tourism and quality of life. When polystyrene travels down waterways and storm drains into the ocean, it breaks down into smaller, non-biodegradable pieces that are ingested by marine life and other wildlife thus harming or killing them. In one Californian study, at least 162 marine species including most seabirds were reported to have eaten plastics and other marine litter.²

The process of manufacturing polystyrene pollutes the air and creates large amounts of liquid and solid waste. A 1986 EPA report on solid waste named the polystyrene manufacturing process as the fifth largest creator of hazardous waste in the United States.³ In the product manufacturing process as well as the use and disposal of the products, energy consumption, greenhouse gas effect, and total environmental effect, polystyrene's environmental impacts were second highest, behind aluminum, according to the California Integrated Waste Management Board.

Although polystyrene manufacturers claim that their products are "ozone-friendly" or free of CFCs, this is only partially true. Most polystyrene is now manufactured with HCFC-22, which, though less destructive than its chemical cousins, CFC-11 and CFC-12, is still a greenhouse gas and harmful to the ozone layer.⁴ According to a 1992 study by the US Institute for Energy and Environmental Research, HCFCs are three to five times more destructive to the ozone layer than previously believed.

Polystyrene recycling, if, and when it is carried out properly, is not "closed loop". For example, collected polystyrene protective packaging is not remanufactured into protective packaging, but into other products, such as packing filler and cafeteria trays. This means that more resources will have to be used, and more pollution created, to produce more polystyrene protective packaging.

References:

1. Friends Of the Earth Hong Kong
2. Public Works Committee, Oakland City Council, Oakland, California
3. US Occupational and Health Administration
4. Californians Against Waste



HUMAN HEALTH IMPACTS OF POLYSTYRENE:

There are potential health impacts from polystyrene foam food packaging associated with its production, and with the leaching of some of its chemical components into food and drink. The general public is not typically warned of these public hazards.

Styrene, a component of polystyrene, is a known hazardous substance that medical evidence and the US Food and Drug Administration suggests leaches from polystyrene containers into food and drink. Polystyrene food containers leach Styrene when they come into contact with warm food or drink, alcohol, oils and acidic foods causing human contamination and posing a direct health risk to people.¹ It is for this reason that it is not recommended that plastic take-out containers ever be heated in a microwave.

Styrene is a suspected carcinogen and neurotoxin which potentially threatens human health. It has been detected in the fat tissue of every man, woman and child tested by the EPA in a 1986 study. Styrene has been found in 100 percent of human tissue samples and 100 percent of human nursing milk samples tested.²

Several adverse health effects have been attributed to styrene. Some studies have concluded that at exposure levels above 100 parts per million, humans experience acute mucous membrane irritation with the eyes, nose, and throat particularly affected. Increased levels of styrene concentration may cause fatigue, irritation, and decrease in concentration ability.³ Styrene has been linked to increased levels of chromosomal damage, abnormal pulmonary function and cancer in workers at polystyrene and styrene plants.⁴

Another known toxin, Benzene, is a chemical component of polystyrene foam. It is a known carcinogen and enters the human body either through the skin or the respiratory system.⁵

References:

1. ejnet.org
2. NaturoPack Sustainable Packaging
3. US Foundation for Advancements in Science and Education
4. California Integrated Waste Management Board
5. US Occupational and Health Administration