Is it necessary?

Green chemistry and California's Green Chemistry Initiative

Presented by Dorothy Wigmore at

Are women automotive plastic workers at risk? Starting the conversation -- Windsor, January 27, 2012

The prevention triangle -- principles for solving health and safety problems

Least effective

Most effective

Level 3 prevention

-- *limit the harm* between the source and worker or at the worker (often individual solutions)

Level 2 prevention

-- *prevent the harm* at source (collective solutions)

Level 1 prevention

-- *prevent/get rid of the hazard* (collective solutions)

* *What happens if it's upside down? It falls over!*

Dorothy Wigmore - 2011

For a healthy environment ...

... inside and out

Why are toxic chemicals used now?

- By "accident"?
- On purpose?

There is a method to the madness

The reactionary principle – don't worry 'til we have to

- Design new chemicals, materials and technologies without thinking about how they could affect people's health and/or the environment.
- *Demand 100% proof about the harm from <u>each</u> hazard before doing anything about it. Tackle hazards one at a time.*
- Expect the public and government to prove something is harmful, <u>after</u> it is on the market, and keep chemical information secret ("confidential business information").
- *Use the "Delay game" as long as possible.*
- Discourage a public voice – including workers' and consumers' experiences -- about the need to deal with these hazards.

From David Kriebel's 2007 article, "The reactionary principle: inaction for public health".

Delay game – the four dog defence

My dog doesn't bite.

My dog bites, but it didn't bite you.

My dog bit you, but it didn't hurt you.

My dog bit you, and hurt you, but it wasn't my fault!

The Chemical Industry Delay Game, ***How the Chemical Industry Ducks Regulation of the Most Toxic Substances,*** **Natural Resources Defense Council, 2011.**
http://www.nrdc.org/health/thedelaygame.asp

You're running the world.
You get to design
products and what goes
into them.

Think of the plastic
cutlery used for lunch.

What "rules" would you
make about "safer"
cutlery?

The precautionary principle -- *better safe than sorry*

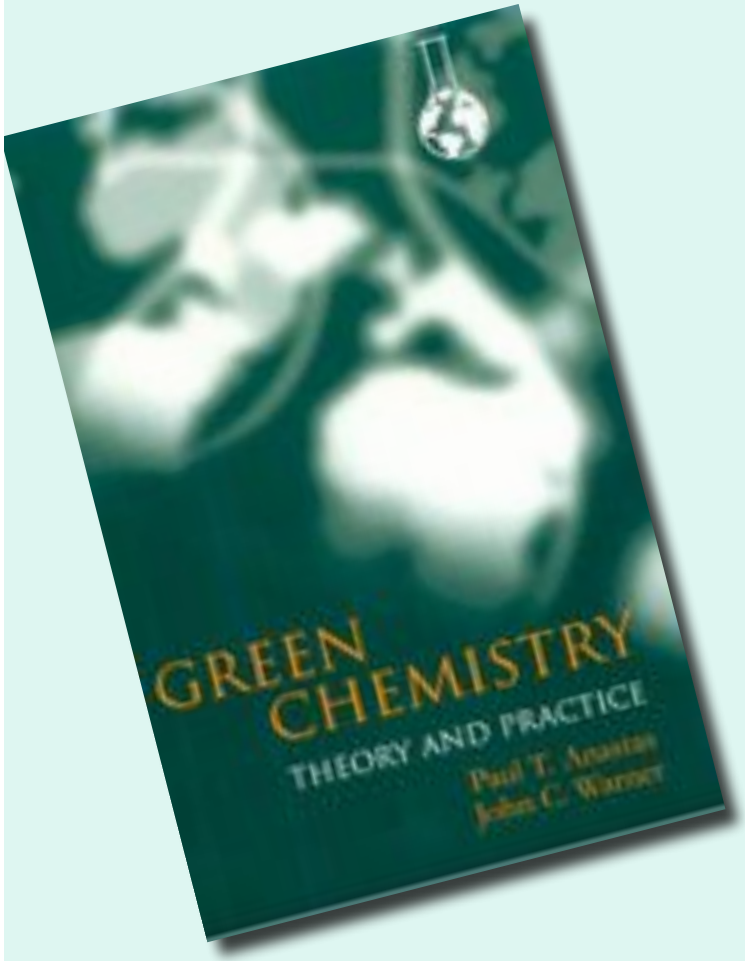
- ✓ Take action to prevent harm, even if we are not sure about (all) the hazards.
- ✓ *Shift the "burden of proof" to companies. Before it is sold, used or put on the market, make them prove that something will not harm people or the environment.*
- ✓ Look at a lot of options or alternatives. Go for the non-toxic or least toxic.
- ✓ *Increase public participation. Be democratic. Make sure that workers, consumers, and environmentalists are in all conversations and decisions about how to deal with chemicals and products.*

It's the hazards, stupid!

Green chemistry is about the chemical's hazard, not the risk it will harm (so why talk of "risk factors"?).

It's not about "safe" exposure levels or "controlling" the hazard.

Green chemistry is ...



- ✓ *asking "Is this chemical/product necessary for this task?"*
- ✓ about prevention -- using the precautionary approach
- ✓ *better recipes -- designing safer chemicals, products and processes for healthier people, communities and environments*
- ✓ not having to say you're sorry (or making it less likely)

Green chemistry ...

.. is a **framework** for the design of products and processes such that the goals themselves, e.g. degradability or less toxic products, are essential performance criteria.

It will be important that these goals are intrinsic design specifications. In that way, it **will be obvious that when a hazardous and unsustainable product or process is produced, there are only two explanations: (1) there is a design flaw or (2) it was designed to be hazardous.**

Paul Anastas

Paul Anastas and Evan Beach, "Green chemistry: the emergence of a transformative framework", *Green Chemistry Letters and Reviews,* March, 2007.

