

# Green Chemistry and the Environmental Community



**Building Bridges with ICE—Information, Communication, Education**

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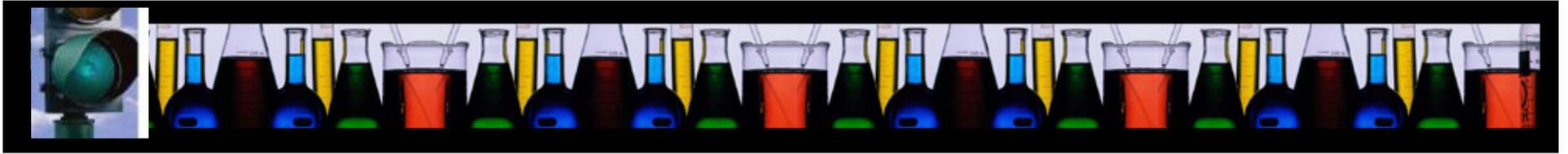
## Abstract

Green Chemistry is a concept that is approaching its adolescence in terms of the number of years it has existed. Much of its growth and development has gone virtually unnoticed by the environmental community. The demand for consumer goods still requires considerable inter-connections to chemistry and chemical processes. This demand for goods has placed a wide variety of well-documented burdens on the environment and the producers of those consumer goods. Combating the environmental impact of "chemicals" has proven to be a costly venture in terms of time, energy, expertise, and money. Green Chemistry has emerged as a means to shift the focus of environmental impact to the prevention of adverse impact through the design of chemical process to be more compatible with positive environmental outcomes, such as decreasing the amounts of harmful chemicals used in processes, reduction in on-site storage of chemicals, and implementation of strategies to achieve zero-discharge of pollutants and emissions. The concept of Green Chemistry has been closely aligned to that of sustainability and to a lesser degree the tenants of the Precautionary Principle. The "three-legged stool" model of sustainability--Ecology, Economics, Equity--has a logical analog for introducing the concepts of Green Chemistry: Government Agencies, Business and Industry, Environmental Concern. This presentation will examine another three-legged stool model to explore the potential for increased public awareness and outreach: Green Chemistry ICE--Information, Communication, Education--and cite the example of the Center for Environmental Information (Rochester, NY), in particular, CEI's Rochester Green Business Network as the type of organization that can perform such services, programs, and publications.

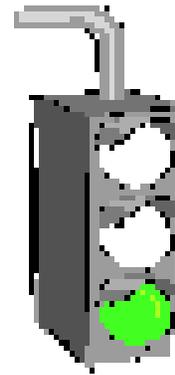


## Perceptions of Chemistry & Chemists

- First there were alchemists, then devil-may-care industrial chemists. Are green chemists, who will do no harm, about to be born?
- Bradley Pine  
Green Chemistry  
*Whole Earth*, Winter 1999
- Whether it's choosing low-emission company cars, "greening" corporate headquarters by using sustainable materials and design elements or even reducing the amount of waste produced by implementing paperless offices or recycling programs, many of today's leading businesses are demonstrating that sustainable practices are not only Earth friendly but also good for business.
- Putting a "Green Foot" Forward  
Editorial by DNA Communications  
*Sierra*, July/August 2005

