

# Highly Fluorinated Chemicals: A Sticky Issue

We will begin momentarily.

## Presenters:

**Mark Strynar, PhD**, Physical Scientist, U.S. Environmental Protection Agency

**Christopher Higgins, PhD**, Associate Professor, Colorado School of Mines

**Robert Bilott, JD**, Partner at Taft, Stettinius and Hollister LLP

**Arlene Blum, PhD**, Executive Director, Green Science Policy Institute

To submit questions, click “Q&A” or email [Veronica@GreenSciencePolicy.org](mailto:Veronica@GreenSciencePolicy.org).

Questions will follow the presentations.

**Wednesday, April 19, 2017**

**11:00 AM Pacific / 2:00 PM Eastern**



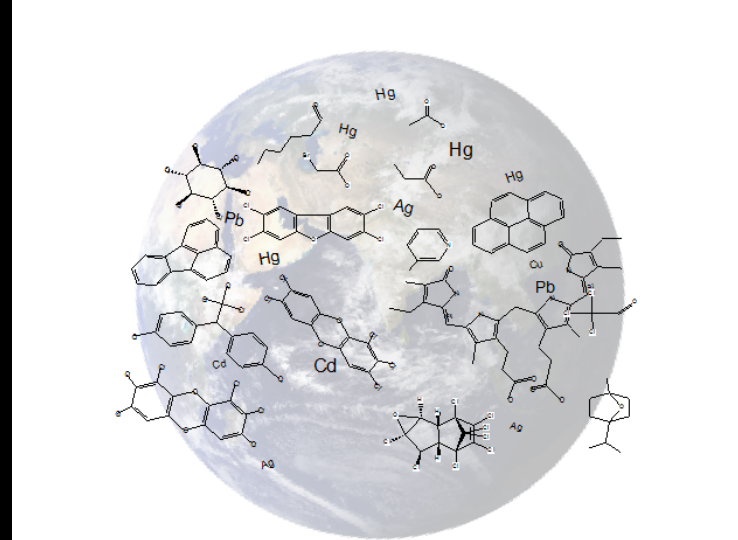
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POLICY INSTITUTE**

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# A Planetary Boundary for Chemical Pollution

## Chemical pollution:

- Increasing chemical production
- Persistence and long range transport
- Finite capacity of the earth to absorb toxics



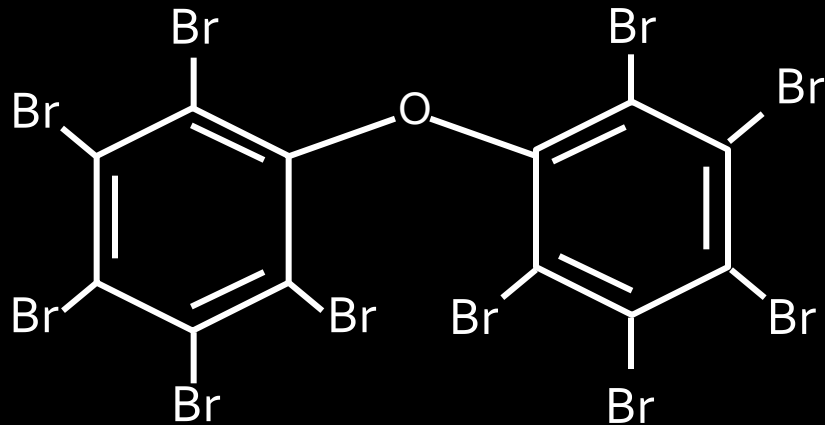
Diamond et al, 2015, Environment International

# U.S. Toxic Substances Control Act (1976)

- 62,000 previous chemicals “grandfathered”
- 23,000 new chemicals
  - 85% have no health data
  - 67% have no data at all