Green chemistry is important to workplaces and workers

- ✓ addresses the unique effects of toxic chemicals on workers' health
- ✓ *prevents workplaces from contaminating the environment and communities*
- ✓ promotes integrated strategies to protect workers, communities, and the environment
- ✓ *builds on safer/healthier chemical alternatives already out there*

Based on Julia Quint's presentation at a Green Chemistry Initiative workshop, 2010

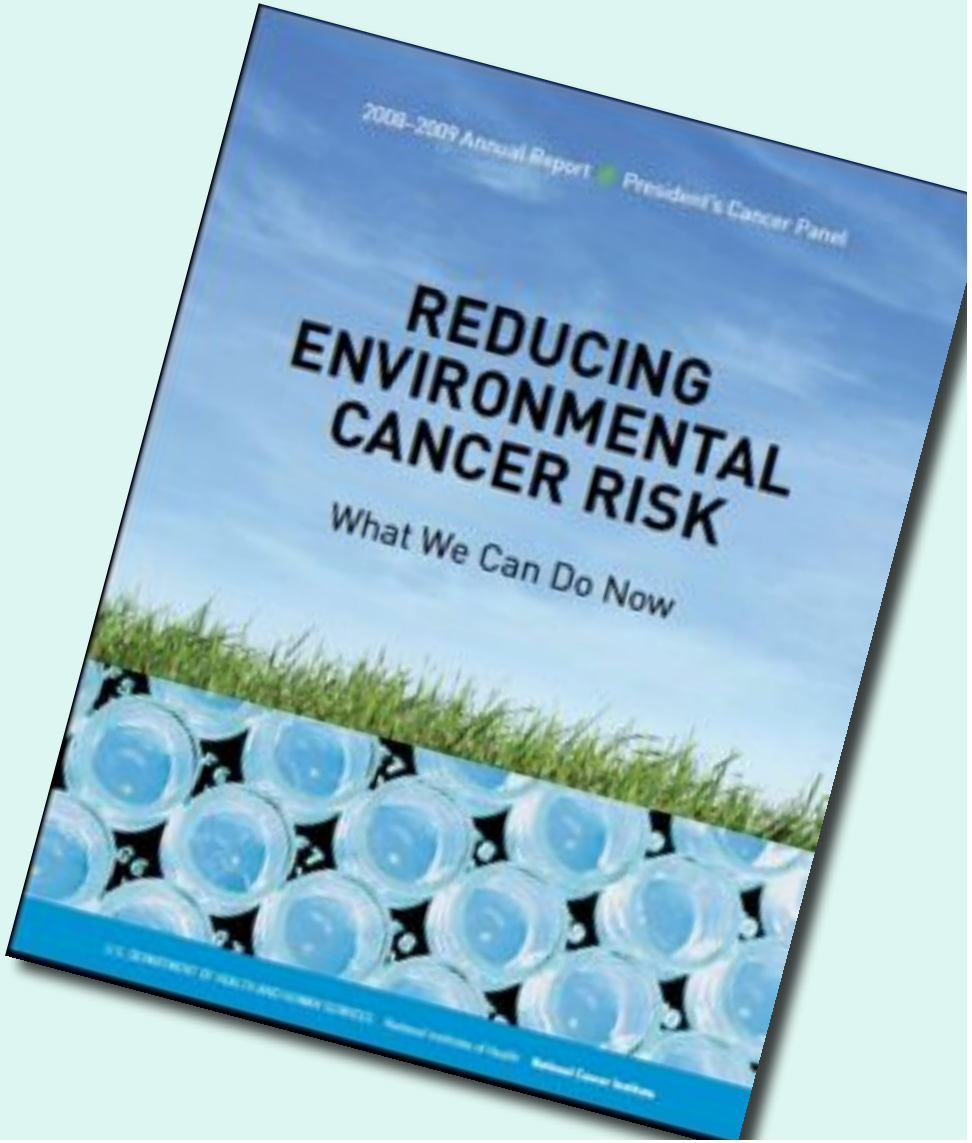
Benefits of green chemistry

- ✓ healthier workplaces and communities
- ✓ links healthy workplaces to a healthy environment
- ✓ economical
- ✓ less waste
- ✓ fewer "accidents"
- ✓ safer/healthier products
- ✓ lowers cost of production and regulation
- ✓ competitive advantage

Thanks to Clean Production Action

Use informed substitution

"Green chemistry" initiatives and research, including process redesign, should be pursued and supported more aggressively, but ***new products must be well-studied prior to and following their introduction*** *into the environment and stringently regulated to ensure their short- and long-term safety.*



Cradle-to-Cradle is an innovative and sustainable industrial model that focuses on design of products and a production cycle that strives to produce no waste or pollutants at all stages of the lifecycle.

Braungart and McDonough
Cradle-to-Cradle: Remaking the Way We Make Things (2002)

