



Standards

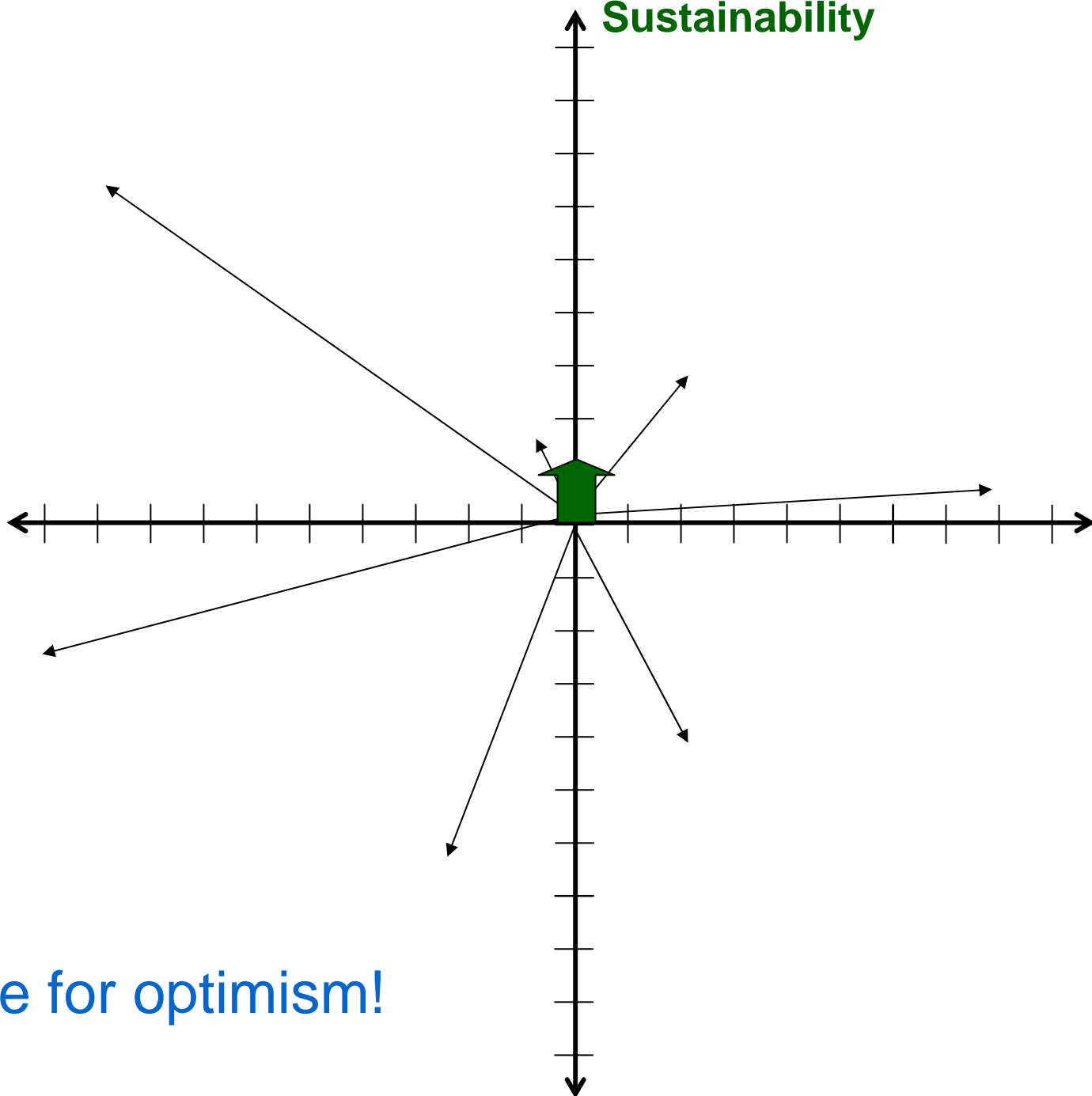
A Look Back, A Look Forward

Robert Peoples, Ph.D.

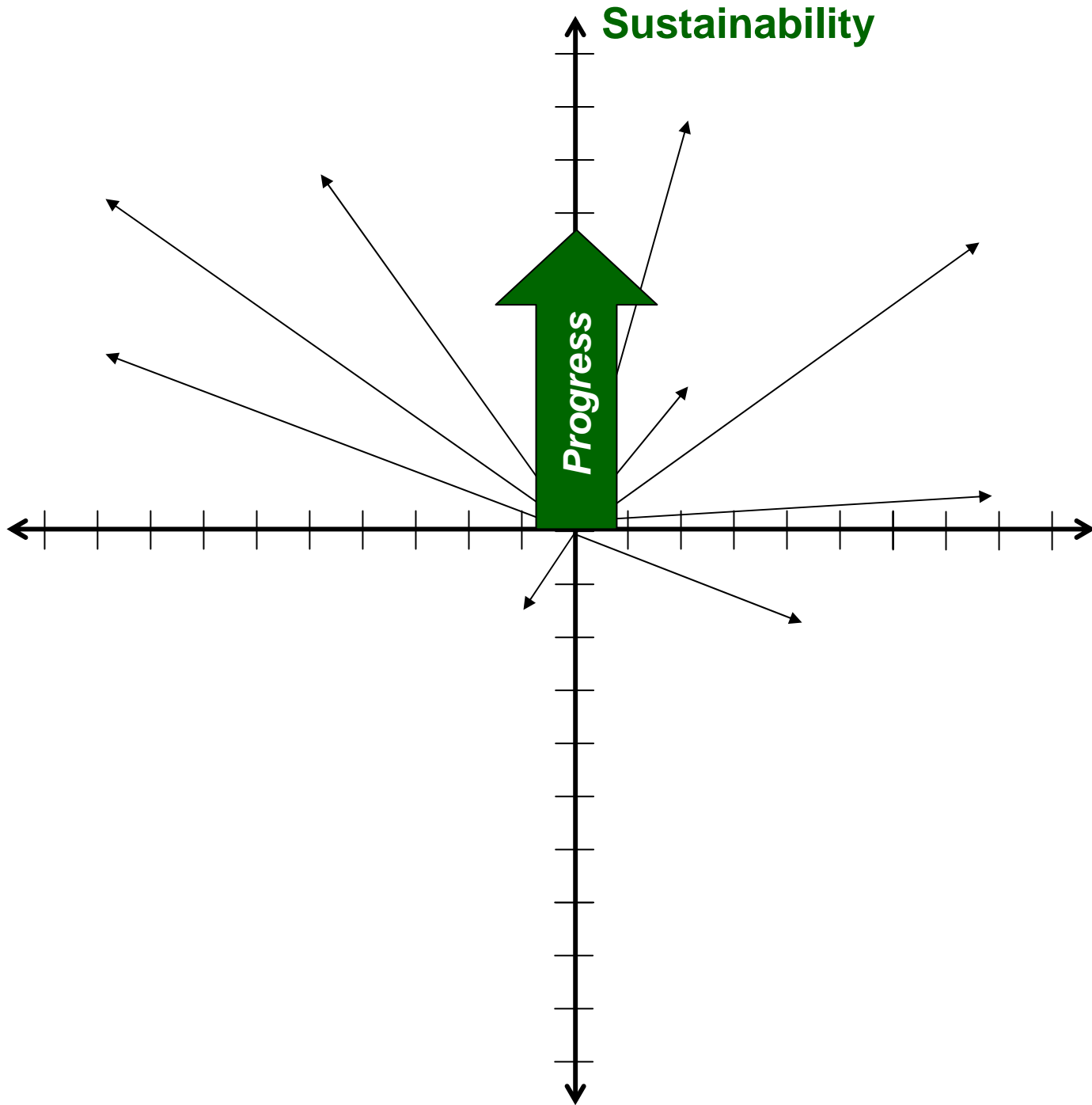
Director

ACS Green Chemistry Institute®

Sustainability



A cause for optimism!