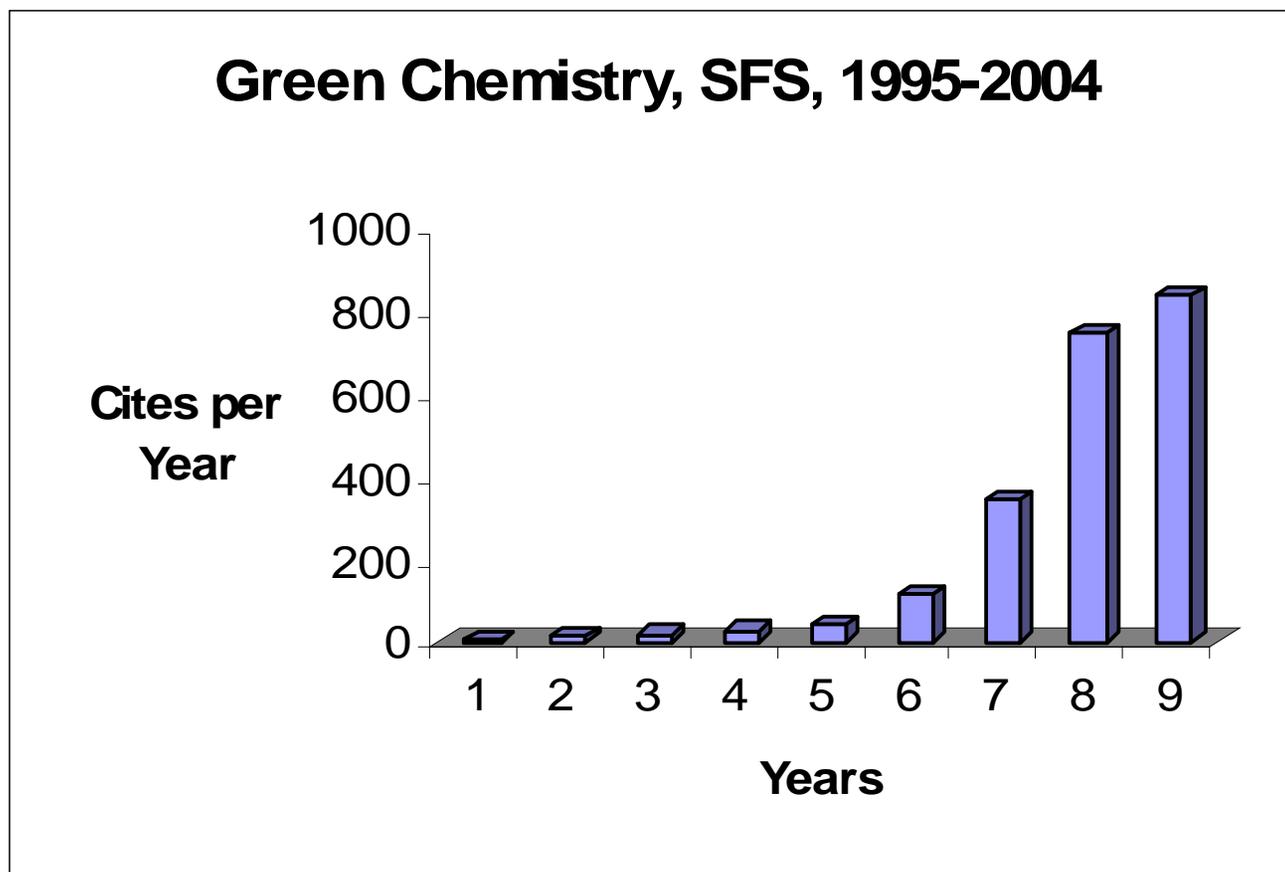


## What Are Images of Green?





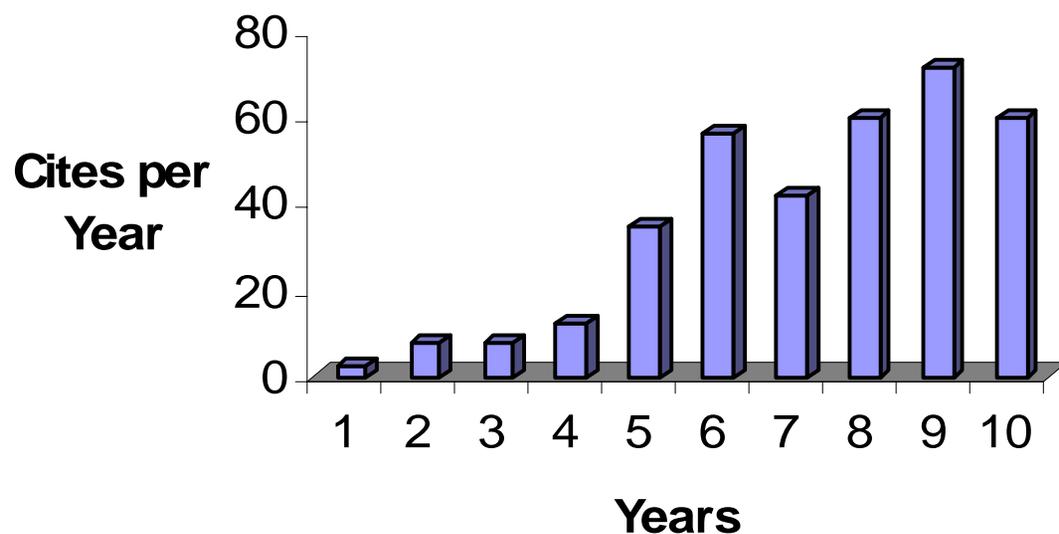
## Growing Information Base—Technical





## Growing Information Base—Non-Technical

**Green Chemistry, InfoTrac OneFile,  
1995-2004**





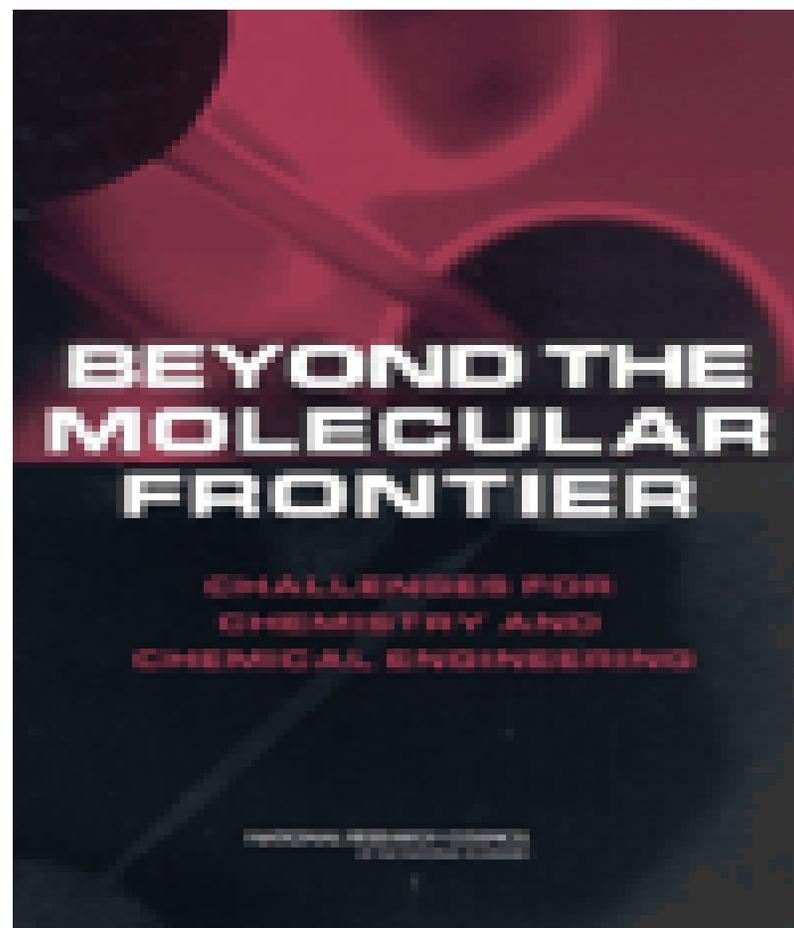
## Need Recognized

- **Beyond the Molecular Frontier: Challenges for Chemistry and Chemical Engineering** (2003)

[www.nap.edu/books/0309084776/html/](http://www.nap.edu/books/0309084776/html/)

- Board on Chemical Sciences and Technology, National Academy of Science

