



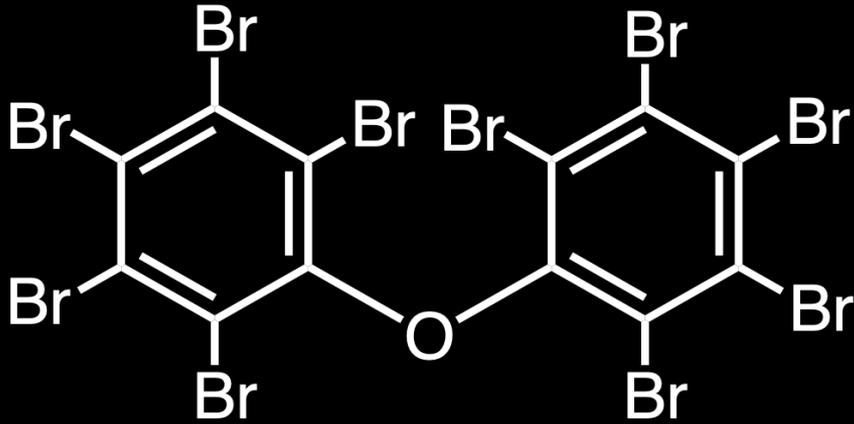
GREEN SCIENCE
POLICY INSTITUTE

Flame Retardants in Recycled E-waste: Implications for the Circular Economy

Joe Charbonnet, PhD

June 26, 2019

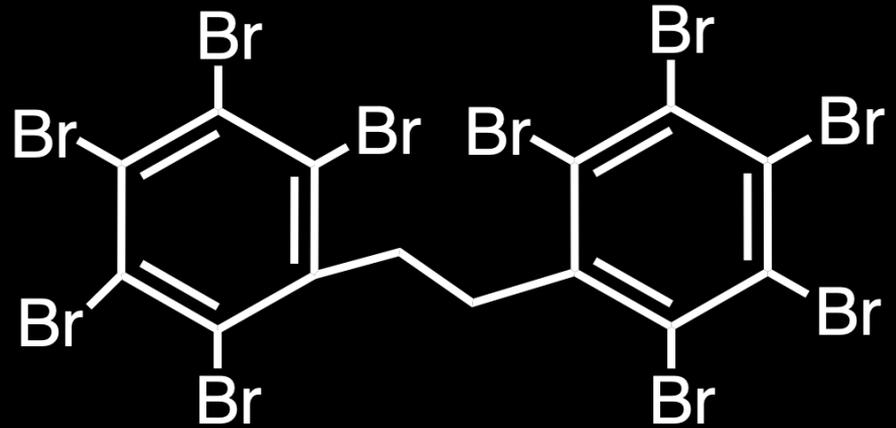
Regrettable Substitution



Decabromodiphenyl
ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl
ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity

A dense, colorful field of multi-colored jelly beans, including shades of red, orange, yellow, green, blue, purple, and pink, filling the entire frame. The text is overlaid in the center.