Agenda

- Sea of information
- History of standards
- Making progress
- Green Carpet Standard
- Communications
- Green Chemistry



Web Search Results

Enter sustainability into Google

– guess how many hits you get:

- Sustainability 125M
- Standards 329M
- Recycle 48.8M
- Environmental 1.16B
- Environmental Organizations 216M
- Green chemistry 6.5M
- Carpet recycle 831K
- Green Carpet 22.1M
- Recycling Carpet 3.84M
- Sustainable carpet 1.83M



Definition of Sustainability*

Meeting the needs of today without compromising the ability of future generations to meet their needs.



- *Good working definition*
- *Incomplete to enable progress*
 - ✓ *Measures*

History of Standards



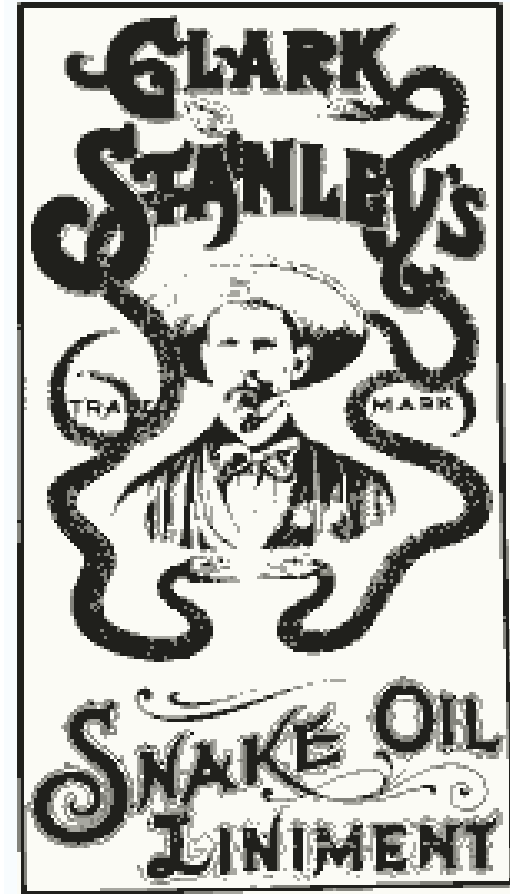
In the beginning...

- **Certification around for hundreds of years**
 - **Weights and measures: gold, silver, iron ore**
 - **Quality: silk, cotton, tea, coffee, wine**
 - **Certifications performed by trusted allies: individuals and companies – Strategically located to monitor activities of producers and shippers**
 - **Written rules: codes, specifications**



Why Certification?

- Weights & Measures
 - Calibration
 - Wear & tear
 - Tampering
- Verification
- Independent assessment
- Snake oil salesman, huckster
- Oops!



***Enron, HealthSouth, Tyco, others
- No guarantees***

Adding Safety

- **1890s - insurance companies banded together**
 - Address need for product safety requirements: growing electrical & mechanical products marketplace
- **1894 Underwriters' Laboratory (UL) was born**
 - Not-for Profit
 - Dedicated to product safety testing and certification
 - Over 17 billion UL marks are applied each year
 - Over 66,000 manufacturers



Moving into Environmental Issues

- By the 1960s, society began to recognize the environmental impacts of manufacturing
 - **Rachael Carson's "Silent Spring"**
 - **EPA formed (1970) and signed:**
 - ✓ **Clean Air Act - 1970**
 - ✓ **Clean Water Act – 1977**
 - ✓ **RCRA - 1976**

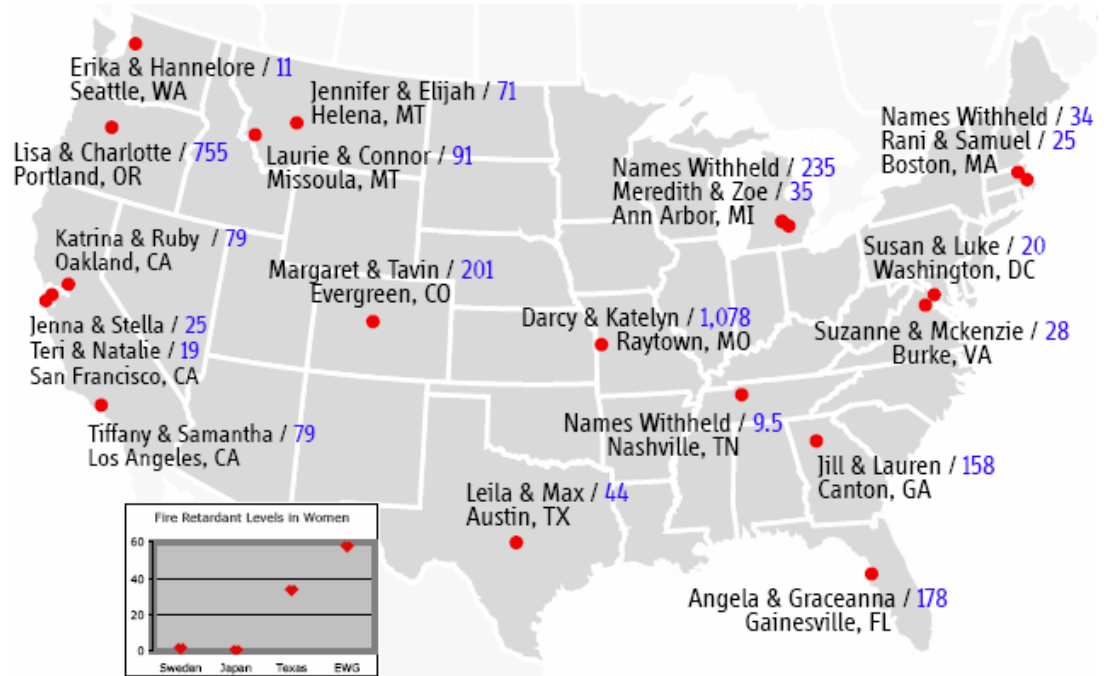
Early thinking...