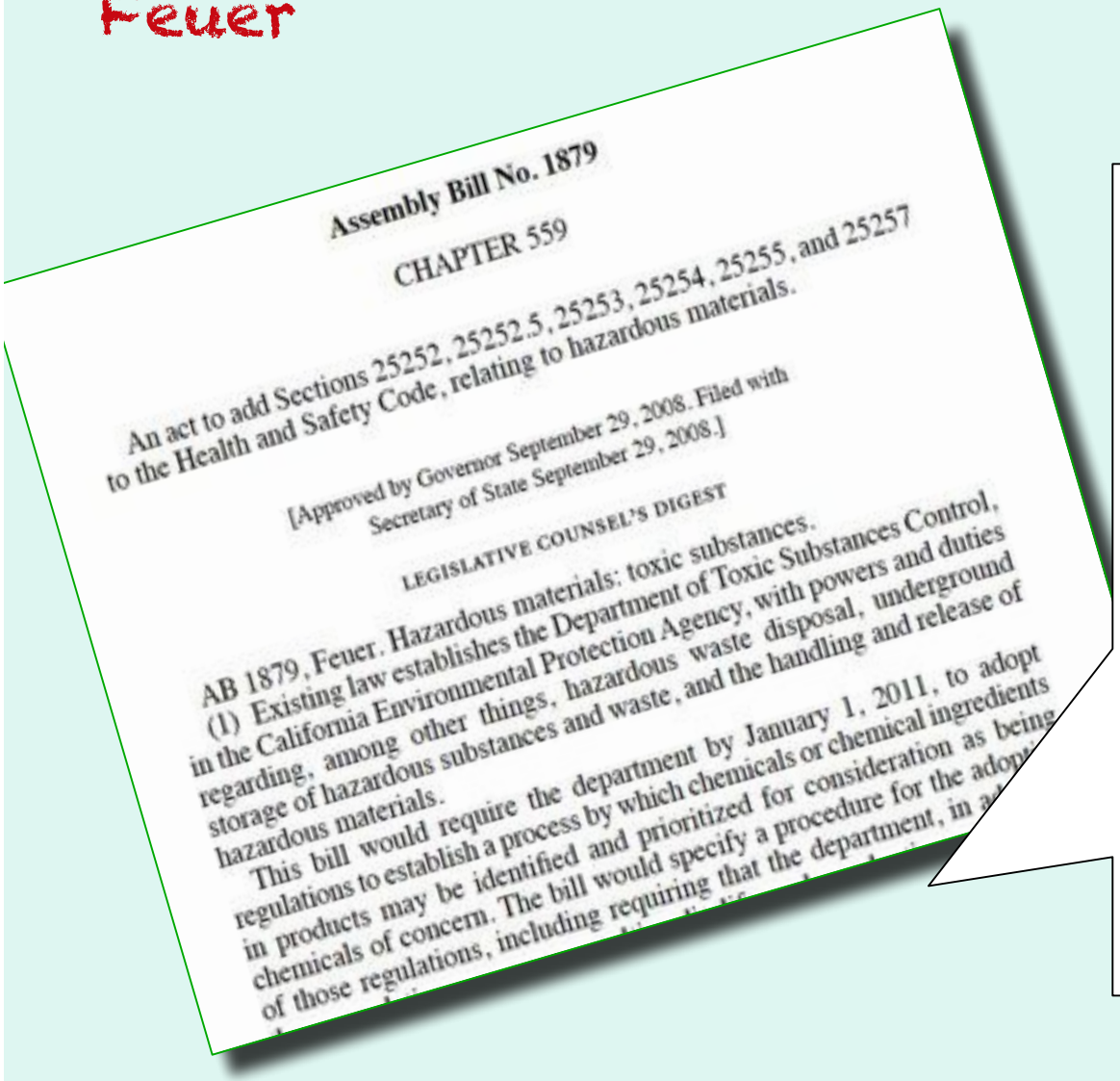
It takes us to different ways of thinking about the design of materials and products and the chemicals that go into them

California has a Green Chemistry Initiative

1. Expand pollution prevention
2. Develop green chemistry capacity
3. Create an on-line product ingredient network
4. Create an on-line toxics clearinghouse (SB 509)
5. Accelerate the quest for safer products (AB 1879)
6. Move toward a cradle-to-cradle economy

California Green Chemistry Initiative, Final Report
December, 2008

The main law was proposed by Assembly Representative Michael Feuer



Assembly Bill No. 1879

CHAPTER 559

An act to add Sections 25252, 25252.5, 25253, 25254, 25255, and 25257 to the Health and Safety Code, relating to hazardous materials.

[Approved by Governor September 29, 2008. Filed with Secretary of State September 29, 2008.]

LEGISLATIVE COUNSEL'S DIGEST

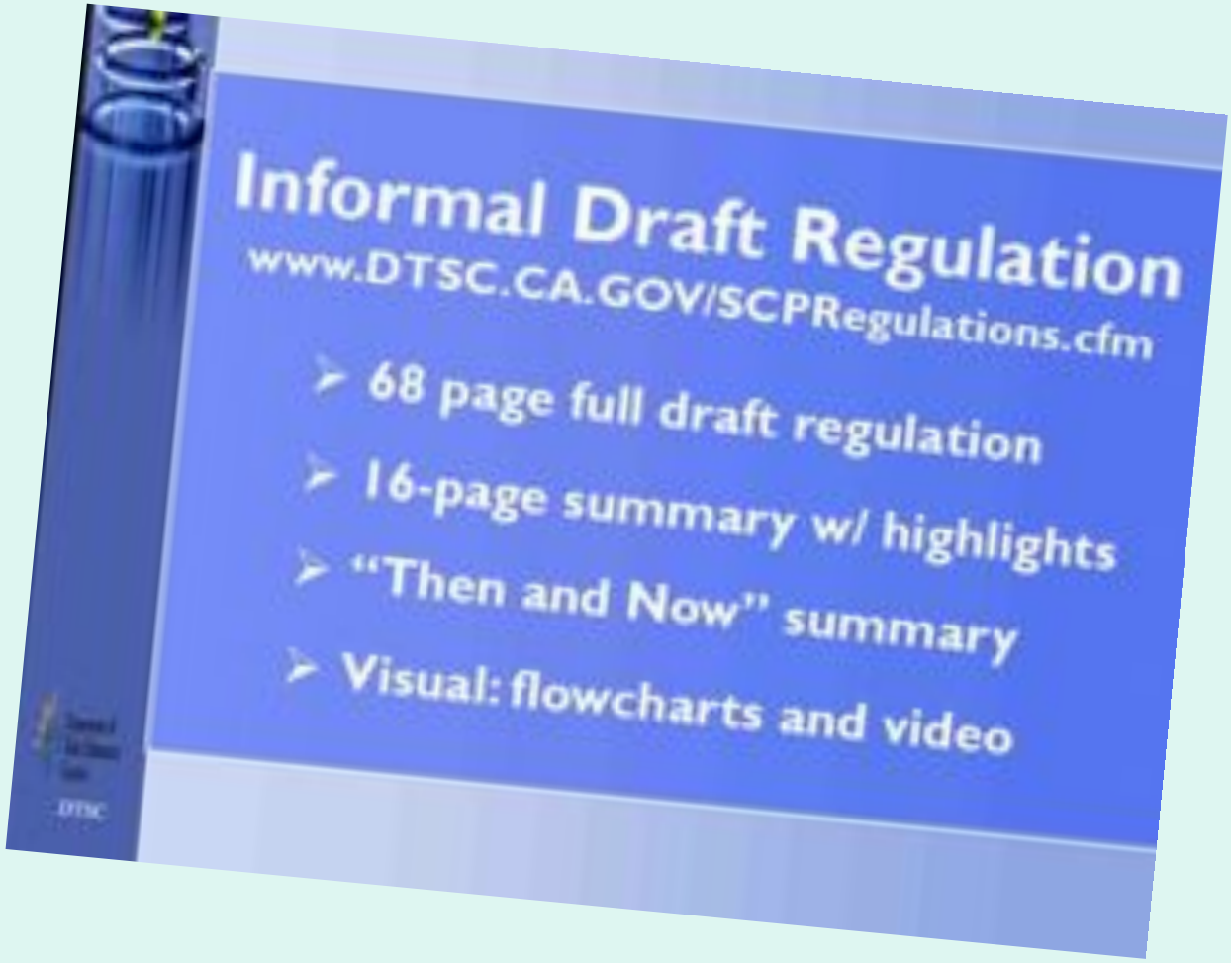
AB 1879, Feuer. Hazardous materials: toxic substances.

