# Top 4 Toxic Materials Found in E-waste

The consequences of improper e-waste disposal and what to be aware of

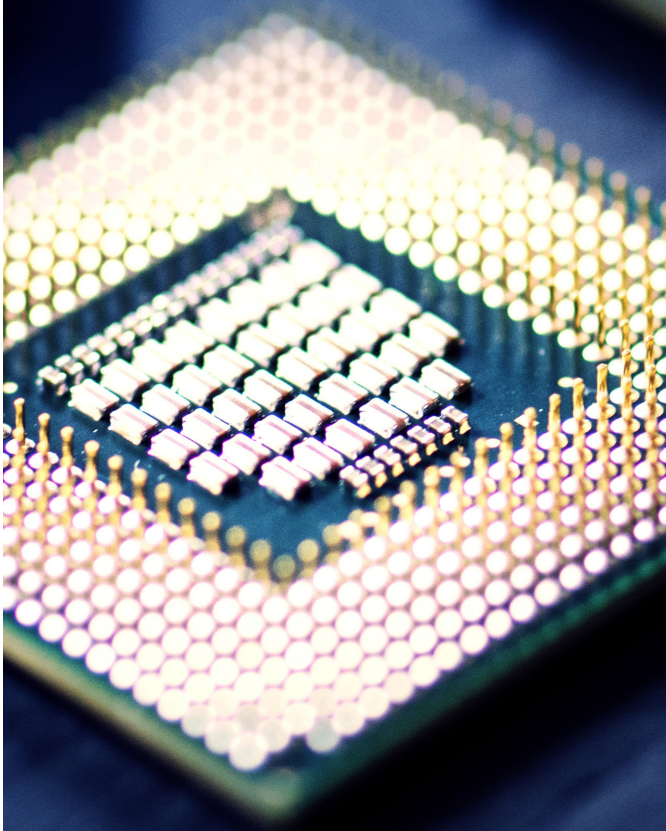
A REPORT BY APTO SOLUTIONS

Apto Solutions

## When electronics are improperly disposed of and end up in landfills...

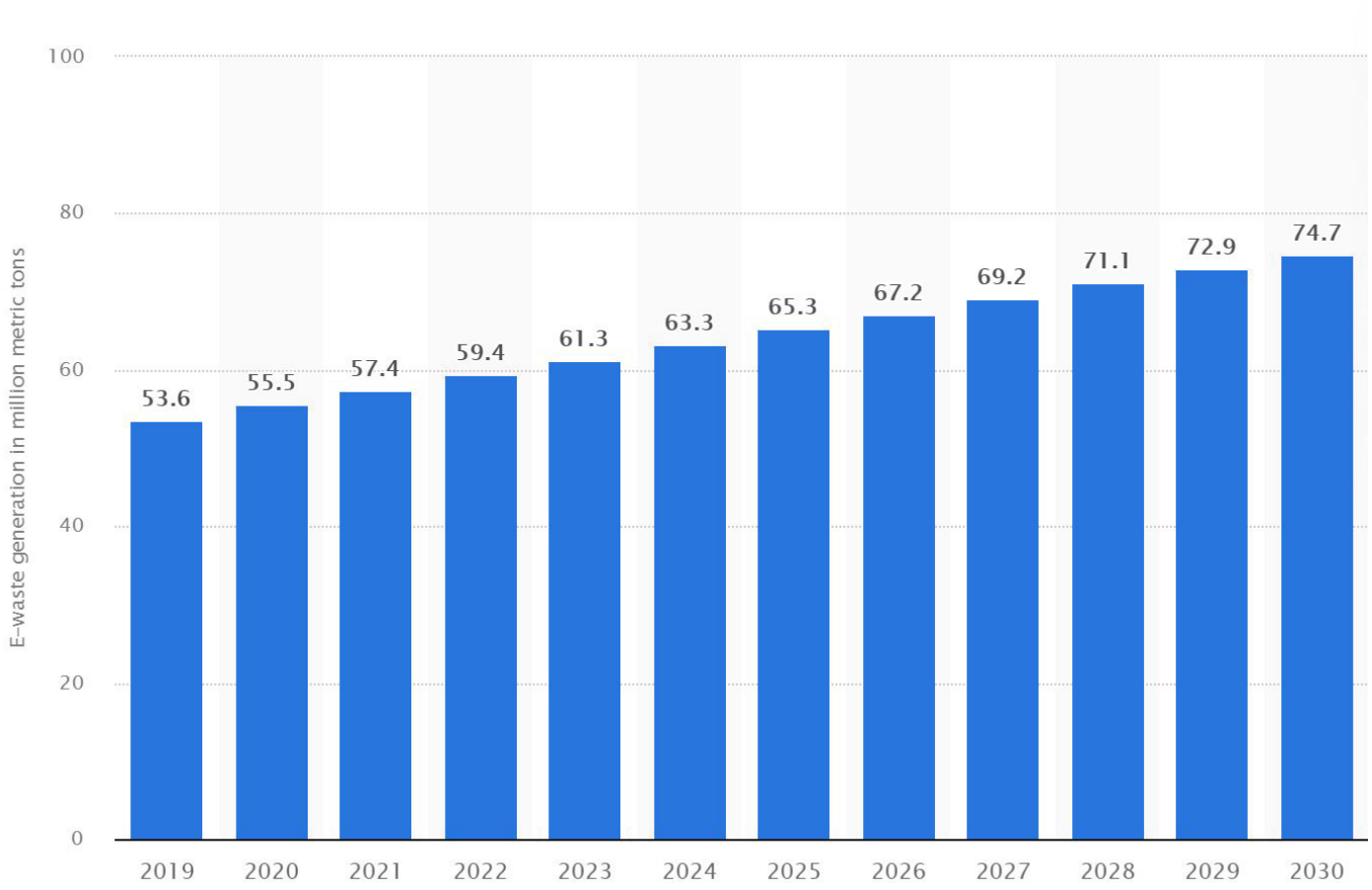
toxic chemicals such as lead, cadmium, mercury, arsenic, and Polychlorinated Biphenyls (PCBs), are released, impacting the earth's air, soil, water and ultimately, human health.

Electronics are resource-intensive to make and a challenge to dispose of. On paper, e-waste is less than 2 percent of the world's waste stream by volume, but it causes over 70 percent of the waste stream's harmful and toxic environmental effects! On top of that, humans have a habit of buying new technology every 2-3 years and consequently getting rid of what's old.



# The Problem with E-waste

This current cycle of electronics consumption has made electronics waste the world's fastest growing solid waste stream. Left unchecked, this trend is expected to continue, with projections showing that by 2030, annual e-waste generation worldwide is likely to increase by approximately 30 percent. With this level of growth, business as usual (i.e. a linear economy) is not an option!