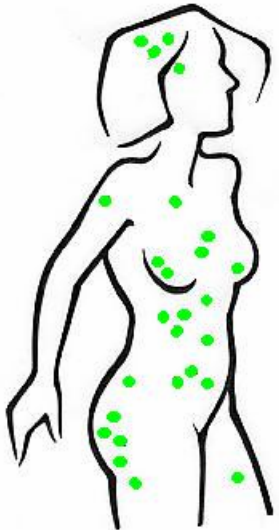
Field Observations Lead to Study



EWG BREAST MILK STUDY PARTICIPANTS & THEIR BABIES



Numbers indicate total PBDEs found in participant's breast milk.
Units are parts per billion, lipid.

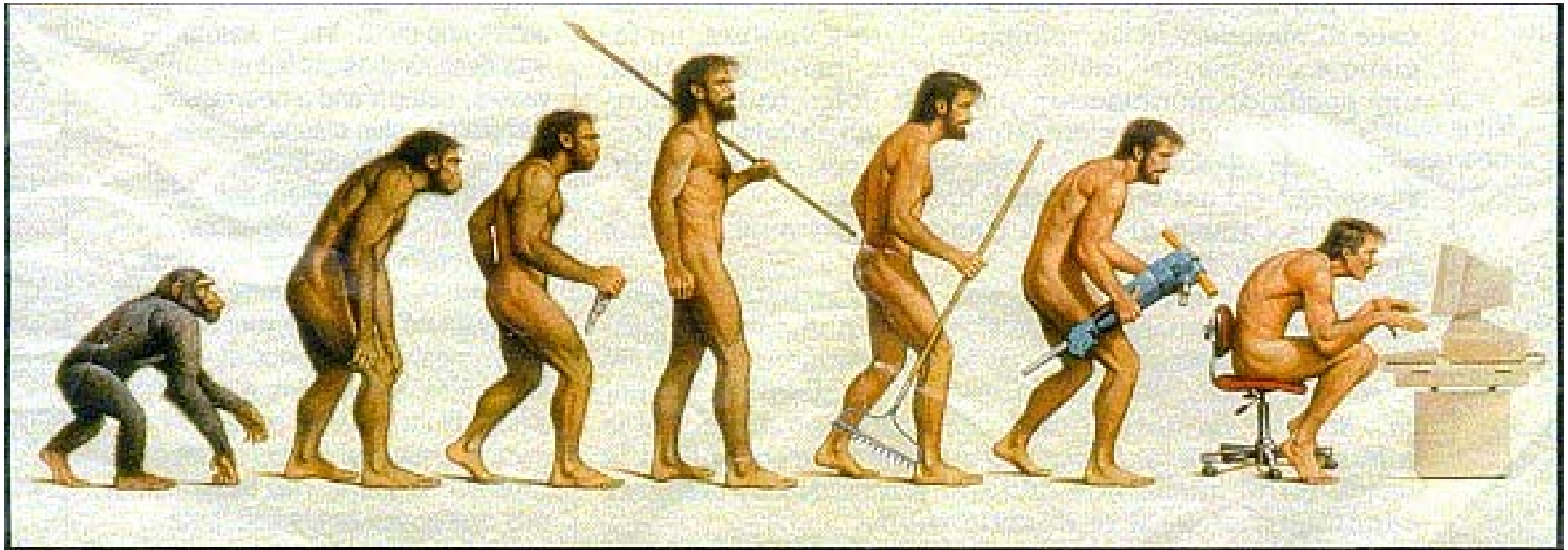


Body Burden

Our knowledge advances...

- Through the 1980s & 1990s, society begins to recognize environmental impacts of products:
 - ✓ Recyclability / Reusability
 - ✓ Energy Consumption
 - ✓ Water Consumption
 - ✓ GHG emissions
 - ✓ VOC Emissions
- New Century = Systems Thinking
 - ✓ Multi-attribute
 - ✓ Life Cycle Impact
 - ✓ Integrated standards
 - ✓ Sustainable design

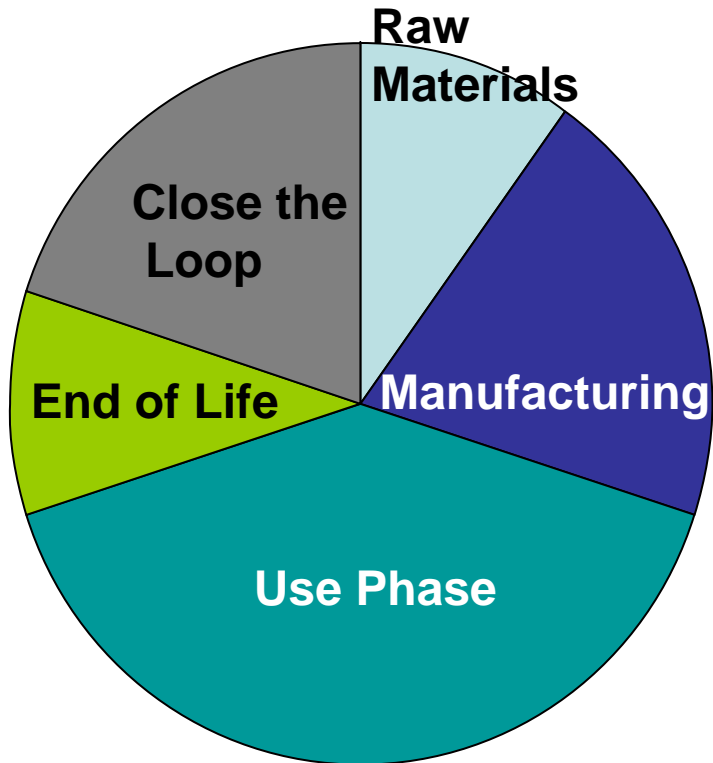
Keep in Mind – It's Evolutionary



Somewhere, something went terribly wrong

Nature as our model

Systems Thinking



- **Sustainability requires systems thinking**
- **Products are only one element**
- **Use phase can = big impact**
- **Depends on nature of product**
- **LCA tools help answer questions**
- **Not an exact science**

Why do manufacturers make claims?

- **Market Differentiation:**
 - Targeting market segments and buyers who 'care'
- **Procurement Demands:**
 - Governments & Private sector
- **Pride in Accomplishment:**
 - Promote leadership environmental attributes & performance (EPP)

Capture business!

Consumer confusion...

