

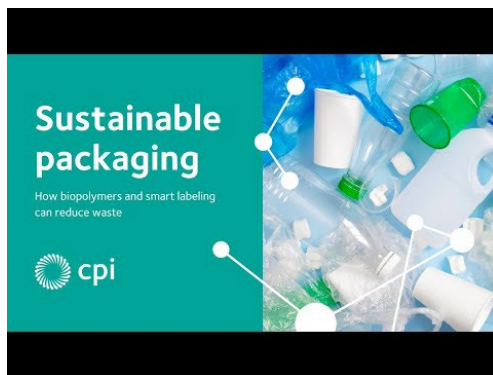
SUSTAINABILITY



Issue 4 / January 2024

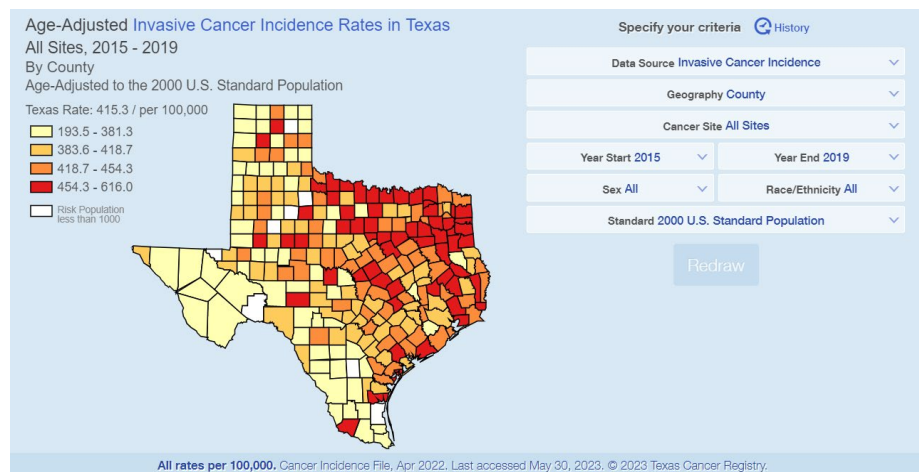
Sustainable Packaging

The era of single-use plastics and excessive packaging waste gradually leads to a new paradigm: sustainable packaging. Businesses can significantly reduce their environmental footprint by using recyclable, biodegradable, or made-from-renewable resources. Traditional packaging materials, such as plastic and Styrofoam, are being replaced by alternatives like recycled paper, cardboard, plant-based plastics, and compostable materials. Access more information by clicking on the video link.



POLLUTION

Pollution is an unwanted and harmful substance. The **toxicity** of the pollution depends upon the dose. Many substances are toxic in specific quantities but have negligible effects below certain concentrations. Nitrogen, for example, is necessary for plant growth, but added in excess amounts as fertilizer can result in nitrate contamination of drinking water and cause dead zones along coastlines. Pollution is often categorized by where it occurs; it can be air, soil, or water. It is further categorized by content. Pollution comprises particulate matter, organic compounds, inorganic salts, and metals. When a pollutant is of particular concern, it is listed by a regulatory agency, such as the United States Environmental Protection Agency (EPA). Research has shown that areas with high cancer rates are directly linked to those regions' industrial pollution levels. The [National Institute for Health](#) (NIH) and the [World Health Organization](#) (WHO) publish interactive maps correlating cancer data to different geographies. TASI's 2024 commitment to becoming ISO 14001 certified will help systematically identify, manage, and continually improve our environmental performance, including waste management. However, as the expert in your process, it is vital to communicate your ideas about enhancing the procedure and minimizing waste.



WASTE

Every day, the average person in the US throws away 4.6 pounds of solid waste, and for every pound of household waste we discard, 40-70 additional pounds of industrial debris were generated during its production. One of Barry Commoner's four laws of ecology aptly states, "Everything must go somewhere. There is no 'waste' in nature, and there is no 'away' to which things can be thrown" (Commoner 1971). Every piece of material in a garbage bag carries large quantities of embedded energy and invisible material resources that were part of its life history. Behind every object is the mining of resources or cutting of trees, the transport of ingredients and components by fossil fuel-burning vehicles, production in factories, more production for packaging, and transport again as the product is distributed. TASI's existing product take-back programs empower our companies to circumvent the re-manufacturing of a device, especially when it may only require a new calibration or replacement parts to be sent back to our customers.

