# EXECUTIVE SUMMARY

"Billions of pounds of PVC, the 'poison plastic,' are being thrown 'away' in the U.S.— but there is no away for the health threatening chemicals associated with PVC."

*The disposal of polyvinyl chloride (PVC) plastic threatens public health and the environment. Although problematic throughout its lifecycle – from production through final use – the discarding of PVC as waste poses perpetual hazards. PVC is widely used in plastic pipes, building materials (e.g., vinyl siding, windows), consumer products, disposable packaging and many everyday products. We can prevent harm from PVC by replacing it with safer, cost-effective alternatives that are available, and by diverting PVC waste away from incineration and open burning. This report summarizes data on PVC production, use and disposal in the United States, though its conclusions about the environmental health hazards of PVC are applicable to every country.*

## How much PVC do we use?

### Billions of Pounds of PVC are Discarded Each Year

Large and growing amounts of PVC are discarded daily in the U.S. As much as 7 billion pounds of PVC is discarded every year in municipal solid waste, medical waste, and construction and demolition debris. PVC disposal is the largest source of dioxin-forming chlorine and hazardous phthalates in solid waste, as well as a major source of lead, cadmium and organotins. Dioxins are a family of highly toxic chemicals that are known to cause cancer, reproductive, developmental and immune problems. More than 2 billion pounds per year of nondurable (short-lived) PVC products are discarded with U.S. household trash, including blister packs and other packaging, plastic bottles and containers, plastic wrap and bags, and more. In fact, nondurable products account for more than 70% of the PVC disposed of in U.S. municipal solid waste. Worldwide, an estimated 300 billion pounds of PVC, which was installed in the last 30 to 40 years in construction and other long lasting uses, will soon reach the end of its useful life and require disposal.

## What's so bad about PVC plastic?

### PVC: A Truly "Poison" Plastic

Unlike the many plastics made without chlorine, PVC

poses serious environmental health threats from the start. The production of PVC requires the manufacture of raw chemicals, including highly polluting chlorine, and cancer-causing vinyl chloride monomer (VCM) and ethylene dichloride (EDC). Communities surrounding U.S. vinyl chloride chemical facilities, half of which are in Louisiana, suffer from serious toxic chemical pollution of their groundwater supplies, surface waters and air. Residents of the town of Mossville, Louisiana had dioxin levels in their blood that were three times higher than normal. PVC plastic also requires large amounts of toxic additives to make it stable and usable. These additives are released during the use (and disposal) of PVC products, resulting in elevated human exposures to phthalates, lead, cadmium, tin and other toxic chemicals. Dioxin emissions from PVC combustion occur regularly due to the 1 million annual fires that burn buildings and vehicles, two sectors that use substantial amounts of PVC.

## What are the options for disposing of used PVC?

### PVC Products + Waste Incinerators or Open Burning = Dioxin Emissions

Dioxin formation is the Achilles heel of PVC. Burning PVC plastic, which contains 57% chlorine when pure, forms dioxins, a highly toxic group of chemicals that build up in the food chain. PVC is the major contributor of chlorine to four combustion sources—municipal solid waste incinerators, backyard burn barrels, medical waste incinerators and secondary copper smelters—that account for a significant portion of dioxin air emissions. In the most recent USEPA Inventory of Sources of Dioxin in the United States, these four sources accounted for more than 80% of dioxin emissions to air based on data collected in 1995. Since then, the closure of many incinerators and tighter regulations have reduced dioxin air emissions from waste incineration, while increasing the proportion of dioxin disposed of in landfills with incinerator ash. The PVC content in the waste steam fed to incinerators has been linked to elevated levels of dioxins in stack air emissions and incinerator ash.

Incineration and open burning of PVC-laden waste seriously impacts public health and the environment. More than 100 municipal waste incinerators in the U.S. burn 500 to 600 million pounds of PVC each year, forming highly toxic dioxins that are released to the air and disposed of on land as ash. The biggest PVC-burning states include Massachusetts, Connecticut, Maine—which all burn more than half of their waste—Florida, New York, Virginia, Pennsylvania, Maryland, Minnesota, Michigan, New Jersey, Indiana and Washington. The incineration of medical waste, which has the highest PVC content of any waste stream, is finally being replaced across the U.S. by cleaner non-burn technologies after years of community activism and leadership by environmentally-minded hospitals. Backyard burning of PVC-containing household trash is not regulated at the federal level and is poorly regulated by the states. There are no restrictions on backyard burning in Michigan and Pennsylvania. It is partially restricted in 30 states, and banned in 18 states.