THE FAMILY CIRCUS[®]

By Phil Keane

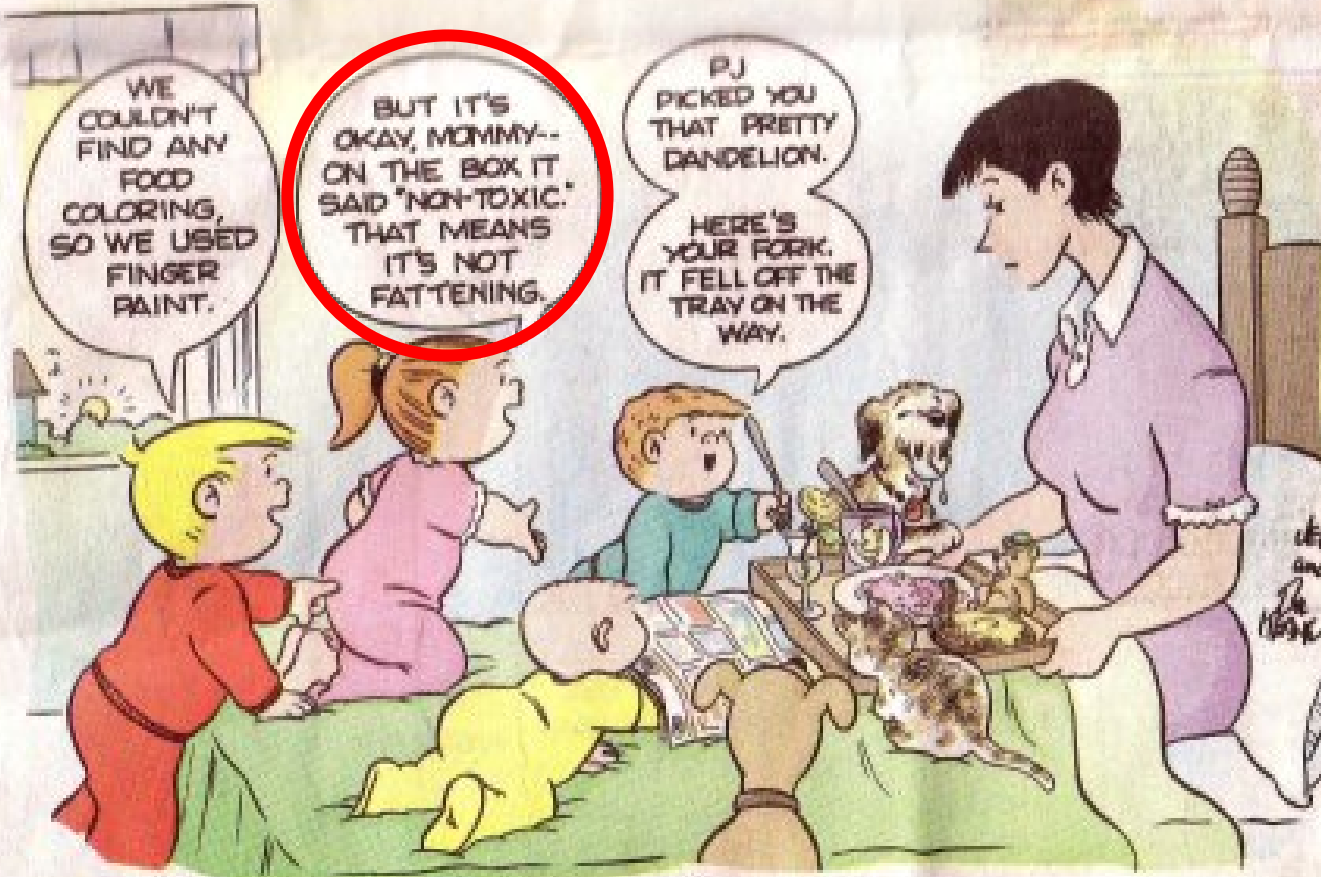
HAPPY MOTHER'S DAY!

WE COULDN'T FIND ANY FOOD COLORING, SO WE USED FINGER PAINT.

BUT IT'S OKAY, MOMMY-- ON THE BOX IT SAID "NON-TOXIC." THAT MEANS IT'S NOT FATTENING.

PJ PICKED YOU THAT PRETTY DANDELION.

HERE'S YOUR FORK. IT FELL OFF THE TRAY ON THE WAY.



What is an eco-label?

“.....any label, seal, logo or claim used to give purchasers an assurance about the environmental characteristics or production methods of the product...”



EcoLabels - A Few Examples



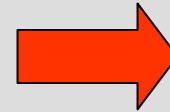
European Union
Eco-Label



Nordic Swan



Indoor Air Quality



Furniture



Carpet



Adhesives

Indoor Air Quality

FLOORING PRODUCTS INCLUDED IN FLOORSCORE PROGRAM:

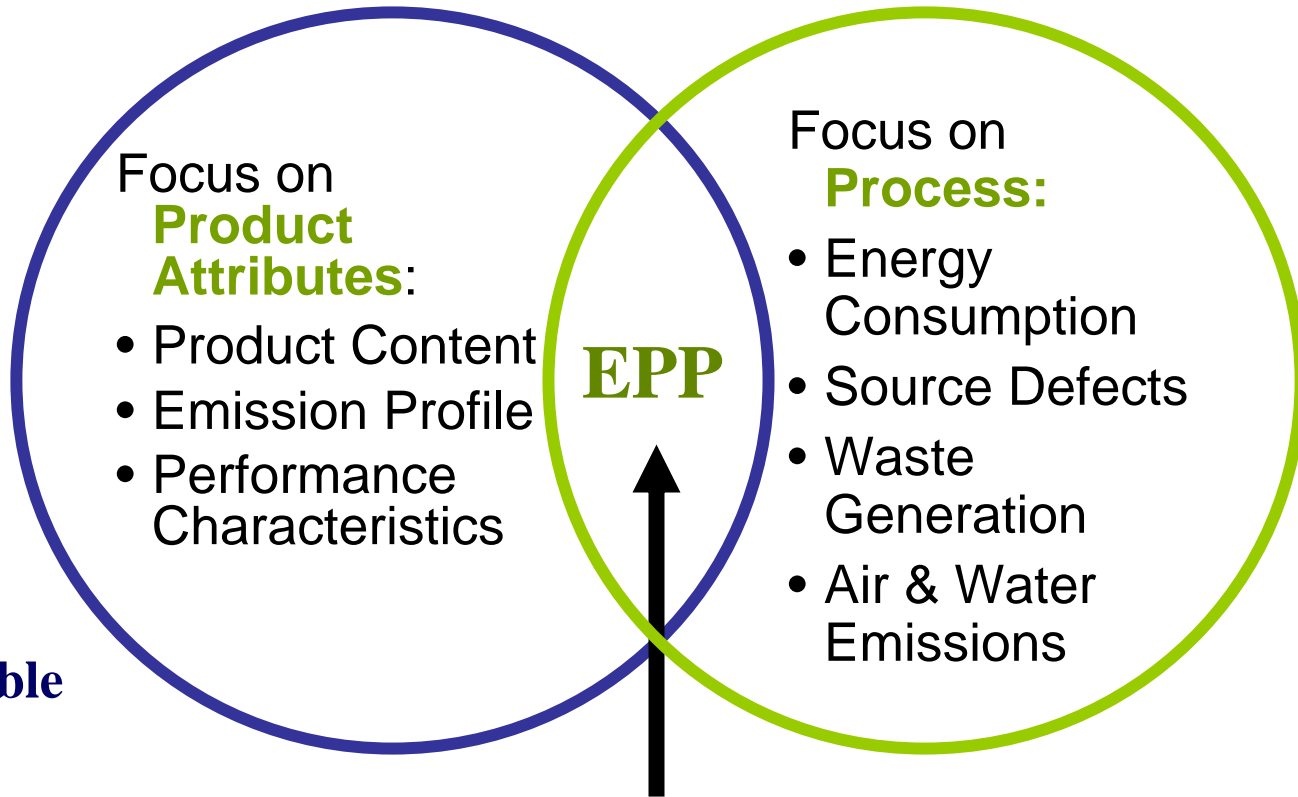
- Vinyl
- Linoleum
- Non-PVC flooring
- Laminate
- Wood
- Ceramic
- Rubber
- Wall base
- Associated sundries