The idea of waste is a human construct. In other parts of the biosphere, matter moves in continuous cycles, and waste from one organism is food for another. Still, in the industrial model of the world, the movement is linear. Materials and resources become waste when we can no longer find ways to use them. Waste management is collecting, transporting, treating, and disposing solid and liquid waste. Today, the world's most significant proportion of waste management still uses the least favorable actions (treatment and landfilling) because their cost is lower.

While TASI currently lacks a specific waste reduction target, our commitment to minimizing waste remains unwavering. We will persist in implementing and extending best practices throughout all our operations. For example, Pulsar Essex (and others) have already exemplified leadership and dedication to sustainable business practices by reusing incoming packaging materials, responsibly disposing of electronic waste, eliminating paper product inserts, composting organic waste, and offering recycling options in break rooms. Scaling up these programs across our entire portfolio will correlate with TASI's ascent within the waste management hierarchy.



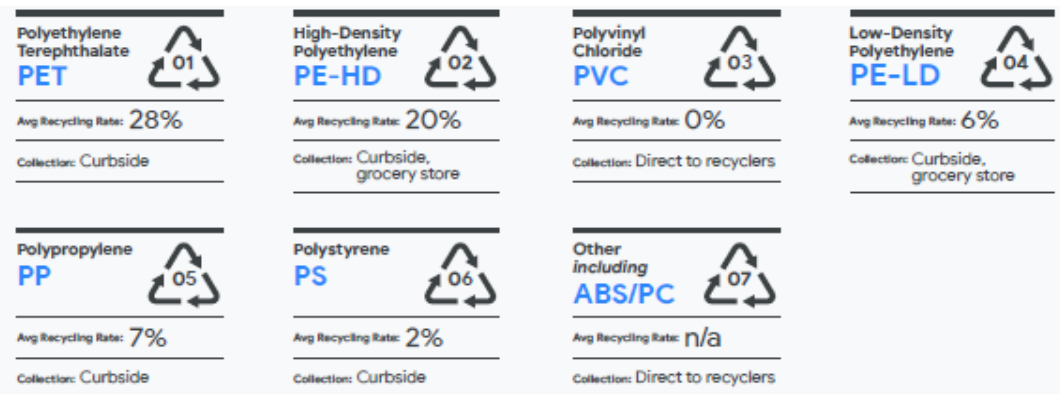
PLASTIC WASTE MANAGEMENT

Plastics have several essential characteristics – they are lightweight, affordable, waterproof, and durable. As global populations have risen, these qualities that make plastics so useful are also why there is a growing global plastic waste problem. It is estimated that over 8,300 million metric tons (18 trillion pounds) of virgin plastic have been produced. Significantly, roughly two-thirds of all plastic ever produced has been released into the environment and remains there in some form – as debris in the oceans, as micro- or nanoparticles in air and agricultural soils, as microfibers in water supplies, or as microparticles in the human body. Numerous interventions have been studied in hopes of reversing the current trend in plastic pollution and recycling. They include **consumer incentives, education and awareness campaigns, plastic taxes, collection programs/services, plastics reduction policies, plastic substitutes, and investments in new recycling technologies** (pictured after final thoughts).

Figure 1

North American Recycling Rates (2019)

In North America, plastics recovery through recycling is low for all polymers.



SOURCE: UNEP and Basel Convention 2020¹¹



If you are interested in learning more or have thoughts about how we could be doing better, please get in touch with me.

All responses will be kept confidential.