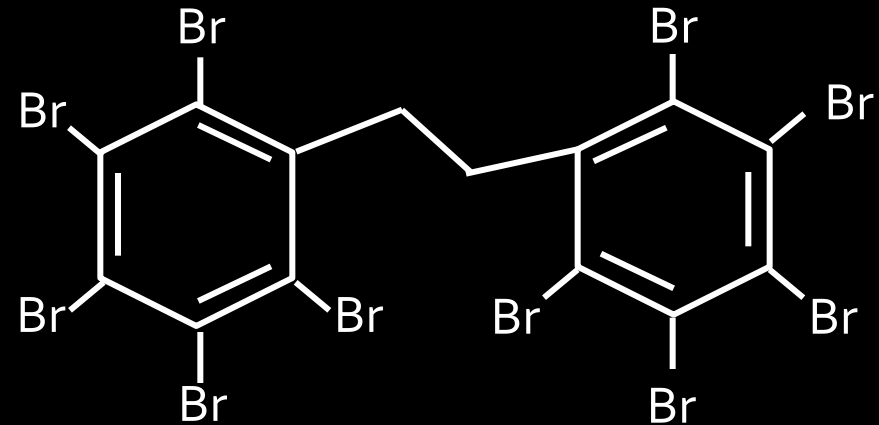
# Regrettable Substitution



Decabromodiphenyl  
ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl  
ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity





# GREEN SCIENCE POLICY INSTITUTE

**Environmental Science & Technology**

**Novel and High Volume Use Flame Retardants in US Couches**  
Heather M. Thomas F.  
Nicholas S. J.  
Department of  
Support

**Fluorine in U.S. Fast Food Packaging**  
Laurel A. Margaret  
Support

**Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants**  
Xindi C. Hu,<sup>1,2,3</sup> David Q. Andrews,<sup>4</sup> Andrew B. Lindstrom,<sup>5</sup> Thomas A. Bruton,<sup>6</sup> Laurel A. Schaidt,<sup>7</sup> Philippe Grandjean,<sup>8</sup> Rainer Lohmann,<sup>9</sup> Courtney C. Carignan,<sup>10</sup> Arlene Blum,<sup>11</sup> Simona A. Balan,<sup>12</sup> Christopher P. Higgins,<sup>13</sup> and Elsie M. Sunderland<sup>14</sup>

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<sup>2</sup>Harvard John A. Paulson School of Engineering and Applied Sciences, Cambridge, Massachusetts 02138, United States  
<sup>3</sup>Environmental Working Group, Washington, D.C. 20009, United States  
<sup>4</sup>National Exposure Research Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, United States  
<sup>5</sup>University of California at Berkeley, Berkeley, California 94720, United States  
<sup>6</sup>Silent Spring Institute, Newton, Massachusetts 02460, United States  
<sup>7</sup>University of Rhode Island, Narragansett, Rhode Island 02882, United States  
<sup>8</sup>Green Science Policy Institute, Berkeley, California 94705, United States  
<sup>9</sup>California Department of Toxic Substances Control, 1001 I Street, Sacramento, California 95814, United States (Formerly at the Green Science Policy Institute, Berkeley, California 94705, United States)  
<sup>10</sup>Colorado School of Mines, 1500 Illinois Street, Golden, Colorado 80401, United States

**ABSTRACT:** Drinking water contamination with poly- and perfluoroalkyl substances (PFASs) poses risks to the developmental, immune, metabolic, and endocrine health of consumers. We present a spatial analysis of 2013–2015 national drinking water PFAS concentrations from the U.S. Environmental Protection Agency's (U.S. EPA) third Unregulated Contaminant Monitoring Rule (UCMR3) program. The number of industrial sites that manufacture or use these compounds, the number of military fire training areas, and the number of wastewater treatment plants are all significant

**Hydrological units with detectable PFASs**

**PFAS detected county**

**Supporting Information**

Research



Education



Convening

Policy & Purchasing Change

# The Six Classes

1. **Highly fluorinated chemicals (PFASs)**  
water and oil repellants
2. **Chlorinated antimicrobials**  
triclosan and triclocarban
3. **Flame retardants**  
brominated, chlorinated, phosphate
4. **Bisphenols and phthalates**  
phthalates, BPA, BPS, etc.
5. **Organic solvents**  
benzene, methylene chloride, xylene, etc.
6. **Certain metals**  
lead, mercury, cadmium, arsenic

Is it necessary?