EPP

Combining Existing Standards

Recycled content
Organic
Low emitting
Energy efficient
Biodegradable

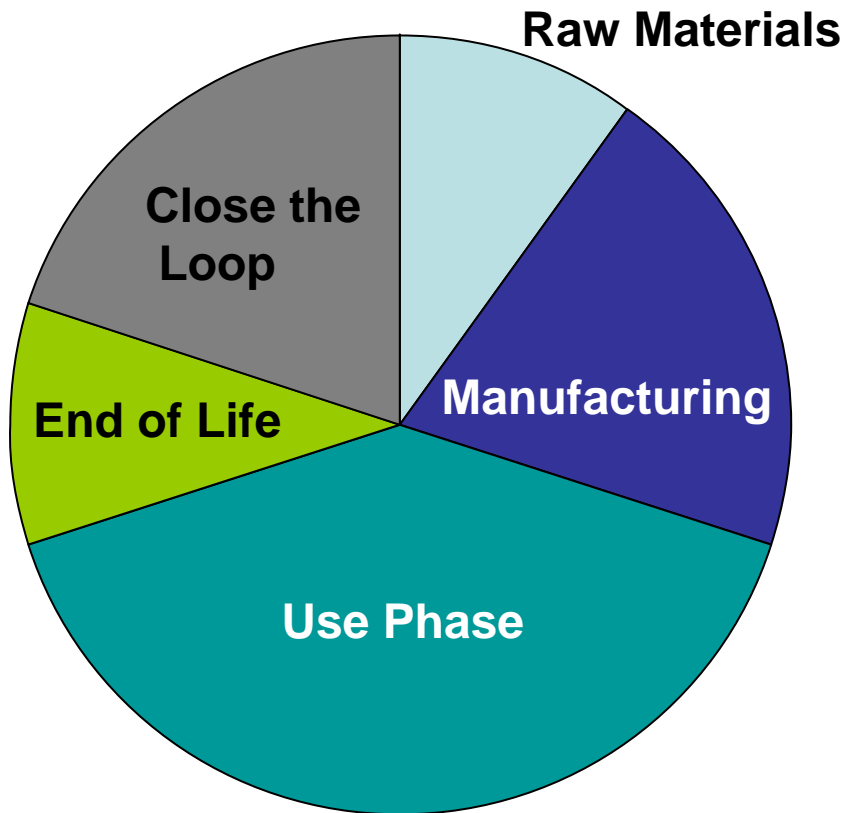


Renewable energy
ISO 14000
ISO 9000
LCI/LCA
GHG Registry

*Environmentally Preferable,
Well Managed, Sustainable*

NSF 140-2007

An integrated environmental standard



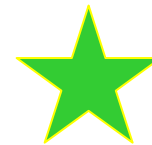
Systems Thinking

- Full lifecycle
- Supply chain
- Social aspects

Partnership: NSF 140 Sustainable Carpet Certification

The First ANSI Approved, Multi-attribute Standard for Environmentally Preferable Building Materials

- ❑ More than 5 years in development
- ❑ Consensus: a facilitated partnership
- ❑ Multi-stakeholder group:
 - ✓ Industry
 - ✓ EPA
 - ✓ States
 - ✓ Academics
 - ✓ Designers & architects
 - ✓ NGO
- ❑ Unification of a national approach



NSF 140-2007 Certification

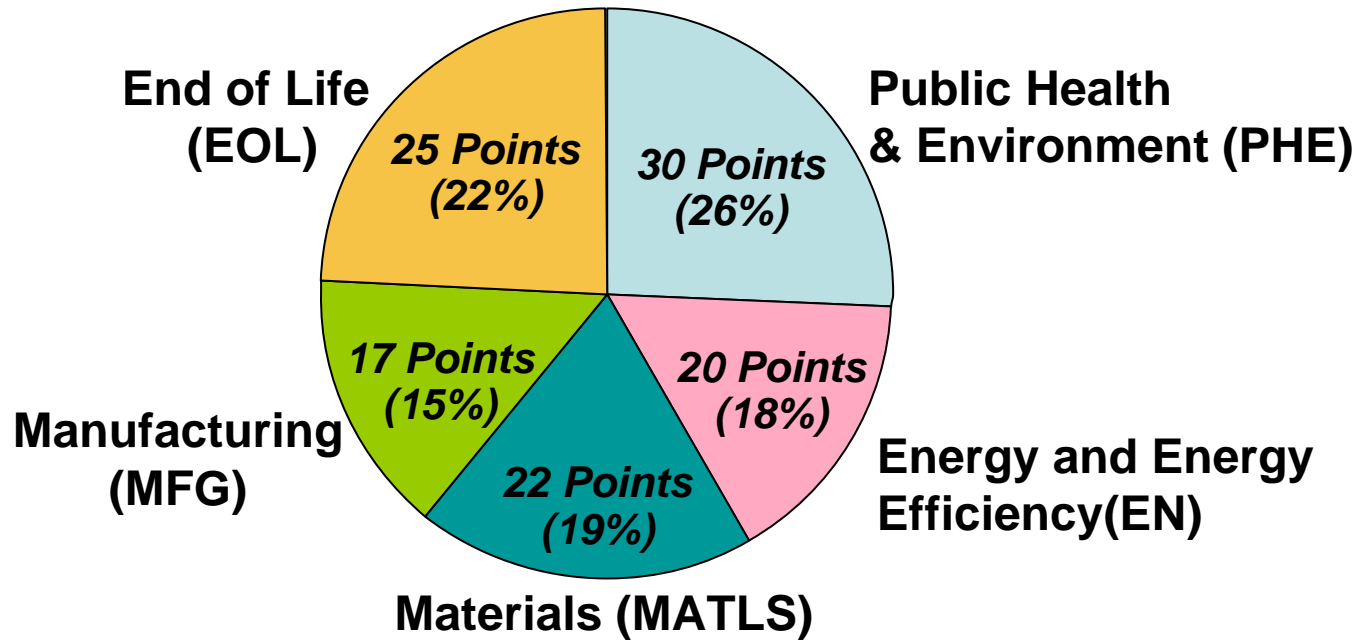
3 Levels of Certification:

- Silver 37 points
- Gold/EPP 52 points
- Platinum/EPP 60 points



- ✓ Prerequisites in each of the five categories
- ✓ No minimum number of credits from any category required for compliance
- ✓ All credits have the same weighting toward compliance
- ✓ Similar to LEED, once all prerequisites have been met, users may earn additional credit points toward certification

