Chemicals without Harm
Policies for a Sustainable World

Ken Geiser
Lowell Center for Sustainable Production
There is a problem with chemicals:

Too many of the products that we need and use are made with hazardous chemicals

BPA is found in 9 out of 10 Americans

232 toxic chemicals are found in umbilical cord blood of newborns in the US
The Conventional Policy Response to Hazardous Chemicals

Federal Chemical Control Laws on the 1970s

• Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
• Federal Food, Drug and Cosmetics Act (FFDCA)
• Toxic Substances Control Act (TSCA)
• Consumer Product Safety Act of (CPSA)

For some 40 years we have relied on government regulations to manage the risks of dangerous chemicals
Limits of Federal Chemical Control Laws

• The laws depended on government to determine risks
• The processes focused on exposure control (risks) rather than reducing inherent hazards

• The processes addressed chemicals one-by-one
• The laws did not generate sufficient chemical information

• The processes have been slow, adversarial and costly
• The laws have not stimulated green chemistry and safer chemicals
Reforming the Toxic Substances Control Act

- Senate – S. 697
  - Creates Safety Assessments, Safety Standards, Safety Determinations
  - EPA identifies 10 High Priority Substances per year with 25 maximum and 10 Low Priority Substances with 25 maximum
  - States are pre-empted when EPA begins an assessment
  - Develops a Sustainable Chemistry Program
  - Sets a fee

- House—H.R. 2576
  - EPA conducts 10 or more Risk Evaluations per year
  - States are pre-empted when EPA finds a substance poses no unreasonable risk
  - EPA publishes a list of Persistent, Bioaccumulative and Toxic Substances
  - Sets a fee

**TSCA reform will provide necessary, but modest improvements**
Pressure for safer chemicals is growing
Consumers are increasingly concerned about the Safety of Chemicals

Suffolk County Bans Bisphenol A

CDC Biomonitring Study

Declining sperm counts in Men

Maine warnings on Mercury in Fish

PBDEs found in Breast Milk

Washington bans phthalates in Toys

Santa Monica finds MBTE in Drinking Water

Mattel recalls lead painted Toys

European Union moves to ban Nanoparticles in Food

Growing market for Organic Foods

EPA to consider Perchloroethylene in Drycleaning
States are enacting Chemical Policy Laws

States Considering or Enacting Chemical Policies, 2013

However, not all states are covered

Source: Safer States
NGOs are conducting successful Advocacy Campaigns

- Mercury in medical devices
- Lead in children’s toys
- Parabens in cosmetics
- Trichlosan in personal care products
- Brominated flame retardants in upholstered furniture
- Bisphenol A in water bottles, can linings and thermal papers
- Phthalates in building materials
- Perfluorinated compounds in garments

However, most are single substance campaigns
Product Manufacturers are creating Safer Chemical Programs

Limited Impact due to Confidentiality
Retailers are launching Safer Chemical Selection Programs

Limited by lack of disclosure in Supply Chains
Foreign and International Governments are creating New Chemical Policies

• European Union’s REACH is
  – registering all chemicals,
  – developing rich chemical information profiles
  – Requiring authorization for substances of very high concern

• European Union’s Product Directives are restricting hazardous chemicals in products

• Stockholm, Rotterdam, Basil Conventions and SAICM are setting global policies on chemicals
There are many safer chemical initiatives...

...however, they are fragmented and not scaled to adequately address the chemicals problem
We need to build a Comprehensive Safer Chemical Strategy

- Consumer Awareness
- NGO Campaigns
- Brand Manufacturer Programs
- Retailer Chemical Initiatives
- International Government Policies
- Green/Sustainable Chemistry
- Safer Chemical Businesses

Strategy

The Chemicals Problem:
The Chemicals Economy
Principles for a Safer Chemicals Policy Framework

- **Comprehensive**—covers all chemicals
- **Transparent**—increases chemical information and public knowledge
- **Participatory**—engages multiple parties
- **Hazard-based**—focuses on intrinsic properties
- **Transformative**—transitions from high hazard to lower hazard substances
- **Innovative**—encourages research and green chemistry
First Steps

Reframe the Chemicals Problem

• Shift from a focus on controlling hazardous chemical risks to a focus on converting the chemicals market and chemical industry to safer chemicals

Focus on the Chemicals Economy as a System

• Address the chemicals economy as a chemical production and consumption system and locate the most promising levers for change
Building Blocks for a Safer Chemicals Policy Framework

1. Set National Goals and Plans
2. Characterize and Classify All Chemicals
3. Generate and Make Accessible Chemical Information
4. Accelerate Substitution with Safer Alternatives
5. Create Safer Alternatives
6. Reconstruct Government Capacity
1. Set National Goals and Plans

Models:
European Union “Generational Goal”:

“By 2020...chemicals are only produced and used in ways that do not pose significant threats to human health or the environment”

Example: National Safer Chemical Goal

By [certain date] achieve an environment free of manufactured hazardous chemicals that present a threat to human health or the environment and phase out those substances that pose the highest risks throughout their life cycles.
2. Characterize and Classify All Chemicals

<table>
<thead>
<tr>
<th>Preferred Chemicals</th>
<th>Chemicals of Unknown Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Use, but Periodically Review</em></td>
<td>Poorly Characterized Chemicals</td>
</tr>
<tr>
<td><em>Use, but with Care</em></td>
<td><em>Avoid, but promote Research</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemicals of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Chemicals</td>
</tr>
<tr>
<td><em>Seek Substitutes</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemicals of Very High Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Hazardous Chemicals</td>
</tr>
<tr>
<td><em>Avoid, phase out Use</em></td>
</tr>
</tbody>
</table>

Universal Classification of Chemical Substances
Methods for Classifying Chemicals