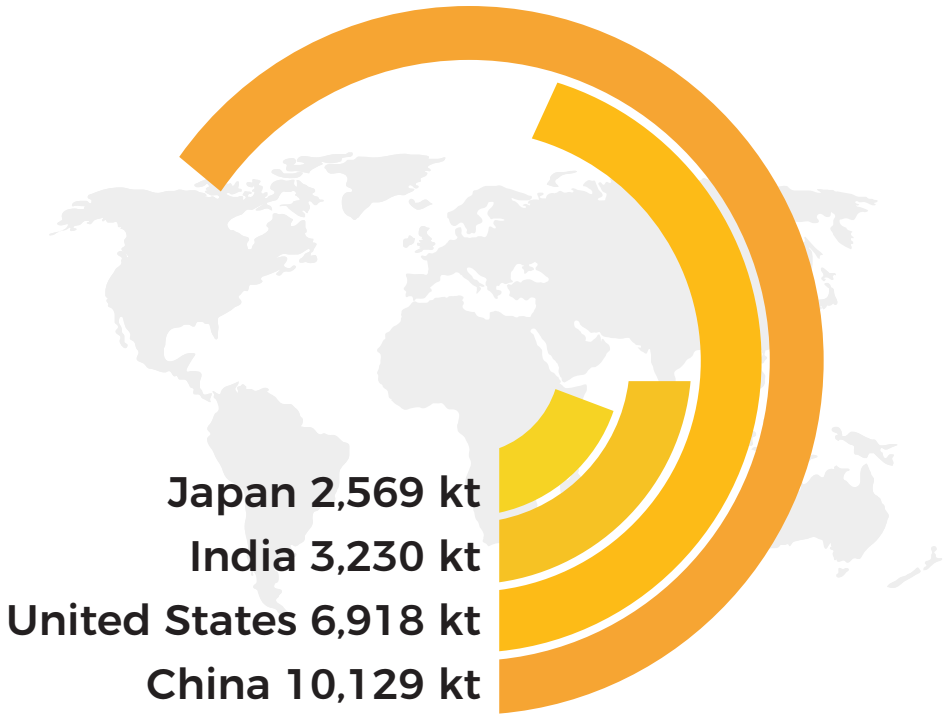


As this report sets out prove, it's not just the overwhelming volume of e-waste, it's the toxicity! Putting aside the amount of e-waste generated over the last few years, electronic devices contain dangerous chemicals and heavy metals like lead, mercury, cadmium, arsenic, and brominated flame retardants: beryllium, and lithium – a typical piece of electronic equipment, like a laptop, may contain all of these.

Though many corporations are making great changes to their manufacturing processes to reduce the amount of waste, the consequences of improper e-waste disposal in landfills still pose a serious threat to public health and can pollute ecosystems for generations to come.

**Improperly disposed electronics end up in landfills, toxic chemicals are released, impacting the earth's air, soil, water, and ultimately, human health.**