This points to the major goal of modern chemical engineering, in which many new factors are important for an optimal manufacturing process. Great progress has been made in developing Green Chemistry, but more is needed as we continue to meet human needs with the production of important chemical products using processes that are completely harmless to the earth and its inhabitants. P. 10



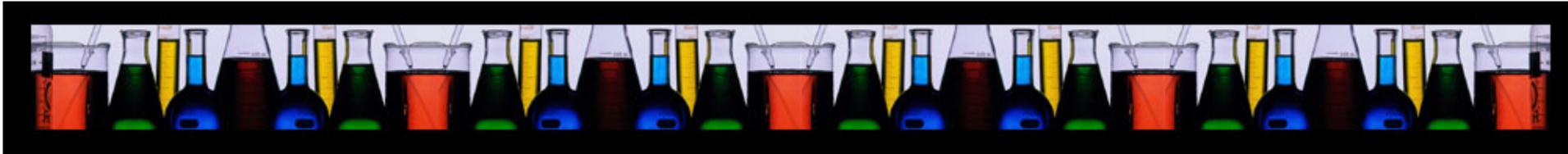


# Environmental ICE

- **Three-legged Stool of Sustainability**
  - Equity
  - Ecology
  - Economy
  
- Other 3-legged stools
  - **Environmental ICE\***
    - **Information**
    - **Communication**
    - **Education**