(1) Existing law establishes the Department of Toxic Substances Control, in the California Environmental Protection Agency, with powers and duties regarding, among other things, hazardous waste disposal, underground storage of hazardous substances and waste, and the handling and release of hazardous materials.

This bill would require the department by January 1, 2011, to adopt regulations to establish a process by which chemicals or chemical ingredients in products may be identified and prioritized for consideration as being chemicals of concern. The bill would specify a procedure for the adop of those regulations, including requiring that the department, in a

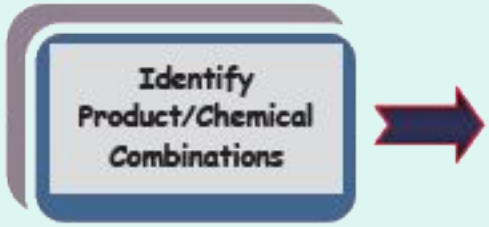
The department would also be required to adopt, by January 1, 2011, regulations to establish a process by which ***chemicals of concern in products****, and* ***their potential alternatives****, are evaluated to determine how best to* ***limit exposure or to reduce the level of hazard posed by a chemical of concern.***

DTSC introduced informal draft regulations in October*



** The formal draft regulations are expected at the end of February, 2012.*

California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) lists ± 3,000 chemicals from different lists as "chemicals of concern"

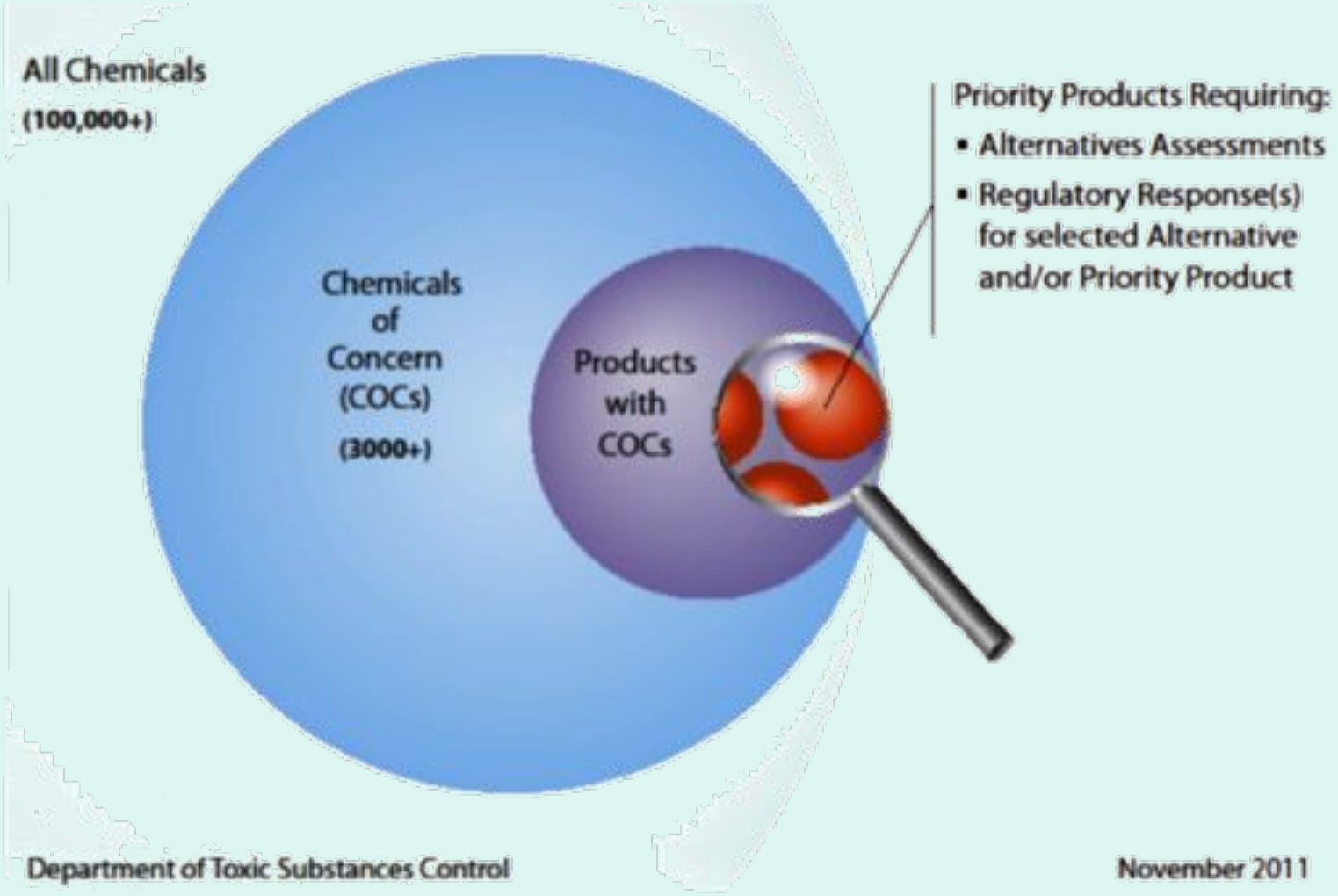


DTSC lists consumer products with these ± 3,000 chemicals that are "in commerce" in California, combinations of the chemicals

DTSC priorises consumer products, based on criteria that include "sensitive populations" (workers?). Companies making these products will have to do alternatives assessment.