## Global E-Waste measured in Kilotons

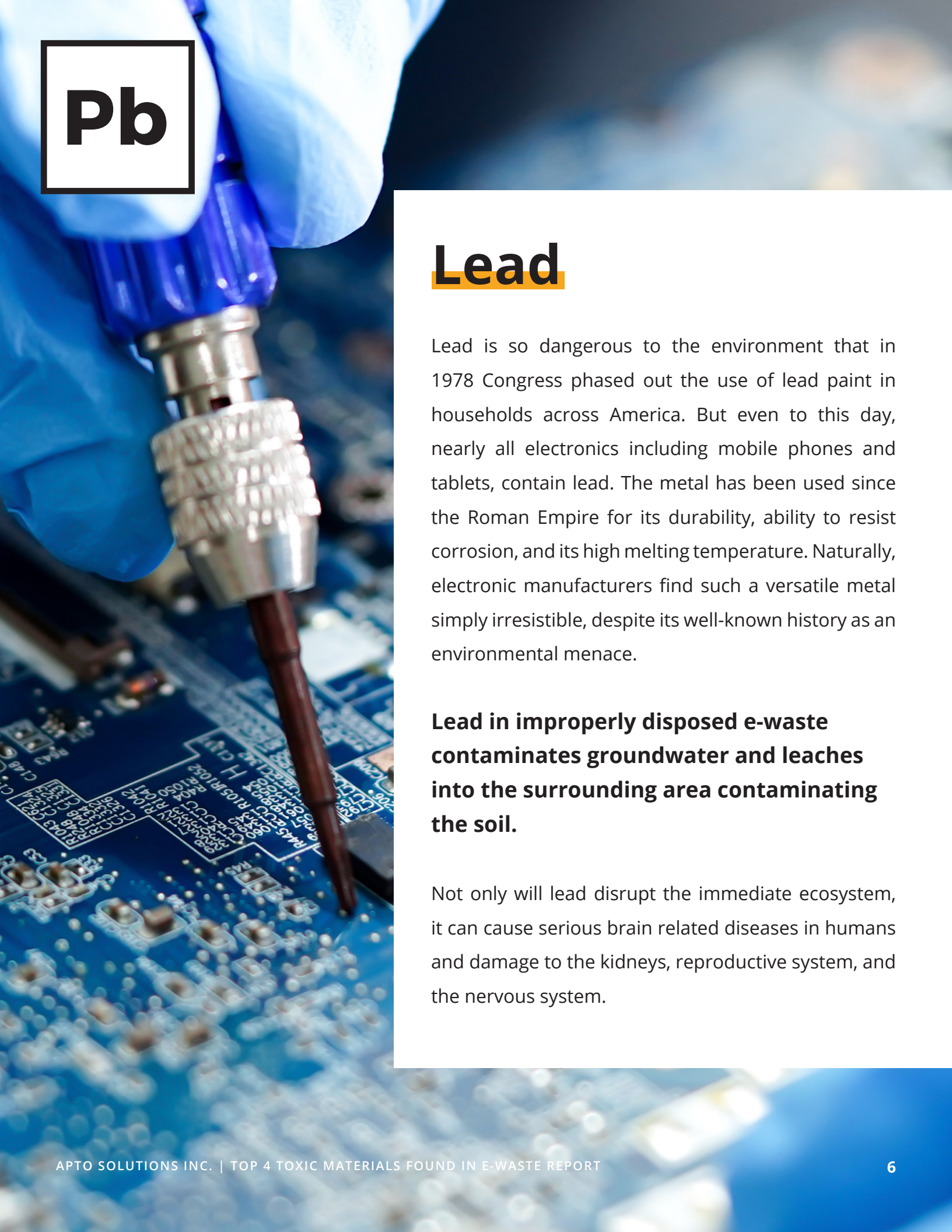



Source: ewastemonitor.info

# Where does it all go?

An undetermined amount of used electronics are shipped from the United States and other developed countries to places that lack the capacity to reject imports or to handle these materials properly. Without rigerous standards and enforcement, improper practices may result in public health and environmental concerns, even in countries where processing facilities exist.

## What about the environment? Here are the top 4 most concerning toxic materials found in e-waste...



Pb

# Lead

Lead is so dangerous to the environment that in 1978 Congress phased out the use of lead paint in households across America. But even to this day, nearly all electronics including mobile phones and tablets, contain lead. The metal has been used since the Roman Empire for its durability, ability to resist corrosion, and its high melting temperature. Naturally, electronic manufacturers find such a versatile metal simply irresistible, despite its well-known history as an environmental menace.

**Lead in improperly disposed e-waste contaminates groundwater and leaches into the surrounding area contaminating the soil.**