Is it worth it?

Is there a safer alternative?



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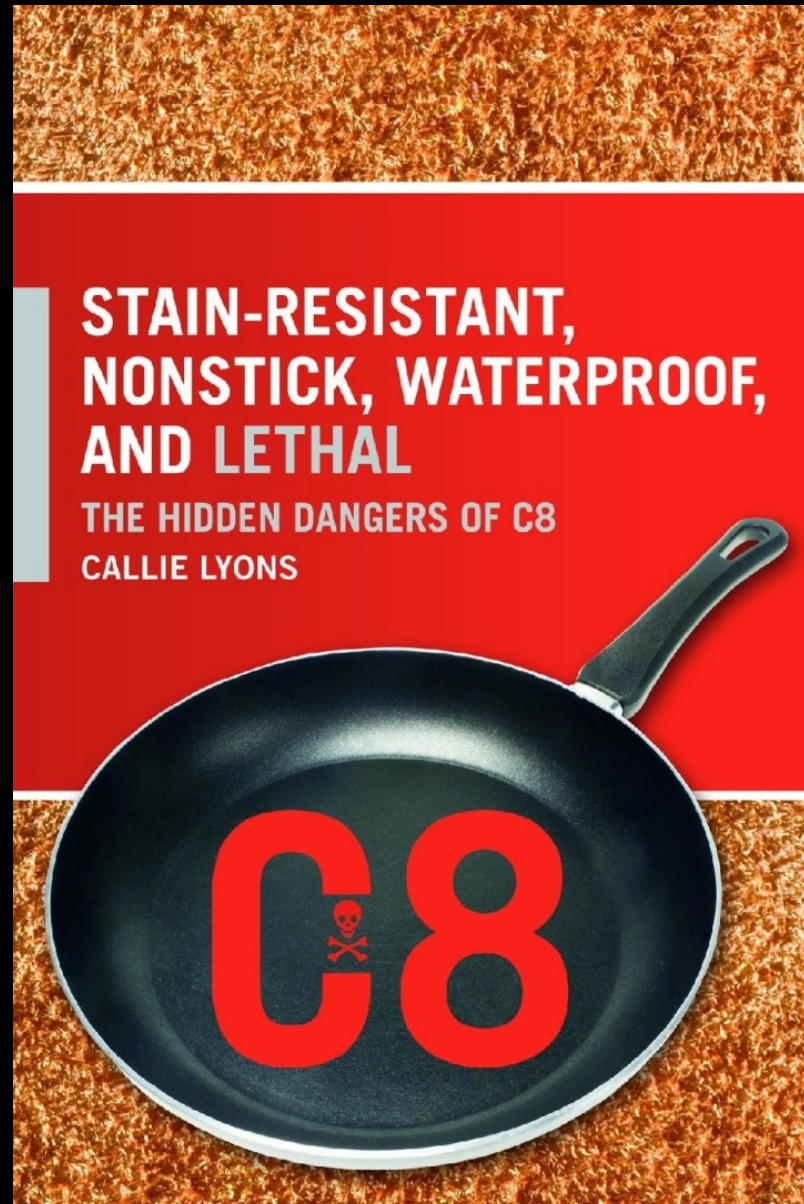
15-minute webinars on Six Classes -- [www.SixClasses.org](http://www.SixClasses.org)

June 22, 2017 at 11:00 am Pacific

Online Premiere: Three-Minute Videos



Published 2007



November 2014      Helsingør Statement on  
Poly & Perfluorinated Alkyl Substances

May 2015      The Madrid Statement on  
Highly Fluorinated Chemicals



“We call on the international community to cooperate in limiting the production and use of PFASs and in developing safer non-fluorinated alternatives.”