NSF 140-2007 Categories



+ Social Equity

Additional points for *Innovation*

NSF 140-2007

Sustainable Carpet Assessment Standard

- Voluntary and consensus driven
- 3+ years in development
- Inclusive (not elite)
- LCA based
- Supply chain focus
 - Well-head to end of life
- Includes social equity & innovation
- Followed ANSI process (key)

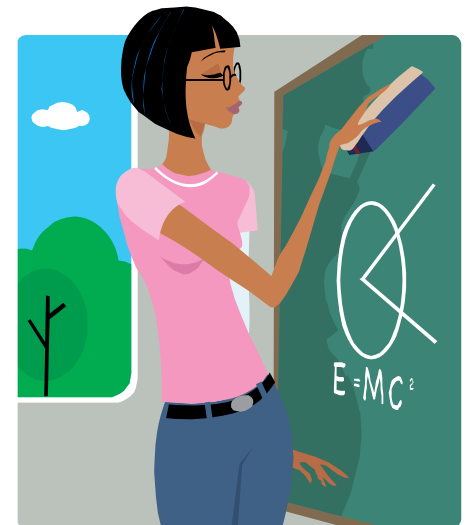


One Standard vs. Many

LEARNINGS: NSF 140 Observations

- New and everyone is learning
- The process is not easy – it takes time & \$\$
- LCI and LCA tools are evolving require expertise
- This is a movement, not a fad
- Can not be ignored in the commercial sector
- Migration has gone mainstream in consumer sector

Global Integration Team



Green Chemistry

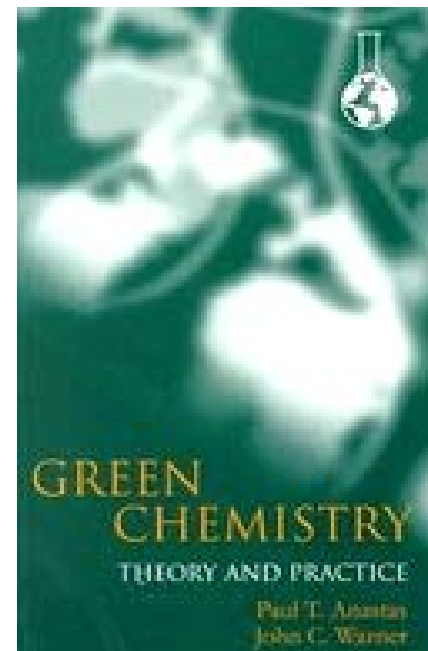


Green chemistry is the **design** of chemical products and processes that **reduce or eliminate** the **use and/or generation** of hazardous substances.

Benign by Design!
Benign by Design!

12 Principles of Green Chemistry*

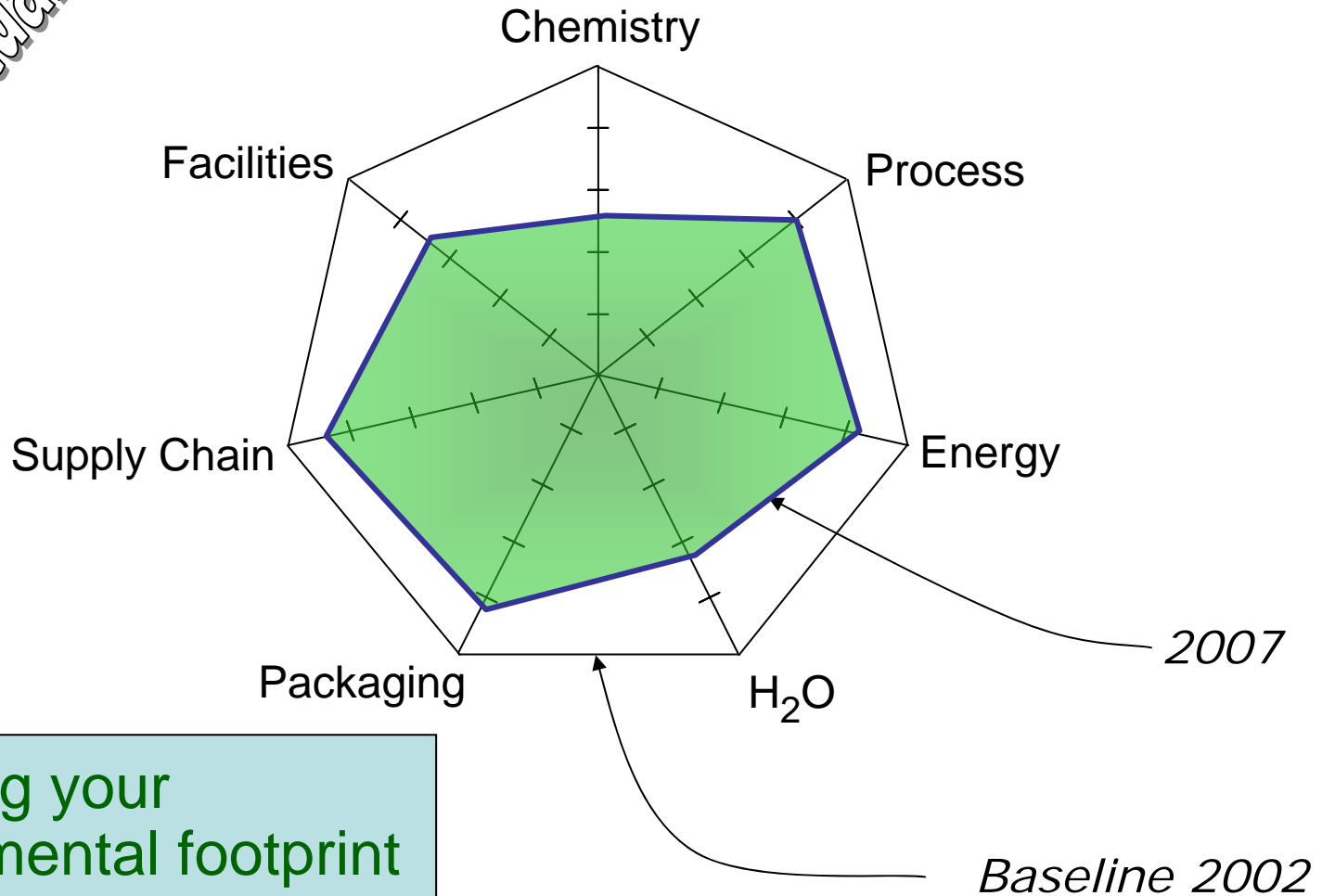
- 1) Prevent waste
- 2) Maximize atom economy
- 3) Design less hazardous chemical syntheses
- 4) Design safer chemicals and products
- 5) Use safer solvents and reaction conditions
- 6) Increase energy efficiency
- 7) Use renewable feedstocks
- 8) Avoid chemical derivatives
- 9) Use catalysts, not stoichiometric reagents
- 10) Design chemicals and products that degrade after use
- 11) Analyze in real time to prevent pollution
- 12) Minimize the potential for accidents



* Anastas, P. T. and Warner, J. C. *Green Chemistry: Theory and Practice*, Oxford University Press: New York, 1998.