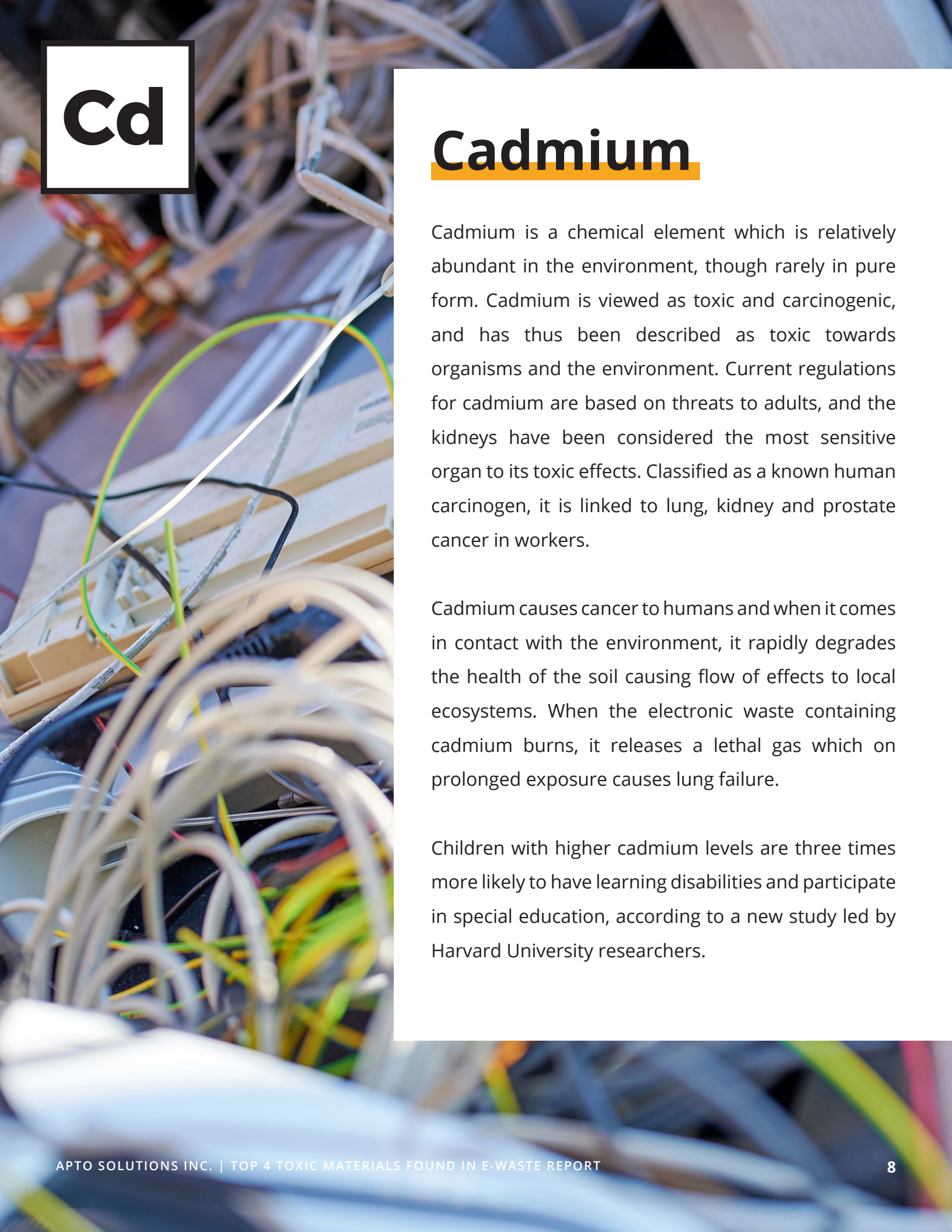
Not only will lead disrupt the immediate ecosystem, it can cause serious brain related diseases in humans and damage to the kidneys, reproductive system, and the nervous system.


# Mercury

**Mercury can enter the environment through the improper disposal of batteries and older computers.**

Once in the environment, mercury can have very harmful effects, especially because it does not filter through organic material quickly.

The effects are dangerous to aquatic organisms as well. The effects of mercury on fish include death, reduced reproduction, impaired growth and development, behavioral abnormalities, altered blood chemistry, impaired osmoregulation, reduced feeding rates and predatory success, and effects on oxygen exchange;" mercury can affect sensory processes as well, especially in humans (Mercury Report to Congress).



Cd

# Cadmium

Cadmium is a chemical element which is relatively abundant in the environment, though rarely in pure form. Cadmium is viewed as toxic and carcinogenic, and has thus been described as toxic towards organisms and the environment. Current regulations for cadmium are based on threats to adults, and the kidneys have been considered the most sensitive organ to its toxic effects. Classified as a known human carcinogen, it is linked to lung, kidney and prostate cancer in workers.