DTSC requires manufacturers to determine if there are alternatives for the chemicals of concern, and to provide information about their health effects.

Bans?
Truly "safer" alternatives?
Less toxic products, chemicals or processes?
Priorities for which chemicals to "pick on"


All Chemicals
(100,000+)
Chemicals of Concern (COCs)
(3000+)
Products with COCs
Priority Products Requiring:
• Alternatives Assessments
• Regulatory Response(s) for selected Alternative and/or Priority Product
Department of Toxic Substances Control
November 2011

Comments on the informal regs:

Many firsts:

- a regulatory agency has set out to build a broad chemicals regulatory structure to require analysis of alternatives to toxic chemicals
- an agency has attempted to regulate chemicals, and their products
- focus first on intrinsic hazard traits of chemicals rather than exclusively relying on risk assessment
- regulations of chemicals will address cumulative exposures, which are a key public health concern and as well
- consumer product manufacturers must formally answer the question, "Is the use of this hazardous chemical necessary in my product?"

CHANGE
Californians for a Healthy & Green Economy

BUT:

- don't go far enough (workers not clearly included, "de minimus" levels -- especially for endocrine disruptors)
- no funding for department to do this work
- need **"no data, no market" rules to close chemical information data gaps and level playing field for all chemicals**
- trade secret claims create lack of transparency
- need other laws to make Green Chemistry Initiative work

And most in industry said:

- regs go too far
- department has no money to do this work
- use "risk assessment" approaches
- … and other things are not clear or are too onerous

http://www.dtsc.ca.gov/LawsRegsPolicies/Regs/upload/SCPInformalComments201201Web1.pdf

So where are there opportunities and openings for green chemistry change, especially with plastics and the auto industry?

- Development of new bioplastics technology- PHA from waste-methane and bioplastics recycling development (Stanford University)

- Sustainable bioplastic market studies (UC Davis and UC Berkeley)

http://www.dtsc.ca.gov/PollutionPrevention/Sustainable_Bioplastics.cfm

BizNGO.ORG
FOR SAFER CHEMICALS AND SUSTAINABLE MATERIALS

The Business-NGO Working Group promotes the creation and adoption of safer chemicals and sustainable materials in a way that supports market transitions to a healthy economy, healthy environment, and healthy people.

Principles for Sustainable Plastics

Plastics provide benefits to people across the globe. Lightweight, d
flexible and easy to form, their use continues to grow rapidly. Ce
baby car seats, blood bags, backpacks, chairs, cars and clothi
among the many products made with plastics and reflect their benef
erties. Yet plastic litter, gyres of plastics in the oceans and toxic phi
in plastic products are raising public awareness, consumer demand
pressure and regulations for a more sustainable material.

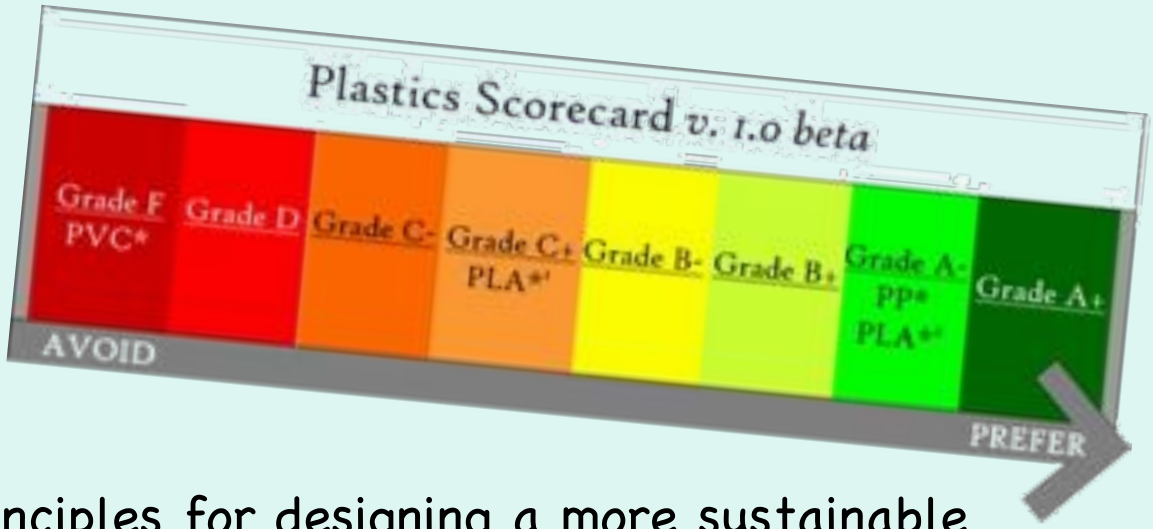
Businesses, hospitals and individuals are increasingly seeking pl
are more sustainable across their life cycle: from raw material e
production to manufacturing to use and end-of-life management

1. Sustainable resources
2. Closed loop systems (minimise the use of raw materials in the life cycle of a plastic and its associated product)
3. Energy efficient and renewable
4. Safer chemicals (i.e., healthier, non-toxic, chemicals and processes)
5. Healthy workplaces and communities

The BizNGO Principles for Sustainable Plastics have been informed by and incorporate concepts from the:

1) 12 Principles of Green Chemistry
2) Organization of Economic Cooperation and Development Sustainable Materials Management Principles
3) Cradle-to-Cradle Design Principles
4) Guidelines for Sustainable Biomaterials
5) Lowell Center Framework for Sustainable Products.

http://www.bizngo.org/sustainable.php



Our core principles for designing a more sustainable plastic product are:

Sustainable Resources: grow, harvest and/or collect natural resources in a sustainable manner.