Impact & Communication

Conceptual



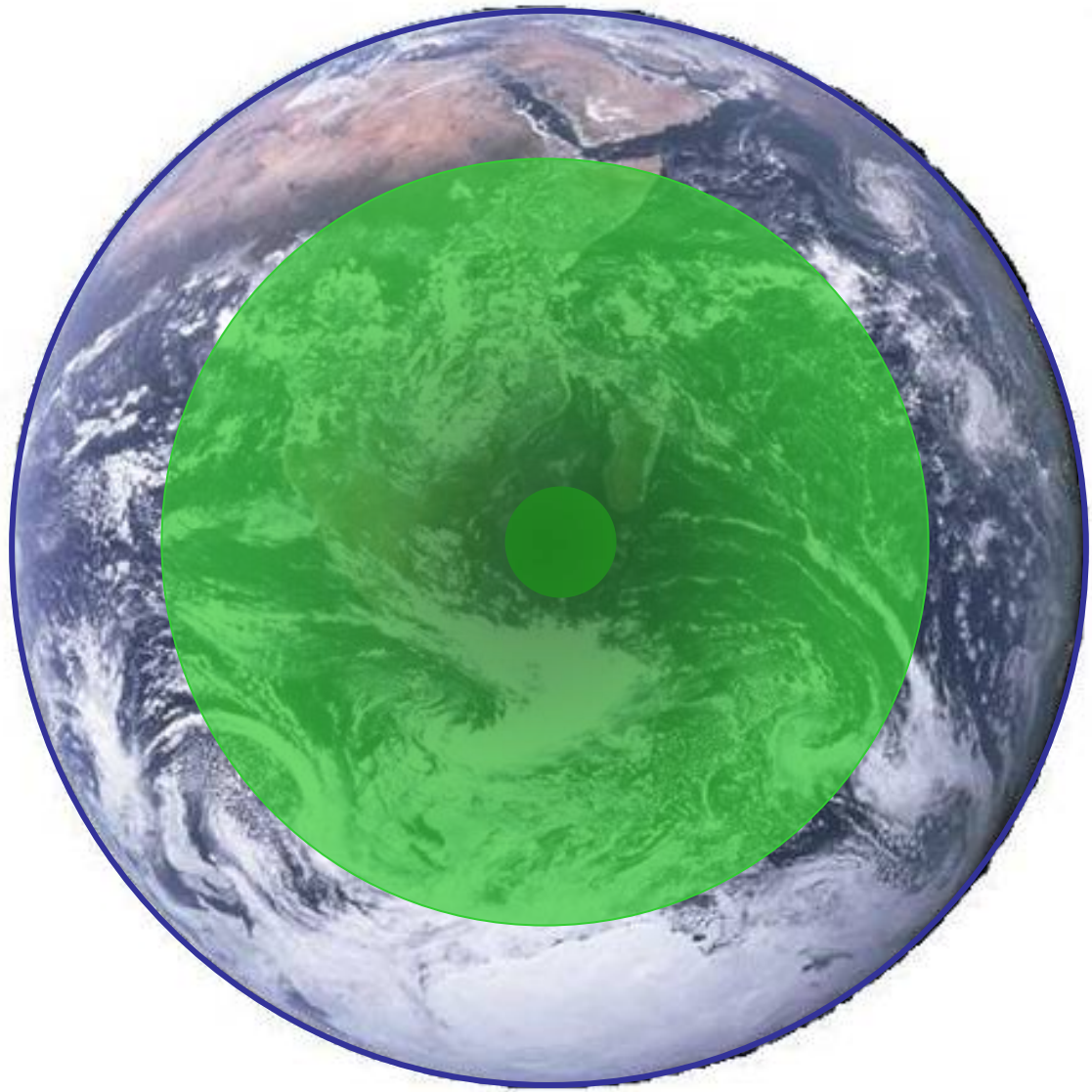
Reducing your environmental footprint

ACS Green Chemistry Institute®

Our Mission:

To advance catalyze and enable the implementation of green chemistry and green engineering principles into all aspects of the global chemical enterprise.

www.acs.org/greenchemistry



Thank you!

Robert Peoples, Ph.D.
ACS Green Chemistry Institute®
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www.acs.org/greenchemistry

ANSI DRAFT Standard for Trial Use NSF 140-2005

- Introduced in December 2005
- 28 products were certified
- Designed to start the ANSI process
- Goes away when final standard approved
- CA Gold is NSF 140-2005 with a number of prerequisites particular to CA:
 - 10% PC content
 - Meet CARE goals
 - No PBDEs (brominated flame retardants)

NSF 140-2007

Sustainable Carpet Assessment Standard

- Final ANSI standard – replaces draft standard
- Basic outline the same, many improvements
- 3 Levels: Silver, Gold, Platinum
- New Platinum level meets ALL CA Gold prerequisites
- CA Gold will go away over a 12-18 month transition period