Cadmium causes cancer to humans and when it comes in contact with the environment, it rapidly degrades the health of the soil causing flow of effects to local ecosystems. When the electronic waste containing cadmium burns, it releases a lethal gas which on prolonged exposure causes lung failure.

Children with higher cadmium levels are three times more likely to have learning disabilities and participate in special education, according to a new study led by Harvard University researchers.

Absorbed from the soil, cadmium is found in certain foods, particularly potatoes, grains, sunflower seeds and leafy greens, as well as tobacco

Many studies indicate that lead (Pb) and cadmium (Cd) exposure may alter bone development through both direct and indirect mechanisms, increasing the risk of osteoporosis later in life.

**Cadmium is commonly found in chip resistors, semi-conductors, infrared detectors, stabilizers, cables and wires.** Circuit boards, switches and relays contain mercury as well chromium.

# Arsenic

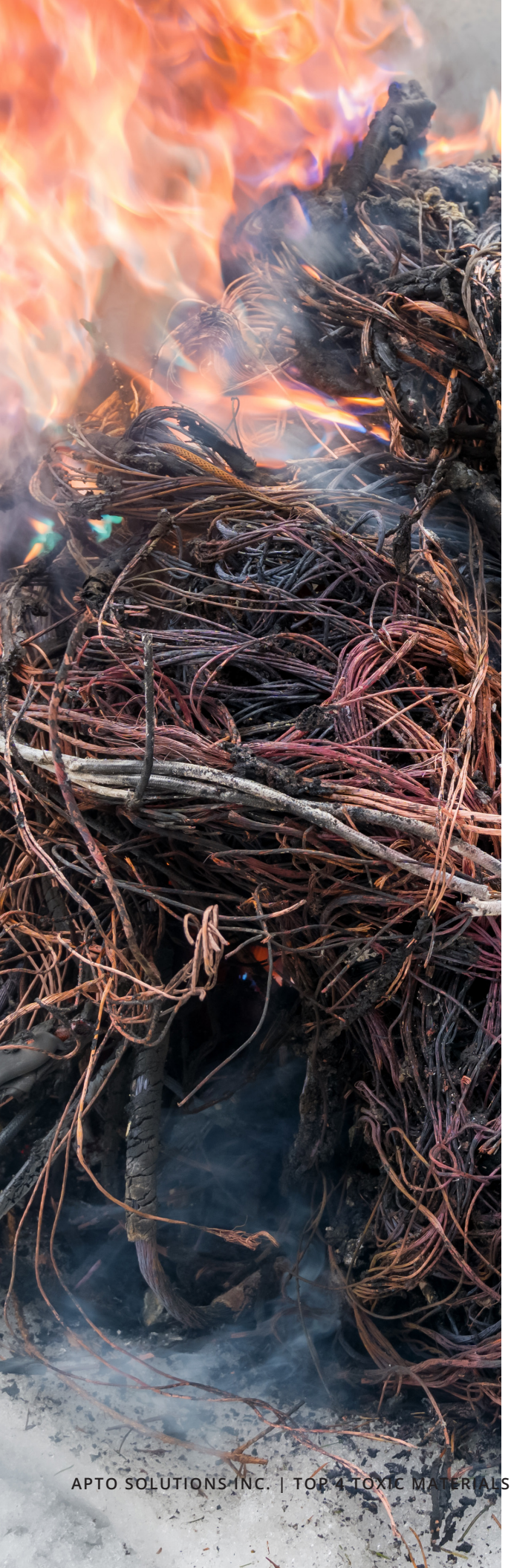
As

**Arsenic is present in circuit boards, LCD displays, and computer chips.**

As these electronic parts pile up in landfills, the arsenic present leaches into the soil at those sites affecting the soil chemistry and possibly the groundwater composition as well.

Predominantly introduced into the ecosystem through smelting operations, the incorrect disposal of electronic waste constitutes one of the most dangerous sources of inorganic arsenic into the environment. Ecologically speaking, arsenic has shown to act as a growth stimulant and development inhibitor depending on the species.