Green Chemistry: strive to manufacture plastics based upon the 12 Principles of Green Chemistry.

Closed Loop Systems: for plastics that meet the above two principles, manufacture and use plastics that either a) contain a very high percentage of post-consumer recycled content or b) are biodegradable into safe and usable organic matter.

http://cleanproduction.org/Scorecard.Intro.php

http://www.greenchemistryandcommerce.org/home.php

Headlines

GC3 Green Chemistry & Commerce Council

Moving Business Toward Safer Alternatives

- About the GC3
- How to Participate
- Green Chemistry & DfE
- News / Updates / Events
- About the Lowell Center
- Links
- Contact Us

Participants Only

GC3 Green Chemistry & Commerce Council

Chemicals, alone or in combination, are the platform upon which key elements of the global economy have been built, and have been incorporated into millions of products used every day. Many chemicals may have inherently harmful characteristics that can impact ecological and human systems as they are used throughout supply chains.

A growing number of companies are discovering that the approaches of green chemistry and Design for Environment (DfE) allow for a transition to safer alternatives. The Green Chemistry and Commerce Council provides open conversation about the challenges to and opportunities for this successful transition.

Lowell Center for Sustainable Production

University of Massachusetts Lowell

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Automotive bioplastics: back to the future. | Canadian Chemical News | Professional Journal archives from AllBusiness.com

http://www.allbusiness.com/chemicals/plastics-rubber-industry-plastics/12399182-1.html
January 21, 2012

[ILLUSTRATION OMITTED]

As far back as the 1930's, Henry Ford used up to 60 pounds of soybeans in paints, enamels and molded plastic parts in his Model T. Plant-based plastics were used to make glove box doors, gear shift knobs, horn buttons, accelerator pedals, distributor heads, interior trim, steering wheels, dashboards and body panels. Ford also used fibres from hemp, wood pulp, cotton, flax and ramie as plastic fillers and reinforcement material.

Over time, bioplastics were eventually replaced by petroleum-based products because they were cheaper and better performing. However, the recent high cost of petroleum-based raw materials used in the production of plastics, and the advancement of new technologies like biotechnology, nanotechnology, green chemistry and material science, are paving the way for the resurgence of bio-based materials.

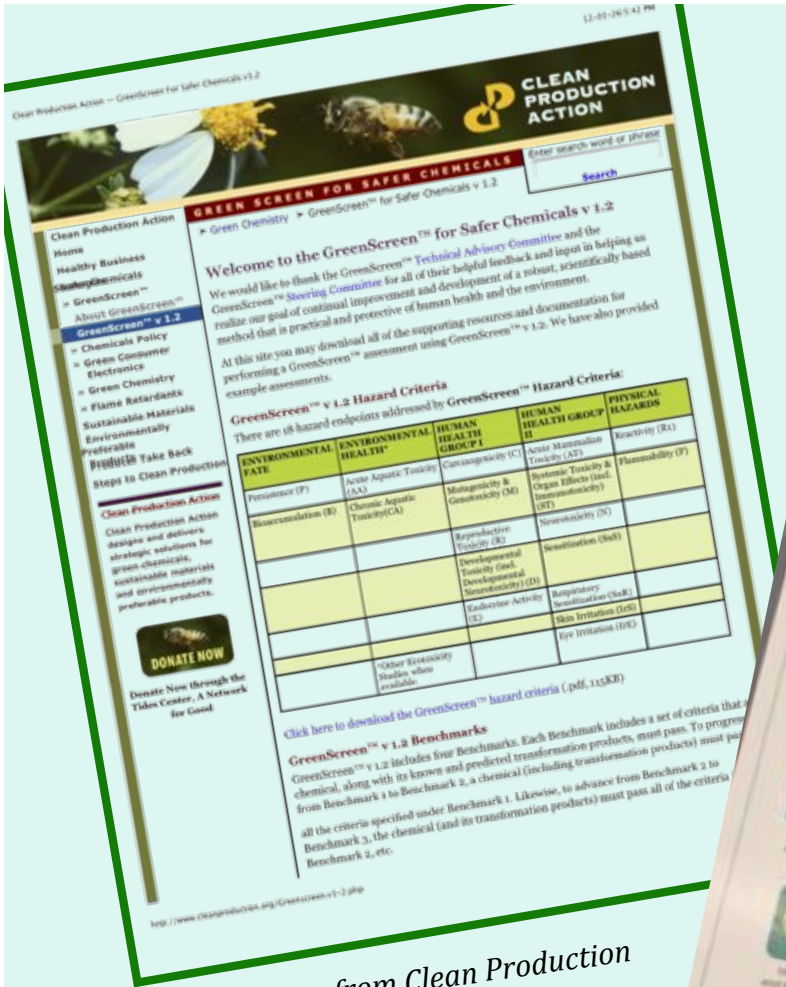
www.bioautocouncil.com

Dr. Emily Cranston, assistant professor at McMaster University, is working with nanocellulose, which she says could be used to reinforce plastics. Nanocellulose comes from wood, and would replace materials that come from non-renewable sources and are hard to recycle.