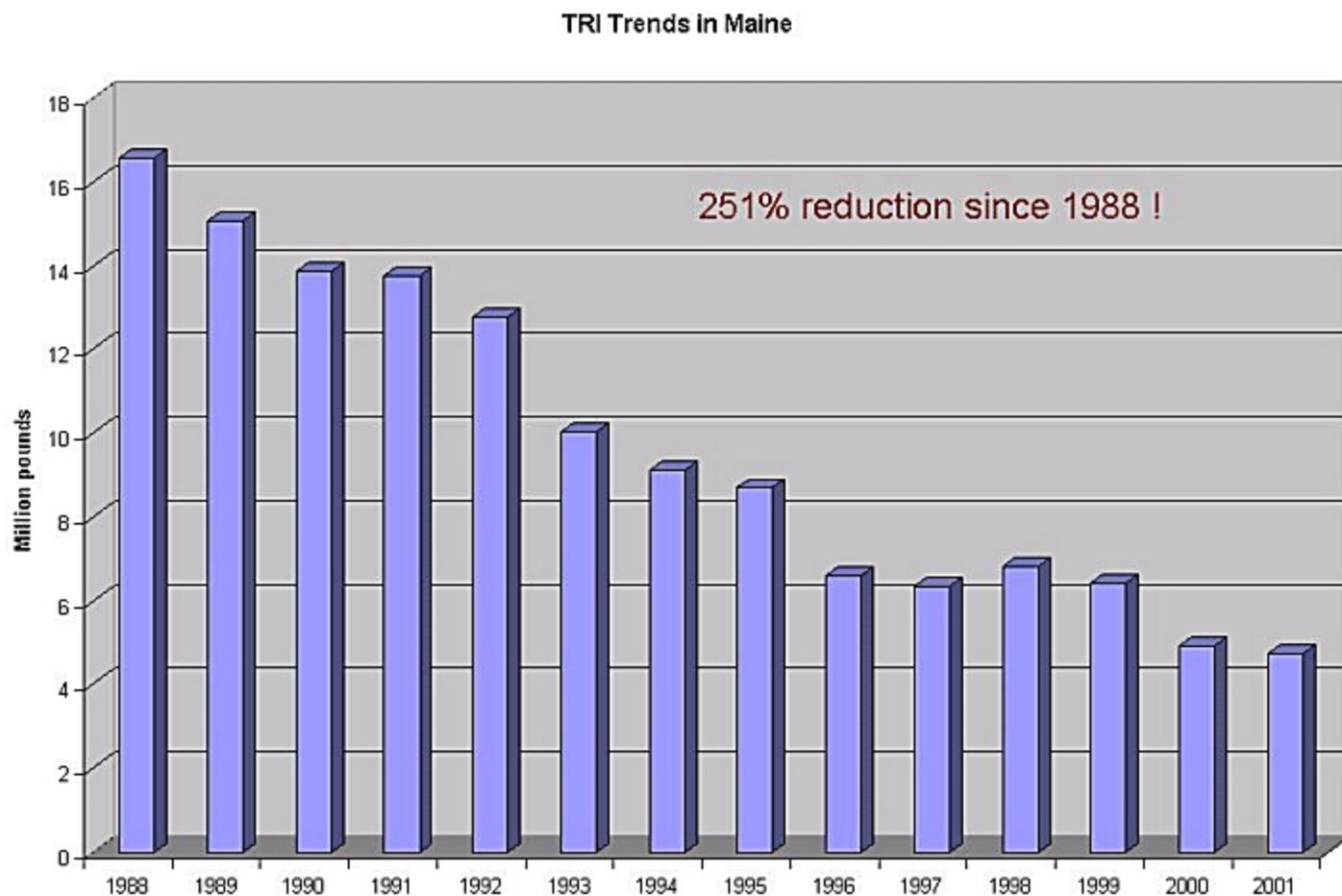
\* Stoss, F.W. 2000. "Libraries Can Make Earth Day Every Day." *Today's Librarian*. 3(4): 14-16. April 2000.

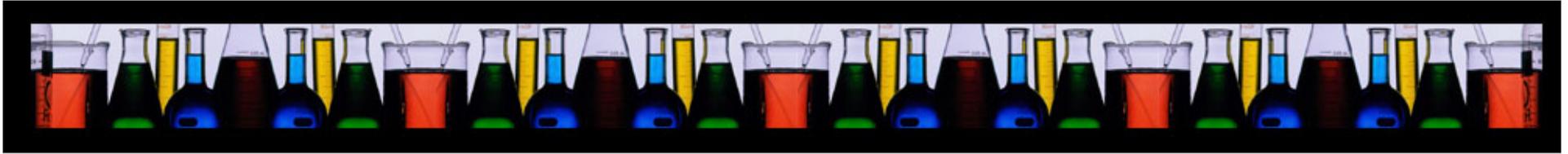




# Empowering Nature of **Information**

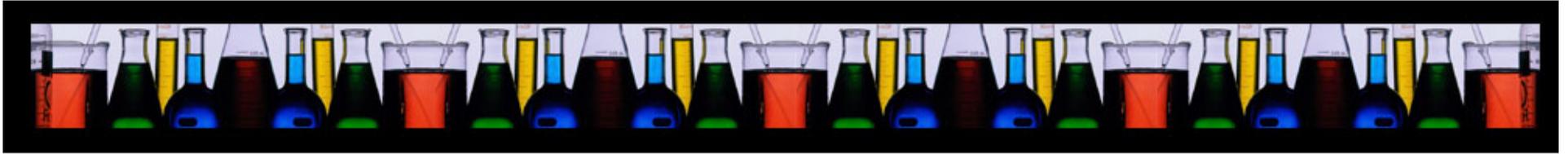
To:





## Getting the Word(s) Out—Effective Communication

- Most vital component
- Community-based initiatives
- Consumer/Community-oriented programs and projects
  - Easy to understand
    - Involve trusted sources and resources
    - Information in readily accessible formats and access
    - Stimulate and sustain interests
      - Non-controversial settings
      - Non-emergency situations
- **Do NOT repeat miscommunication strategies that plagued toxic issues in the 70s, 80s & 90s**



## Communication Building Trust

- Must build trust with individuals, families, neighborhoods, communities
- Foster high-quality community relationships built on that trust
- Consumer/individual awareness—knowledge
- Ensure that **ALL** stakeholders understand
  - What is happening
  - Who is doing what
  - How the process(es) evolve
  - Their role in the decision-making process
    - What is the consumer's role "at the table?"