Another widely-used method of electronic waste disposal is to simply set fires to the unusable parts. This introduction of arsenic into the atmosphere has severe human health implications. As exhibited by workers in old smelter plants, inhaling arsenic can cause lung cancer (in fact, a linear relationship has been shown by research by the National Cancer Institute) as well as an array of peripheral nervous disorders.



# Burning plastics

## to recover other materials

Over the past 60 years, plastics production and waste have dramatically increased, part of a global waste crisis whose drivers have included rapid urbanization, increasing consumption in both high- and low-income countries, and increased production of “throw-away” products. Indeed, the vast majority of plastics are not recycled at the end of their useful life, ensuring that this multiplication in production results in multiplication of harmful waste. From raw material extraction through to plastic polluting the ocean, plastics represent the failure of a predominantly fossil fuel based, linear economic system.

**When e-waste is oxidized during smelting, bromine gets released. The released bromine when combined with unoxidized carbon becomes brominated dioxins and furans which cause lethal effects on flora and fauna.**

Plastic is a petroleum-based material, and when burned it’s like any other fossil fuel: it releases climate pollution. This in turn leads to rising sea levels, increased ocean and air toxicity, and destruction of coral reefs and other marine life. According to the U.S. Environmental Protection Agency, burning plastics is notably the worst possible end-of-life management approach for plastics from a climate perspective.

The most cost effective, reliable, and proven solutions for immediate marine plastic pollution are found in zero waste models that are being implemented in many cities around the world already.

To get rid of this long-lasting waste, several low and middle-income countries have adopted the unregulated technique of openly burning plastic. While this method of eradication definitely removes the physical existence of plastic, it does leave the planet with another problem, the largest environmental cause of death and disease: **toxic air pollution** by burning of plastic.

*Polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxins, and furans are among the most toxic chemicals commonly released into the air when burning plastic waste; chronic exposures cause cancer and interfere with hormone functions."*

You have probably never heard of brominated flame retardants but they're in almost every piece of plastics used on electronics and have been found to emit toxic chemicals, they have slowly been pushed out of laptops but are still present in older models!

Brominated flame retardants are just one small part of why laptops need to be recycled and disposed of properly because they contain many more toxic chemicals that are hurting our nation's directive to go green!

# Meeting the Challenge

The consequences of improper e-waste disposal in landfills or other non-dumping sites pose serious threats to public health and can pollute ecosystems for generations to come.

**The best waste management practice is to not create waste in the first place and we can do that by repairing, refurbishing, and reusing our electronics.**

Repairing electronics instead of replacing them prevents not only waste, but also the carbon emissions and rare-earth mining associated with making electronics in the first place.

When e-waste is properly disposed through safe and effective recycling methods, the chances that hazardous lead levels will affect surrounding communities decreases.Working with a responsible ITAD company to be sure e-waste is being handled properly.

# Together we can help make an impact.

Apto Solutions has changed the way we recycle with a simplified downstream supply chain for improved reporting and ultimate transparency.

In ITAD 1.0, we uncovered common problems in the downstream recycling process such as lack of visibility and a co-mingling of materials that resulted in inadequate tracking and muddied reporting. In the era of ITAD 2.0, we clarify this reporting and improve visibility and ensure each company in the supply chain is being responsible and accountable. Where once we had a confusing web of downstream vendors, we now have a simplified downstream supply chain.

Apto is proud to introduce new innovations that have changed the way we track and report on the downstream in the reverse logistics process - these innovations have accelerated the path for our clients to create a more closed-looped future. Although a shift towards a new supply chain process fully supports the goal of the circular economy and meets the global e-waste problem head-on with a solution and an attainable way to get there.

**Contact us today to learn more about how Apto Solutions can help you with your e-waste recycling plan.**

**info@aptosolutions.com**