

## ***The Problem with Plastics (incl. Polystyrene)***

Since its discovery, plastic has taken an increasingly prominent role in modern society. From drink bottles to windshields to even clothing, it has begun to replace various traditional materials. Plastic is durable and long-lasting, qualities which made it seem like the perfect substance for a diversity of uses. But these factors, combined with others that are increasingly being researched, turn out to be some of the major problems of plastic.

### **Sustainability**

Sustainability has become a key phrase in recent environmental discussions. Sustainable resources are ones that can continue to be used and will still be available for future generations. They can include energy resources like wind and sunlight or biological resources like plants. Plastic is made from oil and coal, materials which are both unsustainable and non-renewable. These resources also result in environmental damage when being mined, transported, and used in production processes; plastic production contributes to problems such as oil spills, toxic emissions, and global warming through the release of greenhouse gases.

### **Where does the plastic go?**

After a plastic container is used, it may be thrown away or recycled. Yet even if the latter step was taken for every piece of plastic, and no greater quantity of plastic was needed, nonrenewable resources would still have to be used to produce more. This is because when plastic is being reprocessed, it changes to a lower grade or quality. For example, plastic PET bottles such as the ones Coke uses for cold drinks cannot be recycled into new Coke bottles. The little bit of recycled plastic that may become a new bottle must be supplemented with new plastic. Also, it is feared that contaminants surviving the recycling process would be able to leach into food from the containers. Thus, while plastic is "recyclable", it is not "sustainably recyclable".

If the plastic is not recycled, it may either go to a landfill or be incinerated. Plastics can take up to 10,000 years to biodegrade, making landfilling an poor solution for the massive quantities produced. There are also many problems with the practice of incineration, especially when plastics are burned. Dioxins and furans are two highly toxic chemicals created unintentionally in this process. Technology exists that separates some of these particles during the burning, but this only consolidates the chemicals in the ash, not solving the problem of their presence.

In South Africa, dioxins and furans are regularly released from the burning of plastic, from people burning waste at home to industrial incinerators. The United Nations Stockholm Convention (to which SA is a signatory) calls for the phasing out, and eventual banning, of these cancer-causing chemicals.

Plastic comes in hundreds of different varieties. In South Africa, there are around 60 chemically different kinds of plastic, each with around 20 to 30 different grades. This adds to the difficulty of

collection, sorting, and recycling. It also adds uncertainty regarding the properties and impacts of the plastics.

### **Plastics and Health**

The health effects of plastic have increasingly been questioned. PVC was one of the first plastics to be shown to leach harmful chemicals. Pthalates from PVC actually move from the plastic (be it wrapping, clothing, a child's toy or a medical blood transfusion bag) and contaminate what it is touching. Pthalates have been proven to be hormone disruptive, and lead to many health problems.

Other chemicals such as p-nonylphenol, which is released from polystyrene plastic, and Bisphenol A, which leaches out of polycarbonate plastic when it is heated, may also adversely affect health. P-nonylphenol has been shown to disrupt hormones. The popular plastic PET, used in cooldrink bottles, also has problems - for example, evidence was also found that acetaldehyde migrated out of PET, and into water. Acetaldehyde is implicated in the causing of cancer. Plastics regularly contain the following toxic substances (these are part of a larger list): Benzene (which causes cancer), Styrene (ranked in the US as "extremely toxic"), Sulphur Oxides (which harm the respiratory system), Nitrous Oxides (which adversely effect the nervous system and child behavioral development), and Ethylene Oxides (harms male and female reproductive capacity). PET bottles often contain lead barriers and Plasticizers, which are known Hormone Endocrine Disrupters (ED's). ED's can migrate into the liquid contents of drinks, causing serious health problems including, but not limited to cancer, brain damage reproductive disorders, and infertility.

We are surrounded by polystyrene containers (see picture) – we use them for hamburgers and hot dogs, coffee and mushrooms; however, most of us don't realise that the whole process, of making, using and “disposing” of this stuff, is highly toxic!

*Officials of the National Institute of Health Sciences in Japan reported that polystyrene containers, commonly used in the packaging of instant noodles, hamburgers, take-aways, and fresh foods in supermarkets, have been found to contain toxic substances known to disrupt the reproductive functions of animals and humans. In a series of tests, researchers measured the amount of toxic chemical compounds in styrene cups and bowls, to determine how much would dissolve into an organic solvent, similar to the effect of high fat foods. They found that no less than 43.9 micrograms of styrene trimer dissolved per square centimeter of the material. This is very high.*

### **South Africa**

MacDonalds made a policy decision in the USA in 1990 to eliminate toxic polystyrene food packaging, yet in South Africa , MacDonalds ignored its corporate policy for the sake of profit, and continues to supply all its food and beverages in polystyrene packaging and cups.

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Polystyrene (PS) is an issue for a number of reasons:

- § PS production involves the use of benzene and other suspected human carcinogenic (cancer causing) substances (styrene and 1,3-butadiene).
- § PS leaches styrene and nonylphenol, both of which are known endocrine disrupting chemicals and should therefore not be used for food packaging.
- § PS is not usually recycled because virgin PS is so cheap, and recycling is also very toxic.
- § PS will not biodegrade easily (made from non-renewable fossil fuel – think Iraq War, Ogoni people's struggle, polluted coastlines, South Durban health hazards and Sasol explosions!) but will slowly leach out styrene and nonylphenol

PS releases styrene gas when burnt. Styrene can readily be absorbed through the skin and lungs. At high levels styrene vapour can damage the eyes and mucous membranes. Long term exposure to styrene can affect the central nervous system, causing headaches, fatigue, weakness, and depression. Burning PS will also release dioxins, one of the 'Dirty Dozen' Persistent Organic Pollutants that South Africa is bound to phase out under the Stockholm Convention.

However, the plastics industry often denies the leaching of harmful chemicals from plastic, despite their acknowledgement that one of the problems with plastic recycling is the potential for contaminants leaching.

These are only a few of the possible contaminants present in plastic. One of the most significant problems surrounding the issue is the uncertainty of what chemicals are actually leached and when leaching occurs. What is known is that it happens.

*(This document is built upon the fine work done by Earthlife Africa at the World Summit on Sustainable Development 2002)*

**Plastic  
Is  
Drastic!  
Just say  
NO !**

# What is the Institute for Zero Waste in Africa?

## Our Mission Statement

Working towards a world without waste through public education and practical application of Zero Waste principles.

## Charter Principles

1. Redesign products and methods of production to eliminate waste by mimicking natural processes and developing closed-loops
2. Convert waste to resources for the benefits of local production and the creation of a healthy and sustainable society.
3. Resist incineration and land filling in order to promote innovation in resource conservation and methods of production
4. Collaborate with others with common interests worldwide

## Objectives

1. To advance the education of the public by all appropriate communication means and through supporting the elimination of waste and the associated health impacts.
2. To promote and fund appropriate research for the public benefit, including education
3. To promote the effectiveness of other Zero Waste initiatives
4. To promote the principles of waste avoidance and minimisation, re-use, repair, recycling and composting, through sustainable resource management in accordance with best environmental options.

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