Signed by 230 scientists from 40 countries

2015: Environmental Health Perspectives

# 2015-16

The Opinion Pages | OP-ED COLUMNIST

The New York Times

## Chemicals in Your Popcorn?

JUNE 4, 2015



Nicholas Kristof

What do a pizza box, a polar bear and you have in common?

[All carry a kind of industrial toxicant](#) called poly- and perfluoroalkyl substances, or PFASs, that do two things: They make life convenient, and they also appear to increase the risk of cancer.

## These Chemicals in Pizza Boxes and Carpeting Last Forever

More than 200 scientists around the world document the threats of perfluorinated compounds and call for more government control.

By **Lindsey Konkel**, National Geographic  
PUBLISHED MAY 01, 2015



NATIONAL  
GEOGRAPHIC

The  
Intercept\_

## THE TEFLON TOXIN

DuPont and the Chemistry of  
Deception



Sharon Lerner

Aug. 11 2015, 3:35 p.m.



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The New York Times Magazine

## The Lawyer Who Became DuPont's Worst Nightmare

Rob Bilott was a corporate defense attorney for eight years. Then he took on an environmental suit that would upend his entire career — and expose a brazen, decades-long history of chemical pollution.

By NATHANIEL RICH JAN. 6, 2016



# November 2015: Highly Fluorinated Chemicals



Scientific Guidance Panel voted unanimously to add entire class of Highly Fluorinated Chemicals (PFASs) to priority list of chemicals.



# EPA Drinking Water Health Advisory Levels

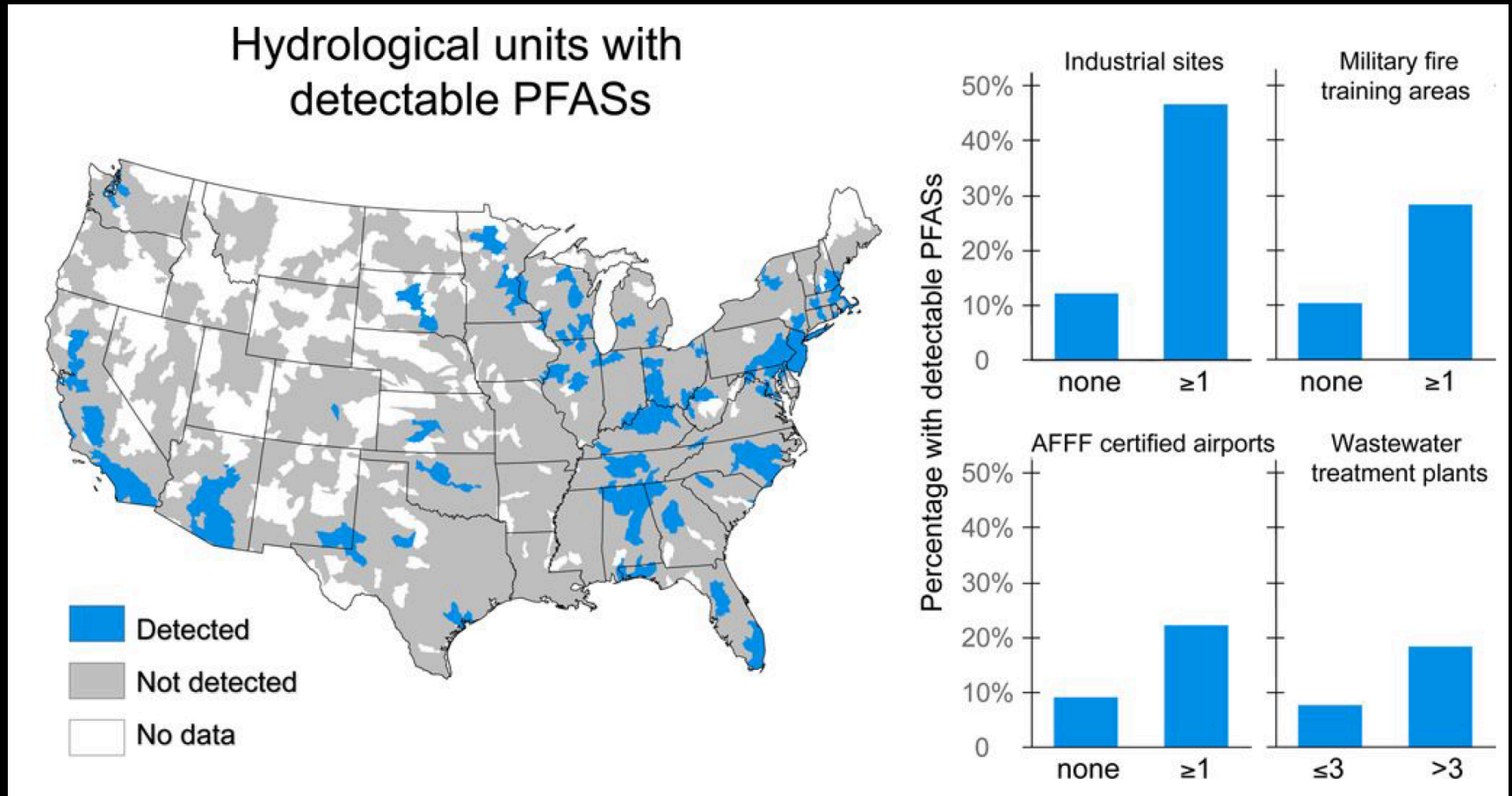
January 2009:

Provisional level of 400 ppt for PFOA and 200 ppt for PFOS

May 2016:

Lifetime level of 70 ppt for total of PFOA and PFOS

# Watersheds with point sources have higher detection frequencies for PFASs



# Air Force stops using AFFF foam in training exercises

- Drinking water of six million Americans contaminated with PFASs
- AFFF firefighting foams used in training are a major contributor
- Air Force, on 19 August 2016:
  - “will stop using foam in training exercises”
  - “will replace C8 foam with C6”



# Fluorinated Alternatives?



## Fluorinated Alternatives: Myths versus Facts



Long-chain highly fluorinated chemicals — including PFOA, PFOS and other C8 compounds — were used for decades to give water-repellant, stain-resistant, and non-stick properties to furnishings, carpets, outdoor gear and other products. Exposure to PFOA has been linked to kidney and testicular cancer, elevated cholesterol, decreased fertility, thyroid problems and changes in hormone functioning in adults as well as adverse developmental effects and decreased immune response in children<sup>1</sup>.

Due to such harmful effects, the long-chain chemicals were recently phased out and replaced by numerous similar compounds, including short-chain molecules called C6 and C4<sup>2</sup>. Industry says these alternatives are safe, sustainable, and well-tested<sup>3</sup>. A look at the facts shows those claims don't stick.

### THE BOTTOM LINE

Highly fluorinated chemicals pose a potential risk to human health and the environment, and they should only be used with safeguards when their function is essential.



**MYTH:** "PFOA-free" means safe.

**FACT:** Products advertised as "PFOA-free" often contain replacement chemicals made with the same **problematic chemical building blocks** as PFOA.

Since PFOA has been phased out, numerous related chemicals that are equally persistent and may pose similar health risks have replaced it<sup>4</sup>. To prevent such "regrettable substitutions", the entire class of highly fluorinated chemicals should be avoided.

**MYTH:** Short-chain fluorinated alternatives like the 6 and 4 carbon-based compounds have been thoroughly tested and are safe.