**EVALUATING TENS OF THOUSANDS OF
INDIVIDUAL CHEMICALS IS UNWORKABLE**



BUT ADDRESSING **SIX GROUPS** OF
CHEMICALS OF CONCERN IS MANAGEABLE



Six Classes Videos

An innovative approach to reducing toxics

1

Highly
Fluorinated

2

Antimicrobials

3

Flame
Retardants

4

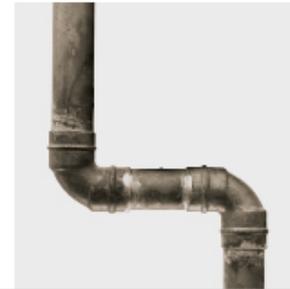
Bisphenols
+ Phthalates

5

Some
Solvents

6

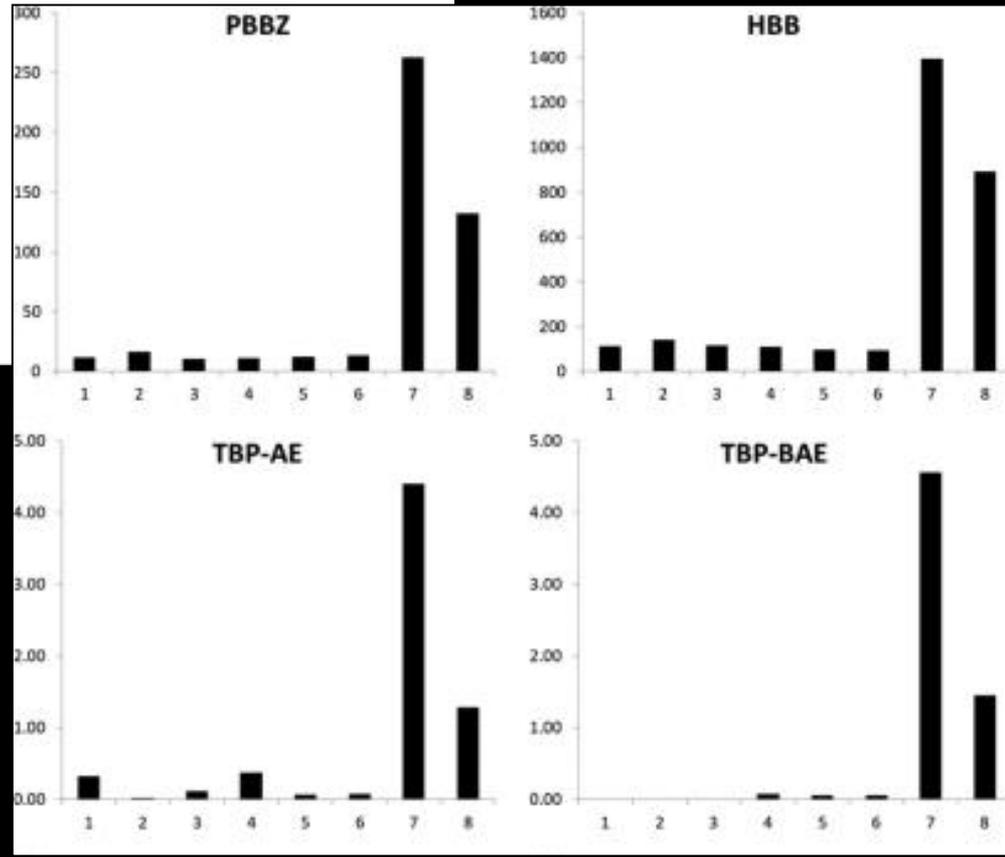
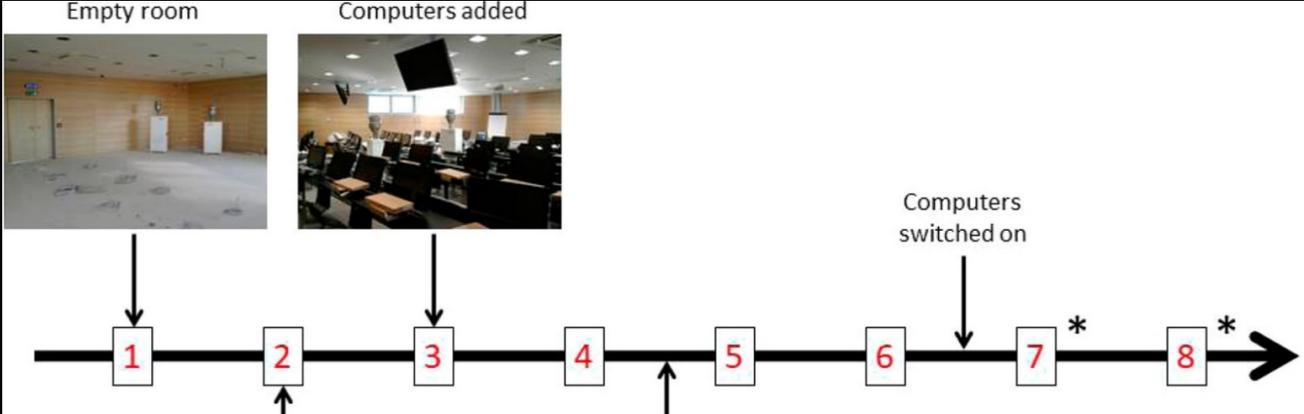
Certain Metals



VIEW and SHARE: www.SixClasses.org

Healthier products, healthier people in four minutes!

Increased FRs from Electronics in Use



Study of flame retardants in air of a newly built classroom at 8 timepoints

Vojta *et al.*, "Changes in Flame Retardant and Legacy Contaminant Concentrations in Indoor Air during Building Construction, Furnishing, and Use," 2017 DOI: 10.1021/acs.est.7b03245

Recycling Flame Retarded Plastics

Flame Retardants in Kitchen Utensils

- Black plastic often contains BFRs
- BFRs found in 34% of tested utensils
- Up to 20% of BFRs transferred to cooking oil



PETITION: U.S. Consumer Product Safety Commission

Declare as “banned hazardous substances”:

- Children’s products
- Residential furniture
- Mattresses & mattress pads
- Plastic electronics enclosures



with the **class** of non-polymeric organohalogen FRs added

GRANTED –2017

National Academy of Science Scoping Report, 2019:

“The only possible practical approach for a set of chemicals as large as the OFRs is a class approach.”

By limiting use of the “Six Classes”

We can have a healthier world.

GreenSciencePolicy.org