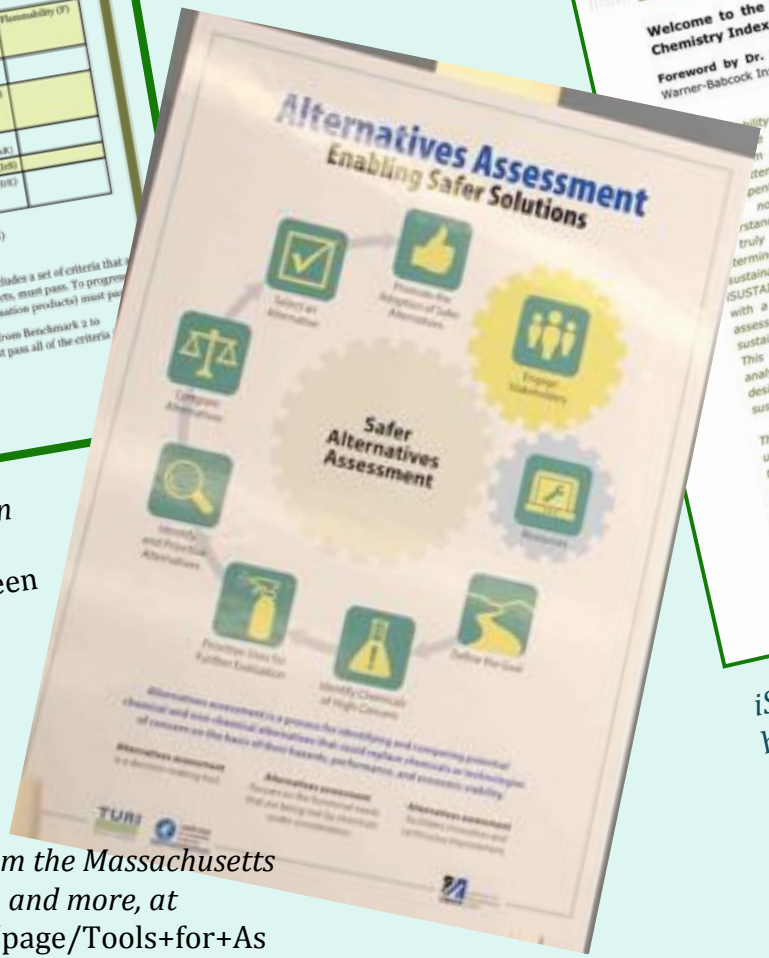
Ford's Matthew Zaluzec is a member of the board of this government-funded organisation. Ask him to push for safer plastics and processes.

http://www.greencentrecanada.com/

There are tools that could help



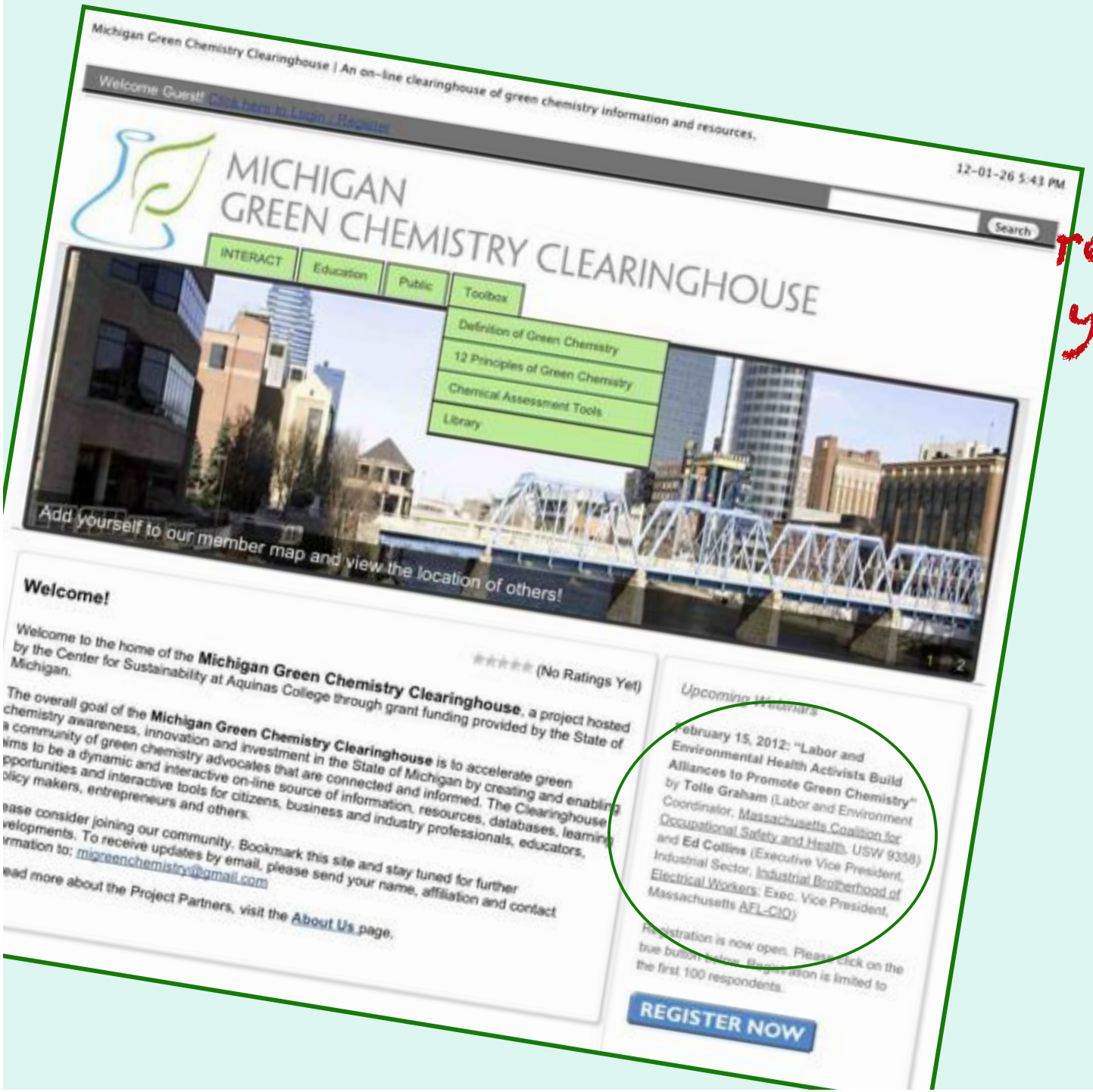
The Green Screen from Clean Production Action. See the latest version at http://www.cleanproduction.org/Greenscreen.v1-2.php