# Expanding **Education** Horizons

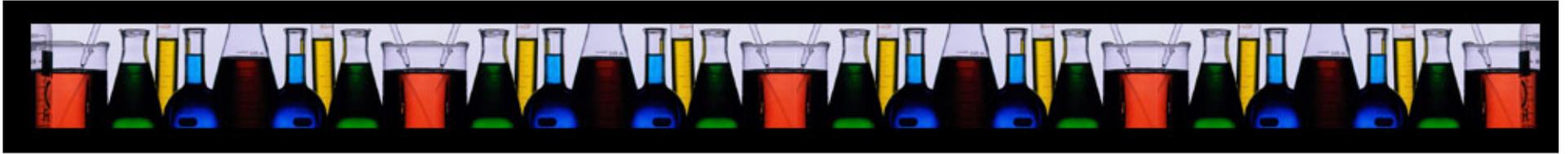
## 140+ citations in SFS on "education"

- Meetings and Conferences
  - 56
  - ACS Meetings
    - 21 Abstracts
- Journals and General Reviews
  - 89 articles
  - Journal of Chemical Engineering
    - 23 articles
- **ERIC lists only 32 citations for Green Chemistry**
- **Education Focus has been for K-12 and academic settings**
  - Need: Adult, Community-based Education, in Non-formal settings
- **GET OUT OF THE CLASSROOM AND INTO COMMUNITIES**



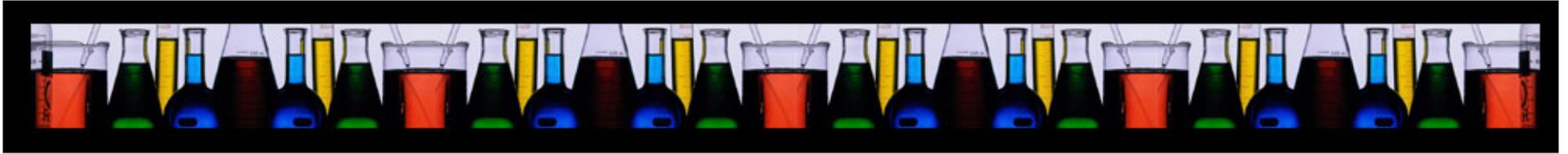
## ICE Community-based Initiatives

- Chemicals
  - They are vital
  - Have every-day uses that weigh costs and benefits
- Fears about chemicals
  - Unseen (until emergency)
  - Unknown (until emergency)
  - Health effects (until emergency)
  - Environmental impacts (until emergency)
- Complexities—Science/Technology “Things”
  - Monitoring, measuring, tracking, properties, reactions, STM literature (it’s not light)
- Chain of Custody, Chain of Command to include:  
CHAIN OF TRUST



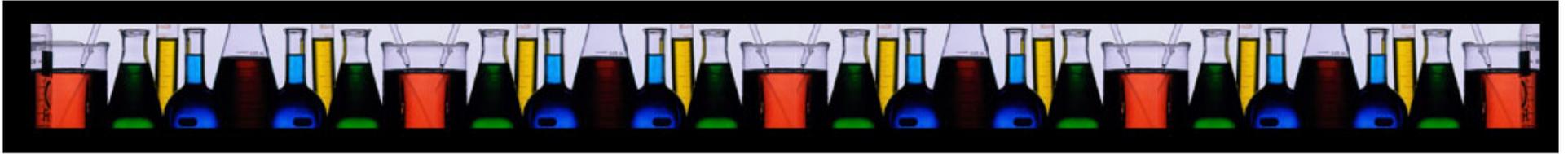
## Getting the Message Out into Communities

- Center for Environmental Information (Rochester, NY)  
[www.ceinfo.org/](http://www.ceinfo.org/)
  - **Rochester Green Business Network**  
[www.ceinfo.org/rgbn.html](http://www.ceinfo.org/rgbn.html)
    - Case Studies of Sustainable Business Practices
    - The RGBN is undertaking a project to collate case studies of sustainable businesses practices in the Rochester region. The case studies website will be launched in Summer 2005, followed by a workshop in late 2005.
      - Pollution prevention (source reduction)
      - Waste minimization
      - Energy efficiency
      - Environmentally preferable product procurement
      - Reduction of toxic and persistent chemicals



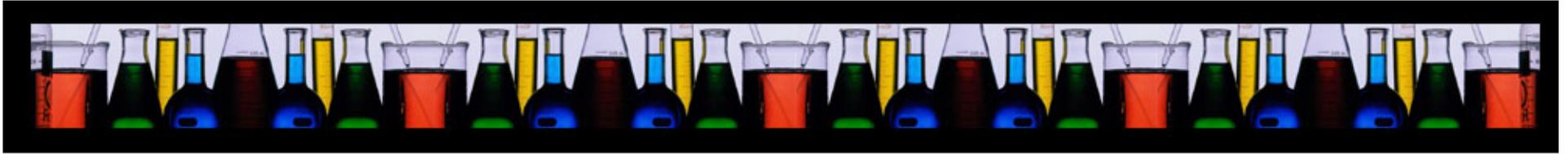
# Rochester Green Business Network

- **Getting to Know the Community:  
Member Field Trips**
  - Renewable and Alternative Energy at Harbec Plastics
  - Brownfield redevelopment in the City of Rochester
  - Energy Savings Project at the Greater Rochester International Airport
  - Energy and Water Efficiency at the Kodak Paper Making Plant
  - Hazardous Waste Disposal for Small Businesses at MCHHW Facility