Contact

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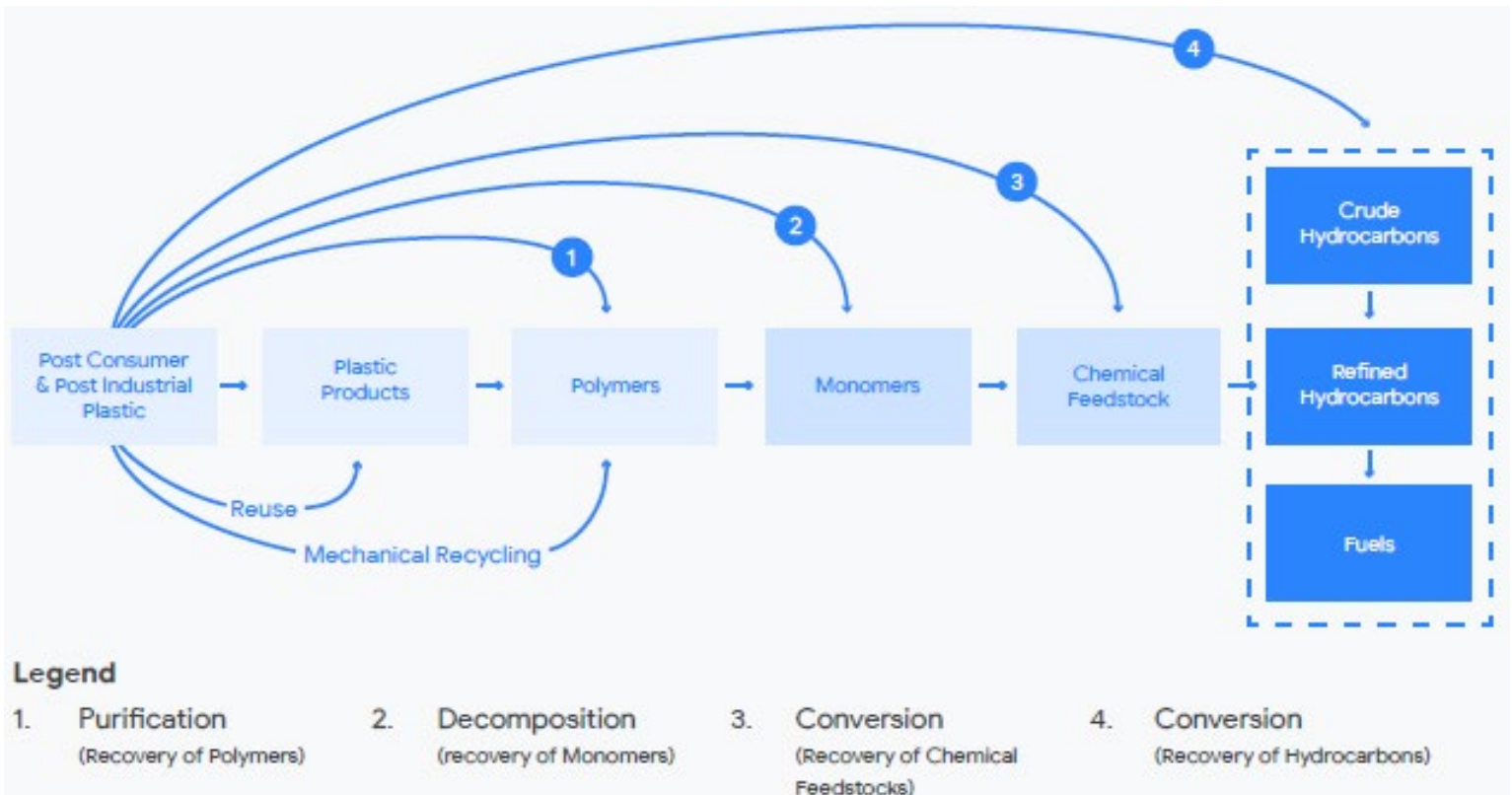
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Special credit to: Robertson, M. (2021). Sustainability Principles and Practice (Third Edition). Routledge.

FINAL THOUGHTS

While advancements in waste management technology have notably increased recycling efficiency, individuals remain central to effective waste management. As the primary generators of waste, people's choices in consumption, packaging, and disposal significantly shape the types and volumes of waste produced. Successful recycling relies on individuals' commitment to segregate recyclable materials at the source, opt for eco-friendly products, and stay informed about recycling processes. Community involvement, proper sorting, and advocacy for enhanced waste management systems are crucial contributions. Embracing innovation and adopting a circular economy mindset, prioritizing waste reduction, underscores collective responsibility for sustainable resource use. Incorporating recycling and efficient waste management practices into your company's operations can foster a circular economy, minimizing the ecological impact of human consumption. By eliminating single-use plastic water bottles, coffee cups, or sandwich bags in both personal and professional settings, and instead opting for reusable bags, containers, and utensils, individuals take proactive steps toward waste reduction. This not only curtails the generation of disposable waste but also contributes to the preservation of valuable resources and the reduction of strain on landfills. Adopting a reusable lifestyle allows individuals to actively participate in the ongoing effort to address environmental concerns, promoting a sustainable future that balances human activities with the well-being of our planet.