An alternatives assessment process, from the Massachusetts Toxics User Reduction Institute (TURI), and more, at http://www.ic2saferalternatives.org/page/Tools+for+Assessing+Alternatives

iSustain from beyondbenign, at https://www.isustain.com/

Check out green chemistry resources in your region



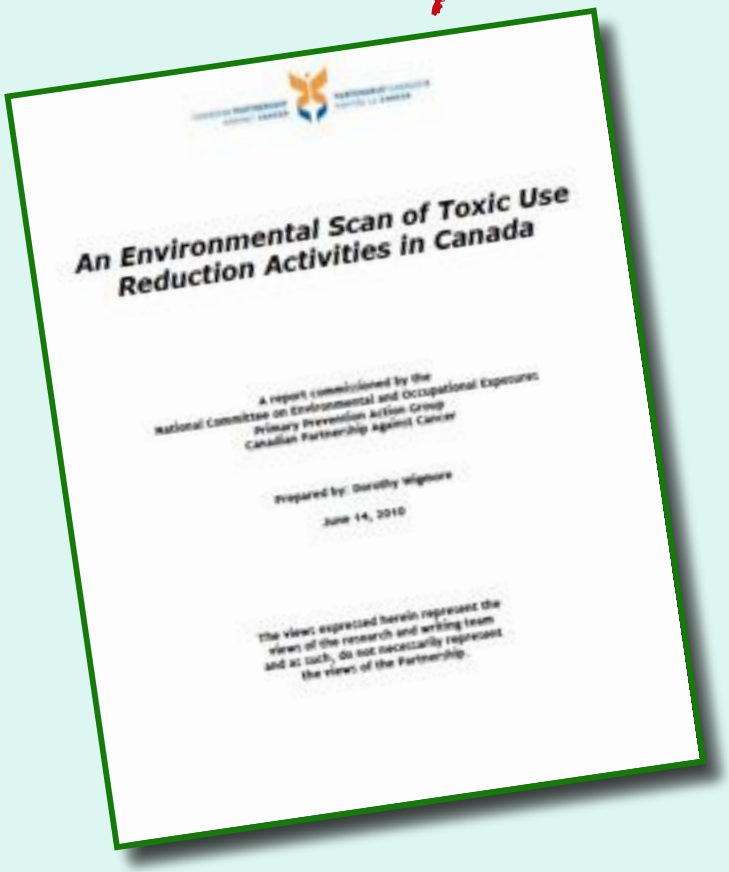
The Michigan Green Chemistry Clearinghouse (http://migreenchemistry.org/) has resources that could be useful. It also is linked to the Great Lakes Green Chemistry Network, which holds regular webinars. The one in February is about how workers and environmentalists in Massachusetts have worked together to promote green chemistry. You can hear it later too.

Some green chemists are interested in workers' needs

Ask Dr. John Warner, one of the "fathers" of green chemistry, for advice and help.

Ask Dr. Francesca Kerton, Memorial University about what she could do to help find some solutions

Check out the 250+ organisations that want to reduce the use of toxic substances in Canada, and the government laws that could do make it possible



An Environmental Scan of Toxic Use Reduction Activities in Canada

An Environmental Scan of Toxic Use Reduction Activities in Canada - Appendices

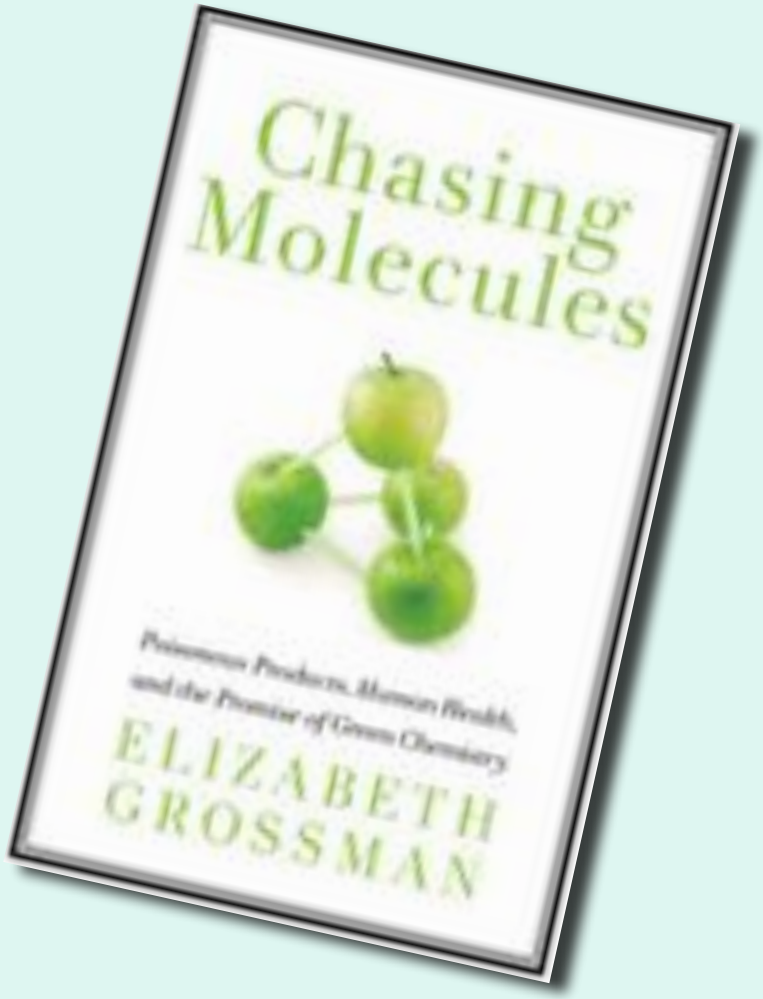
http://www.partnershipagainstcancer.ca/resources-publications/primary-prevention/healthy-public-policy/

Look for research and reports about:

- "environmentally benign manufacturing" that includes the auto industry (e.g., http://www.srl.gatech.edu/education/ME4171/EBM-finalreport.pdf)
- methods to assess the environmental impact of plastic injection molding
- what chemicals we need to substitute now (e.g., the SIN list, the Clean Production Action "Red List", PLUM database)

http://www.sinlist.org; cleanproduction.org/library/CPA-HBN_Red_List_26jan09.doc; http://bcgc.berkeley.edu/databases

For general information about green chemistry, check out *Chasing Molecules.*



Think big.

Think solutions.

Think tools.

Think collective action.