Characterization Criteria

GHS—Globally Harmonized System for Classification and Labeling of Chemicals

WHO
Recommended Classification of Pesticides by Hazard

Internet
Public Review and Comment
3. Generate and Make Accessible Chemical Information

Promote Chemical Profiles on All Chemicals

Models:  High Production Volume
         Chemical Challenge
         European Union REACH
         Chemical Dossier

Chemical Profile
Toluene

Chemical Profile
Perchloroethylene

Physical and Chemical Characteristics
Environmental Fate Properties
Human Health Hazard Assessment
Environmental Hazard Assessment
Exposure Assessment
PBT Assessment
Risk Characterization
New Tools for Generating Chemical Profile Information

**Hazard Assessments**
- Authoritative lists
- SARs, QSARs
- PBT Profiler
- EPA’s Oncologic, ECOSAR

**Release and Exposure Assessments**
- TRI And PRTRs
- EPA’s EPI Suite, ChemSTEER, E-FAST
- Biomonitoring

**Chemical Testing**
- *Invivo* - *Invitro* lab testing
- ToxCast
- High throughput computational toxicology

**Chemical Inventories**
- EPA CDR
- EU EINECS
- Product registries

**Safer Alternative Inventories**
4. Accelerate Substitution to Safer Alternatives in Economic Sectors

Promote Alternatives Assessment

Models:  TURI/Lowell Center
         EU-ECHA
         California Safer Consumer Product Regulation
         NAS Chemical Alternatives Framework

Promote Comparative Chemical Hazard Assessments

Models:  Green Screen
         Pharos
         Swedish PRIO
         German Column Model
## Develop Economic Sector based Planning Strategies

<table>
<thead>
<tr>
<th>Sector</th>
<th>Promoters</th>
<th>Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care</td>
<td>Health Care without Harm, Practice Greenhealth</td>
<td>CleanMed, Green Guide to Health Care</td>
</tr>
<tr>
<td>Cleaning products</td>
<td>EPA, GreenBlue Institute,</td>
<td>CleanGredients, SaferChoice</td>
</tr>
<tr>
<td>Clothing and apparel</td>
<td>American Apparel and Footwear Association, Sustainable Apparel Coalition, OIA</td>
<td>Eco-labels, Eco-Index, Higg Index, Joint Roadmap for Zero Discharge, Environmental Product Declarations</td>
</tr>
<tr>
<td>Building construction</td>
<td>USGBC, Healthy Building Network, Swedish Construction Federation</td>
<td>LEED, BASTA, Pharos, Environmental Product Declarations, Eco-labels</td>
</tr>
<tr>
<td>Automobile</td>
<td>Automobile assembly companies, Ecology Center</td>
<td>IMDS, GADSL, Consumer Action Guides</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>ACS Green Chemistry Institute</td>
<td>Green Chemistry Pharmaceutical Roundtable</td>
</tr>
</tbody>
</table>
5. Create Safer Alternatives

**Designate Regional Green Chemistry and Engineering Centers**

Models: Warner Babcock Institute for Green Chemistry  
Center for Green Chemistry, University of Oregon  
Institute for Green Science, Carnegie-Mellon  
Center for Green Chemistry, U. of California Berkeley  
Center for Green Chemistry and Engineering, Yale

**Expand Green Chemistry Research Funding**

Models: NSF Green Chemistry Basic Research Program  
Green Chemistry Research and Development Bill

**Redesign Secondary and Post-Secondary Chemistry Education**

Models: Beyond Benign K-12 Education Programs  
Green Chemistry Commitment
## Businesses Making Safer Chemicals

<table>
<thead>
<tr>
<th>Company</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segentis</td>
<td>Phthalate-free plasticizers</td>
</tr>
<tr>
<td>Metabolix</td>
<td>Chemical intermediates used in the production of resins, fibers, solvents, personal care products</td>
</tr>
<tr>
<td>SoyClean</td>
<td>Cleaners derived from soy and citrus, vegetable and seed oils</td>
</tr>
<tr>
<td>Air Products</td>
<td>Nonylphenol ethoxylates-free surfactants made from palm oil</td>
</tr>
<tr>
<td>Soy Technologies</td>
<td>Ready-to-use formulations for cosmetics, personal care products, paints and coatings</td>
</tr>
<tr>
<td>Allylix</td>
<td>Terpenes and derivatives for crop protection, biocides, flavors, fragrances and pharmaceuticals</td>
</tr>
<tr>
<td>SyntheZyme</td>
<td>Polyhydroxyalkanoate polymers and biosurfactants</td>
</tr>
</tbody>
</table>
6. Reconstruct Government Capacity

**Work within Current Federal Authorities**

- Promulgate new regulations and standards
- Set national goals and plans
- Collaborate in Economic Sector Work Groups
- Generate chemical information and databases
- Support Green Chemistry and Engineering

**Expand Federal Authorities**

- Reform current Chemical Control Statutes
- Create a new Chemicals Agency
Develop a New Federal Chemical Agency

A non-regulatory Federal Chemicals Agency

- collect and disseminate information
- promote chemical research
- conducts risk, life cycle and alternatives assessments
- promote safer alternatives

Models: Swedish Chemicals Agency (Kemi)

A supervisory authority that works in Sweden and in the EU to promote legislation and programs that contribute to achieving “A Non-Toxic Environment”. Keeps a products register, maintains databases, approves pesticides, conducts risk assessments.

European Chemicals Agency

The Agency’s mission is to ensure consistency in chemicals management across the EU and to provide technical and scientific advice, guidance and information on chemicals.
We can solve the Chemicals Problem
We can have a vibrant, productive and safer economy

It will take a broad and inclusive movement for safer chemicals

For more information

www.materialspolicy.org