**FACT:** Recent studies suggest these alternatives may cause similar health problems as the long chain compounds.

[www.greensciencepolicy.org/  
highly-fluorinated-chemicals/](http://www.greensciencepolicy.org/highly-fluorinated-chemicals/)



# Microwave Popcorn Bags

- High PFAS concentrations <sup>1-4</sup>
- Coop Denmark - halted popcorn sales in 2015 due to PFAS
- RESULT: PFAS-free popcorn bags



1. Zabaleta, I., et al. Talanta. 152, 353-363. (2016)
2. Zafeiraki, E., et al. Chemosphere. 94, 169-176. (2014)
3. Dolman, S. and Pelzing, B. J. Chrom. B. 879:22, 2043-2050. (2011)
4. Begley, T. H., et al. Food Add. and Cont. 22:10, 1023-1031. (2005)

# Proposed State Legislation

- **California** Assembly Bill 958 (Ting)
  - “A food provider shall not serve, offer for sale, or offer for promotional purposes prepared food in, on, or with fast food packaging that contains PFAS.”
- **Vermont**
  - Pending bill would prohibit all PFASs in food contact materials
- **Washington** State Children’s Safe Products Act
  - Proposal to add entire class of PFASs to list of chemicals of high concern at April 25 hearing

# "Tackling Toxics" in *Science*

Purchasers can ask:

"companies are ....phasing out highly fluorinated and other harmful chemical classes from the products they buy, produce, and/or sell."



***"Do we need this chemical,  
given the potential for harm?"***

11 MARCH 2016 • VOL 351 ISSUE 6278

DOI: [10.1126/science.aaf5468](https://doi.org/10.1126/science.aaf5468)

## BRANDS ARE ELIMINATING HIGHLY FLUORINATED CHEMICALS

IKEA

H&M

Crate&Barrel

LEVI STRAUSS & CO.

PUMA

benetton

ESPRIT

adidas

MARKS &  
SPENCER

MANGO

BURBERRY<sup>®</sup>  
LONDON

ZARA



## Phasing out PFASs

“If IKEA can do it, Kaiser Permanente can do it”

- The idea of tackling PFASs was sparked at a conference in which IKEA discussed its goal to phase out the use of fluorinated chemicals
- Kaiser Permanente is phasing out all PFASs and flame retardants from its furnishings

- *Global Business Briefing, February 2016*

## A large retailer celebrates!

“In another couple weeks, we will stop offering C6 chemistry fabric protection as an optional add-on.

If a customer asks for it, we will explain that the manufacturer does not recommend treating the product with any type of fabric protection.

So tonight, I will open a nice bottle of Merlot, and share a toast with my wife over the fact that we have made a few more products safer for a few more people in this world.”



Is it necessary?

Is it worth it?

Is there a safer alternative?



s i x c l a s s e s . o r g

Online Premiere:  
**Six Classes Three-Minute Videos**

June 22, 2017 at 11:00 am Pacific

# We are hiring!

## Deputy Director for the Six Classes:

- Lead Six Classes work

## Science and Policy Associate:

- Implement projects and activities

[www.GreenSciencePolicy.org/jobs/](http://www.GreenSciencePolicy.org/jobs/)



# Thank You!

- More on highly fluorinated chemicals: <http://greensciencepolicy.org/highly-fluorinated-chemicals/>
- Mark Strynar: [Strynar.Mark@epa.gov](mailto:Strynar.Mark@epa.gov)
- Chris Higgins: [chiggins@mines.edu](mailto:chiggins@mines.edu)
- Rob Bilott: [bilott@taftlaw.com](mailto:bilott@taftlaw.com)
- Arlene Blum: [Arlene@GreenSciencePolicy.org](mailto:Arlene@GreenSciencePolicy.org)

## Interesting Reads

- Arlene's Science Magazine article on "[Tackling Toxics](#)".
- The great investigative series [Teflon Toxin - DuPont and the Chemistry of Deception](#).
- The *New York Times Magazine* article featuring Rob Bilott, "[The Lawyer Who Became DuPont's Worst Nightmare](#)".

We will email you these article links.

# Highly Fluorinated Chemicals: A Sticky Issue

## Q&A

**Tom Bruton, Green Science Policy Institute**

To submit questions, click “Q&A” or email [Veronica@GreenSciencePolicy.org](mailto:Veronica@GreenSciencePolicy.org).

Speakers will respond to as many as time permits. We apologize if yours isn't answered.



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