### PVC Products + Landfill Disposal = Groundwater Contamination

Land disposal of PVC is also problematic. Dumping PVC in landfills poses significant long-term environmental threats due to leaching of toxic additives into groundwater, dioxin-forming landfill fires, and the release of toxic emissions in landfill gases. Land disposal is the final fate of between 2 billion and 4 billion pounds of PVC that are discarded every year at some 1,800 municipal waste landfills in the U.S. Most PVC in construction and demolition debris ends up in landfills, many of which are unlined and cannot capture any contaminants that leak out. An average of 8,400 landfill fires are reported every year in the U.S., contributing further to PVC waste combustion and dioxin pollution.

### PVC Products + Recycling = Contamination of the Entire Plastics Recycling Process

Unfortunately, PVC recycling is not the answer. The amount of PVC products that are recycled is negligible, with estimates ranging from only 0.1% to 3%. PVC is very difficult to recycle because of the many different formulations used to make PVC products. Its composition varies because of the many additives used to make PVC products. When these different formulations of PVC are mixed together, they cannot readily be separated which is necessary to recycle the PVC into its original formulation. It's also virtually impossible to create a formulation that can be used for a specific application. PVC can never be truly recycled into the same quality material—it usually ends up being made into lower quality products with less stringent requirements such as park benches or speed bumps.

When PVC products are mixed in with the recycling of non-chlorinated plastics, such as in the "all-bottle" recycling programs favored by the plastics industry, they contaminate the entire recycling process. Although

other types of non-chlorine plastics make up more than 95% of all plastic bottles, introducing only one PVC bottle into the recycling process can contaminate 100,000 bottles, rendering the entire stock unusable for making new bottles or products of similar quality. PVC also increases the toxic impacts of other discarded products such as computers, automobiles and corrugated cardboard during the recycling process.

## Safer alternatives are available to replace PVC

Safer alternatives to PVC are widely available and effective for almost all major uses in building materials, medical products, packaging, office supplies, toys and consumer goods. PVC is the most environmentally harmful plastic. Many other plastic resins can substitute more safely for PVC when natural materials are not available.

PVC alternatives are affordable and already competitive in the market place. In many cases, the alternatives are only slightly more costly than PVC, and in some cases the costs of the alternative materials are comparable to PVC when measured over the useful life of the product. Phasing out PVC in favor of safer alternatives is economically achievable. A PVC phase-out will likely require the same total employment as PVC production. The current jobs associated with U.S. PVC production (an estimated 9,000 in VCM and PVC resin production, and 126,000 in PVC fabrication) would simply be translated into production of the same products from safer plastic resins.

## How can we get rid of PVC?

To end the myriad of problems created by PVC disposal, we recommend the following policies and activities.

- Policymakers at the local, state and federal level should enact and implement laws that steadily reduce the impacts of PVC disposal and lead to a complete phase-out of PVC use and waste incineration within ten years (see box below).
- A new materials policy for PVC that embraces aggressive source reduction of PVC should be adopted to steadily reduce the use of PVC over time.
- Federal and state waste management priorities should be changed to make incineration of PVC waste the least preferable option.
- In the interim, any PVC waste generated should be diverted away from incineration to hazardous waste landfills.
- Consumers should take personal action to buy PVC-free alternatives and to remove PVC from their trash for management as household hazardous waste.
- Communities should continue to organize against PVC-related dioxin sources such as waste incinerators while working to promote safer alternatives.

### A PVC-Free Policy Action Agenda

**▶ Accomplish Within Three Years ◀**

1. Ban all open waste burning.
2. Educate the public about PVC hazards.
3. Ban the incineration of PVC waste.
4. Collect PVC products separately from other waste.
5. In the interim, divert PVC away from incineration to hazardous waste landfills.

**▶ Accomplish Within Five Years ◀**

6. Establish our Right-to-Know about PVC.
7. Label all PVC products with warnings.
8. Give preference to PVC-free purchasing.
9. Ban PVC use in bottles and disposable packaging.
10. Ban sale of PVC with lead or cadmium.

**▶ Accomplish Within Seven Years ◀**

11. Phase out other disposable PVC uses.
12. Phase out other high hazard PVC uses.
13. If safer alternatives are not yet available, extend the PVC phase-out deadlines for specific purposes.
14. Fund efforts to reduce the amount of PVC generated through fees on the PVC content of products.

**▶ Accomplish Within Ten Years ◀**

15. Phase out remaining durable PVC uses.
16. Decommission municipal waste incinerators in favor of zero waste.