## Rochester Green Business Network

- **Educating its Members: Speaker Series**
  - Six Sigma, Lean Manufacturing and Environmental Management
  - The Environmental Implications of the Hydrogen Economy
  - Climate Change – Policy and Practice
  - Pollution Prevention and National Environmental Performance Track
  - Sustainable Business in Practice
  - Environmental Management Systems
  - Alternative Energy – Policy and Practice



## Rochester Green Business Network

- **Community Outreach: Special Projects**
  - providing an interactive web-based resource of local case studies on sustainable business practices linked to directories of service providers.
  - reaching out to particular sectors of small and medium sized businesses on energy efficiency and/or environmental management system projects;
  - providing a forum for companies interested in waste minimization and recycling to share ideas and outlets;
  - bringing together environmental representatives of institutional organizations such as hospitals, universities, schools, hotels, etc. to share problems and solutions to environmental compliance and issues management; and
  - providing regular meetings in Rochester for those interested in green building design.



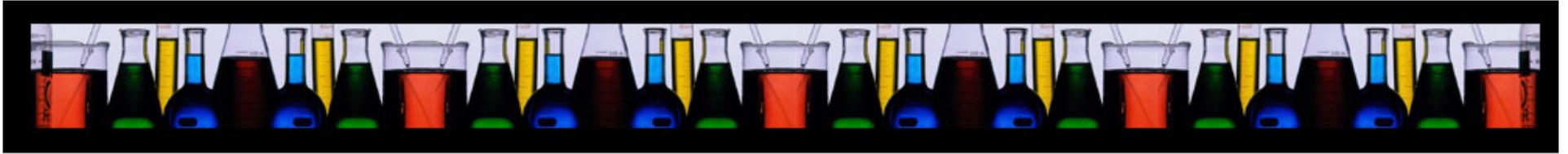
## Another Community-focused GC Group

- Toxics Use Reduction Institute  
[www.turi.org/content/content/view/full/2375/](http://www.turi.org/content/content/view/full/2375/)
  - Works with Center for Green Chemistry (U. Mass. Lowell)
  - [www.greenchemistry.uml.edu/](http://www.greenchemistry.uml.edu/)
  - Workshops and seminars
  - Research and demonstration projects
  - Community outreach and projects



## Global Communities

- Natural Capitalism  
<http://www.natcap.org/>
- US Green Building Council  
<http://www.usgbc.org/>
- Green Chemistry Institute (ACS)  
[www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=greenchemistryinstitute%5Cindex.html](http://www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=greenchemistryinstitute%5Cindex.html)
- Environmental Defense  
[www.environmentaldefense.org/](http://www.environmentaldefense.org/)



## Society for Technical Communication

- Environmental, Safety, and Health Communication  
[www.stcsig.org/esh/](http://www.stcsig.org/esh/)
  - The Environmental, Safety, and Health Communication SIG allows technical communicators to stay current on developments in this growing area of the profession.
  - *ES&H News* (the SIG's quarterly newsletter)
    - Outreach to members of related professional organizations
    - compiling and publishing lists of courses and curricula related to this particular area of technical communication
    - Developing an anthology of related articles
- Regional Chapters World Wide  
[www.stc.org/region\\_info.asp](http://www.stc.org/region_info.asp)



## Beware of Greenwash!

- **GREENWASH:** Perspectives on right-wing and libertarian think-tanks, free-market and common-sense environmentalists, and their corporate sponsors
  - Skepticism
  - Legacy of misinformation
  - Mistrust
  - Fear
  - Betrayal
  - Mapcruzin  
[www.mapcruzin.com/](http://www.mapcruzin.com/)
  - However, some environmentalists say green chemistry amounts to the chemical industry attempting to put a happy, green face on its pollution. Instead of adopting green practices for their main products, chemical companies tend to look at green chemistry as an offshoot to their main business, said Rick Hind, head of the toxics program at Greenpeace USA.  
[http://www.shns.com/shns/g\\_index2.cfm?action=detail&pk=GREENCHEMIS](http://www.shns.com/shns/g_index2.cfm?action=detail&pk=GREENCHEMIS)  
TRY-06-02-05



## Another 3-Legged Stool

- ACS Green Chemistry
- Libraries—Public, Academic, Special, Government Agency
- EPA Green Chemistry Initiative