RECYCLED PLASTIC PRODUCTION PATHWAYS (MECHANICAL AND CHEMICAL RECYCLING)

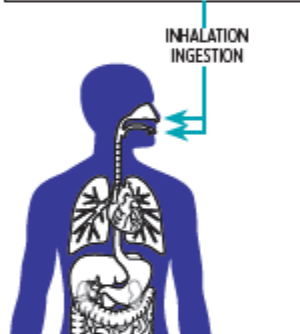
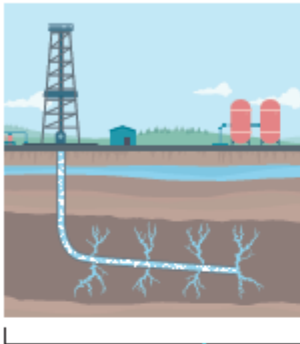


Plastic & Health: The Hidden Costs of a Plastic Planet

Humans are exposed to a large variety of toxic chemicals and microplastics through inhalation, ingestion, and direct skin contact, all along the plastic lifecycle.

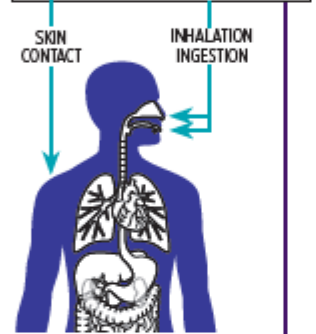
DIRECT EXPOSURE

Extraction & Transport



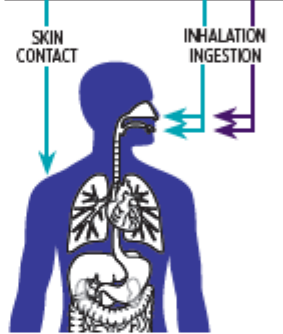
- **Emissions:** include Benzene, VOCs, and 170+ toxic chemicals in fracking fluid
- **Exposure:** inhalation and ingestion (air and water)
- **Health:** affects the immune system, sensory organs, liver, and kidney; impacts include cancers, neuro-, reproductive, and developmental toxicity

Refining & Manufacture



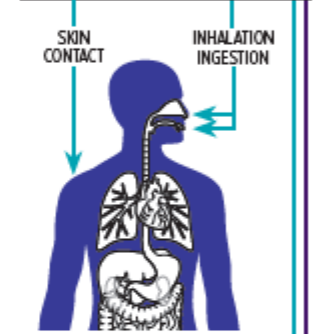
- **Emissions:** include Benzene, PAHs, and Styrene
- **Exposure:** inhalation, ingestion, skin contact (air, water, and soils)
- **Health:** impacts can include cancers, neuro-toxicity, reproductive toxicity, low birth weight, and eye and skin irritation

Consumer Use



- **Emissions:** include heavy metals, POPs, carcinogens, EDCs, and microplastics
- **Exposure:** inhalation, ingestion, and skin contact
- **Health:** affects renal, cardiovascular, gastrointestinal, neurological, reproductive, and respiratory systems; impacts include cancers, diabetes, and developmental toxicity

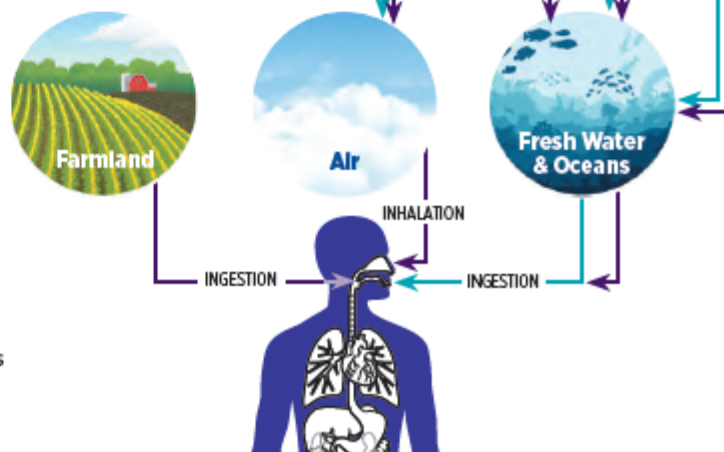
Waste Management



- **Emissions:** include heavy metals, dioxins and furans, PAHs, toxic recycling
- **Exposure:** ingestion and inhalation (air, ash, slag)
- **Health:** impacts include cancers, neurological damages, and damages to immune, reproductive, nervous, and endocrine system

ENVIRONMENTAL EXPOSURE

- **Microplastics and toxic additives:** including POPs, EDCs, carcinogens, and heavy metals
- **Exposure:** inhalation and ingestion (air, water, and food chain)
- **Health:** affects cardiovascular, renal, gastrointestinal, neurological, reproductive, and respiratory systems; impacts include cancers, diabetes, neuro-, reproductive, and developmental toxicity



KEY: Microplastics Chemicals