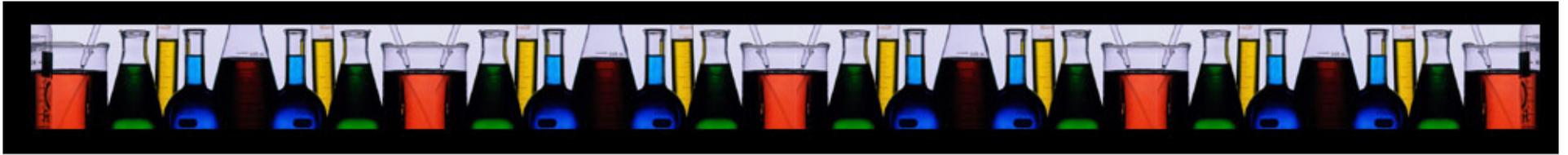
<http://www.epa.gov/greenchemistry/>





## A Library Model

- **American Library Association**
  - **Libraries Build Sustainable Communities**
    - \$300K US AID
    - 1999-2002
    - Train-the-Trainers
      - Build Tomorrow Today
      - Workshop-in-a-Box
      - 130 Trainers
        - 1850+ subsequent librarians trained in 38 states
    - Web Resources
      - [www.ala.org/ala/srrt/tfoe/lbsc/librariesbuild.htm](http://www.ala.org/ala/srrt/tfoe/lbsc/librariesbuild.htm)
      - Books
      - Select Websites
      - Agencies and Organizations
      - 60,000+ resource booklets distributed
    - Featured in 2001 National Conference of the National Council on Science and the Environment



**LBSC Recommended at the 2002 UN WSSD  
Johannesburg, South Africa**

**Libraries Build Sustainable Communities**



## Potential Partners

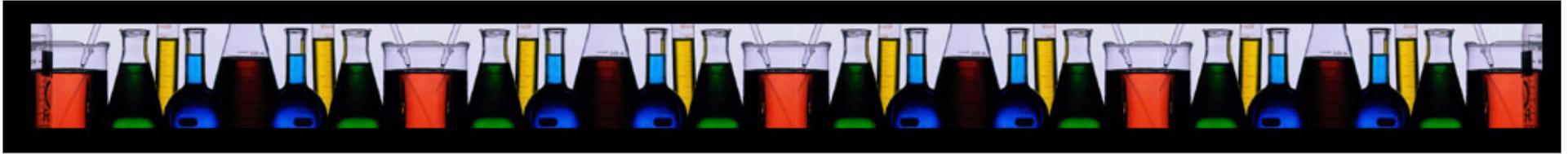
- NIEHS-funded Environmental Health Science Centers  
[www.niehs.nih.gov/centers/](http://www.niehs.nih.gov/centers/)
- Library Associations
  - **American Library Association**  
[www.ala.org](http://www.ala.org)
    - Science & Technology Section
      - Association of College and Research Libraries
    - Task Force on the Environment
      - Social Responsibilities Round Table
  - **Special Libraries Association**  
[www.sla.org](http://www.sla.org)
    - Chemistry Division
    - Science and Technology Division
    - Environment and Resource Management Division



## Potential Partners: Environmental Organizations

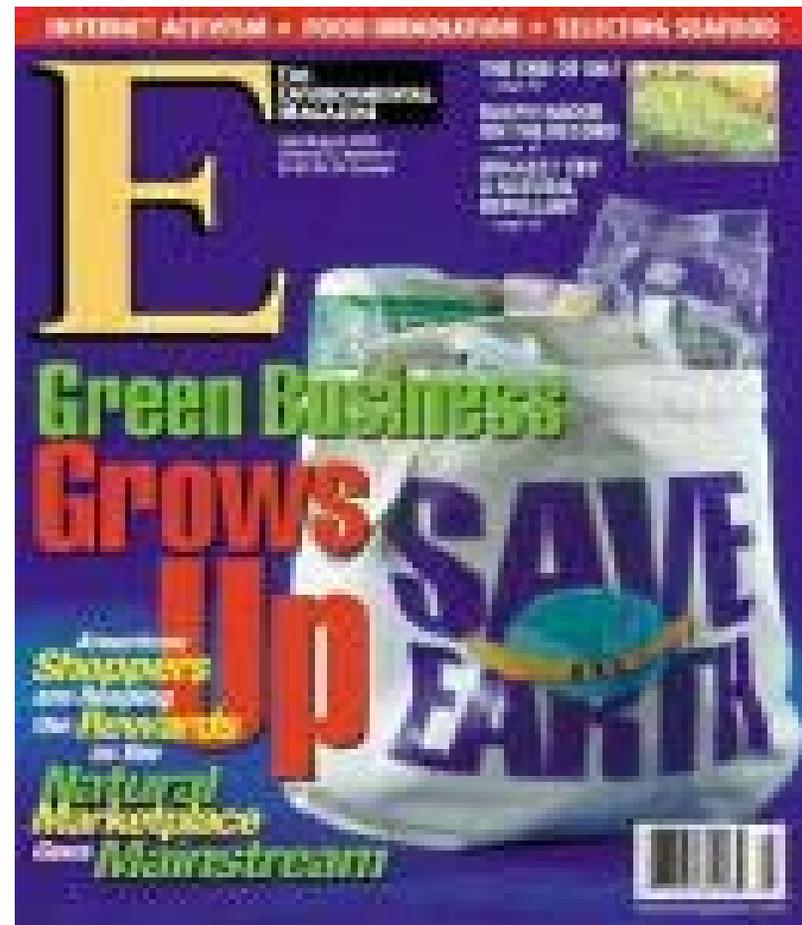
- **Sierra Club**
  - Cover: Can Technology Save the Planet?
    - July/August 2005
- The planet cannot sustain 6 billion humans aspiring to better lives without 21<sup>st</sup>-century solutions. We need the services of science and technology and the skills of engineers. We need to enlist human genius to solve problems, not merely to increase profits. Our role as environmentalists increasingly will be to make sure the appropriate rules and incentives are in place, and then stand back and let the engineers get to work. Carl Pope, Exc. Director





## E Magazine: Consumers' Green Advocate

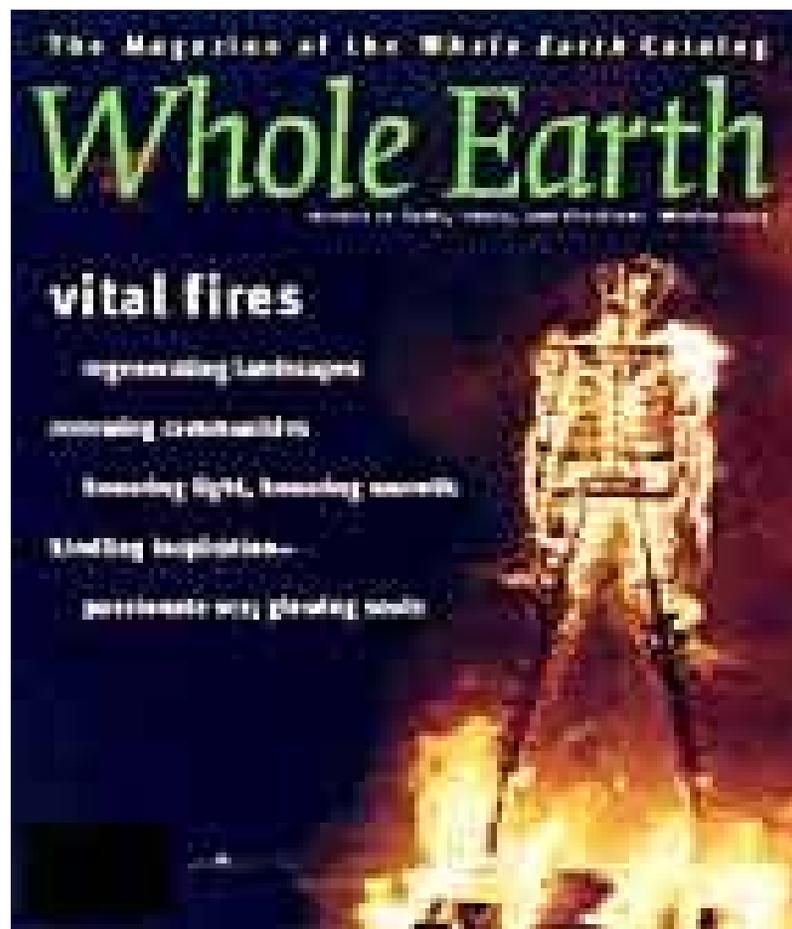
- **E Magazine**  
[www.emagazine.com/](http://www.emagazine.com/)
  - Now in its 16th year
  - bimonthly
  - “clearinghouse” of information, news and resources for people concerned about the environment who want to know “What can I do?” to make a difference.
  - 13-time Independent Press Awards winner and nominee
  - Environmental Health
  - Green Consumerism





## Whole Earth

- Whole Earth Winter 1999  
May be the 1<sup>st</sup> public interest articles on Green Chemistry
  - [Green Chemistry's Maven](#)  
An interview with EPA's Tracy Williamson
    - [www.wholeearthmag.com/ArticleBin/302.html](http://www.wholeearthmag.com/ArticleBin/302.html)
  - Green Chemistry
  - EPA Presidential Green Chemistry Challenge Awards





## Additional Green Chemistry Resources

- Green Chemistry Resources (Univ. Of Oregon)  
[www.uoregon.edu/~hutchlab/greenchem/resources.html](http://www.uoregon.edu/~hutchlab/greenchem/resources.html)
- Center for Green Chemistry  
[www.greenchemistry.uml.edu/html/links.htm](http://www.greenchemistry.uml.edu/html/links.htm)
- NSF Science and Teaching Center  
[www.nsfstc.unc.edu/](http://www.nsfstc.unc.edu/)
- American Chemical Society Green Chemistry Education  
[www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=education%5Cgreenchem%5Cindex.html](http://www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=education%5Cgreenchem%5Cindex.html)



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