www.nsf.org/info/carpet - November 8, 2007

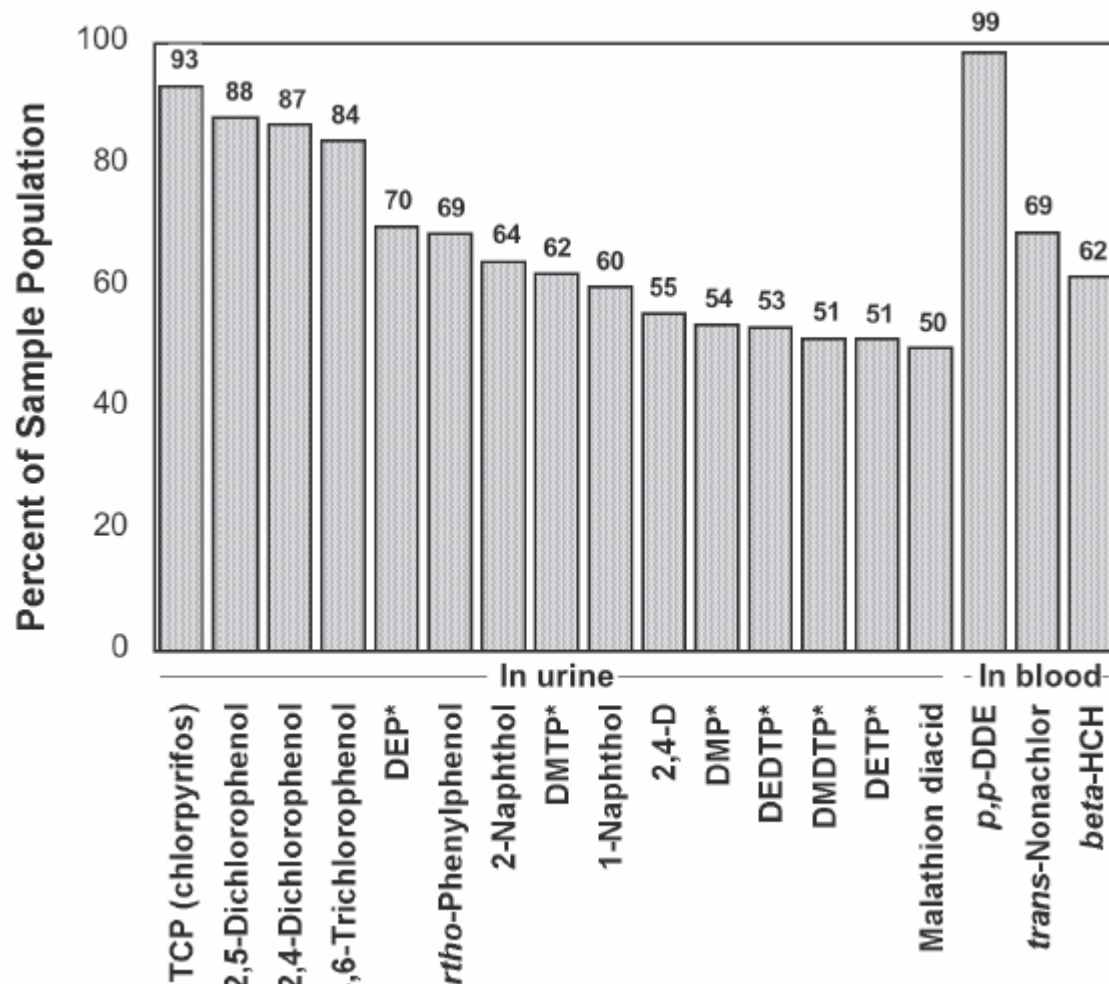
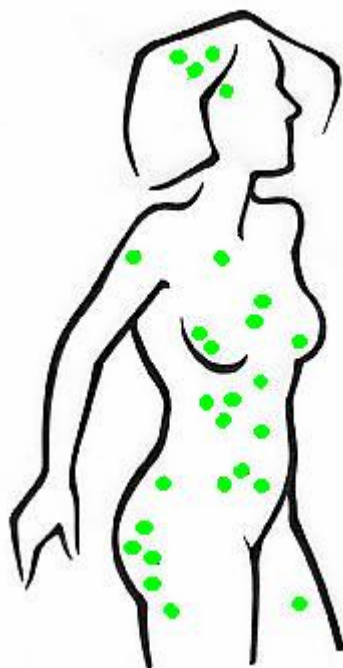
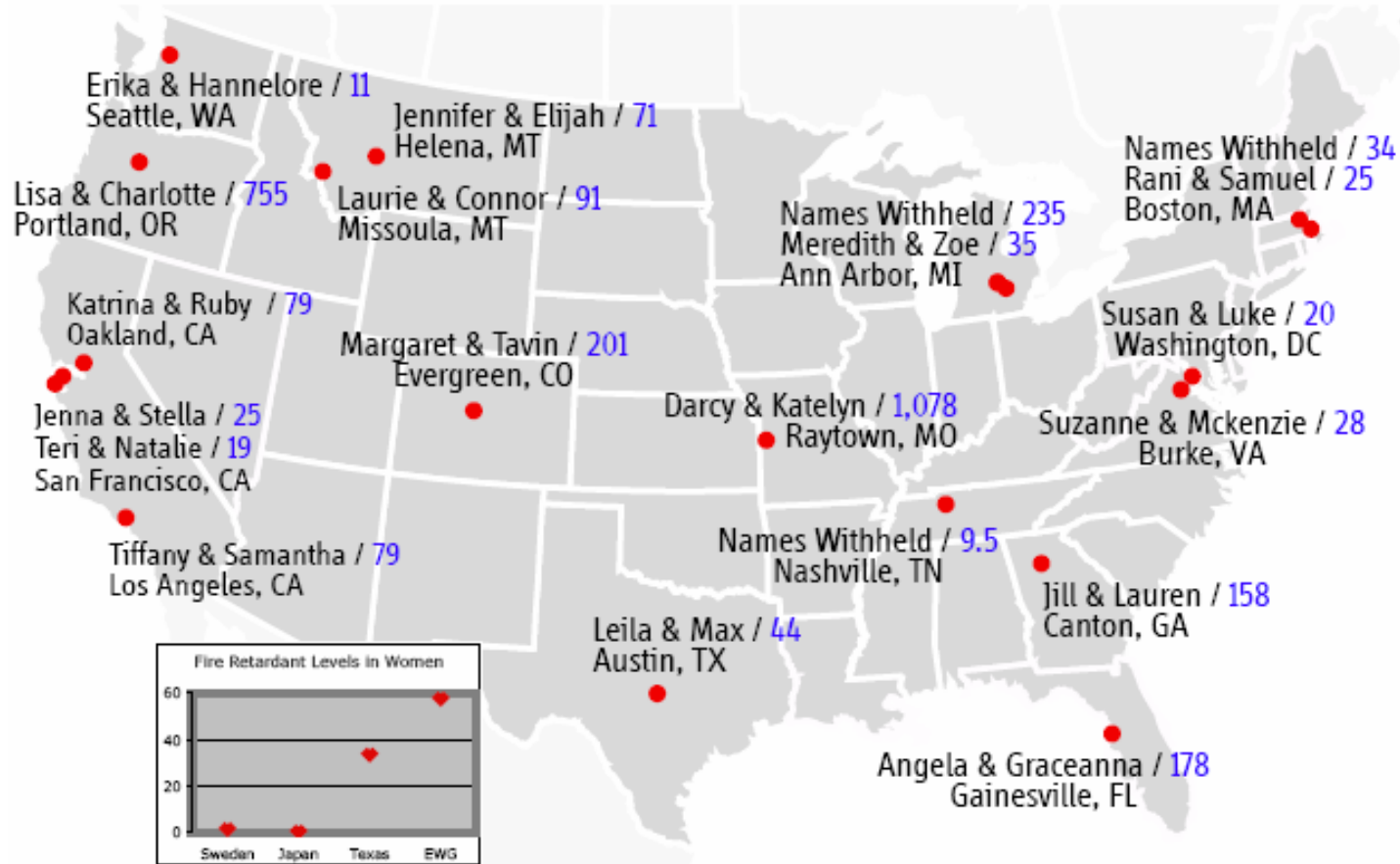


Figure D. Eighteen Pesticides Found in at Least Half of People

Sampled. Fifteen of the pesticides or metabolites found in urine and three of the six found in blood were present in at least 50% of the study subjects. (Metabolites common to many organophosphorus insecticides are indicated with an asterisk.)

EWG BREAST MILK STUDY PARTICIPANTS & THEIR BABIES



Numbers indicate total PBDEs found in participant's breast milk.
Units are parts per billion, lipid.

EWG – Environmental Working Group

Source: http://www.ewg.org/files/MAP_breastmilk.pdf

Teflon chemicals: PFCs (Perfluorochemicals)



Fire retardants: PBDEs (Polybrominated diphenyl ethers)



Mercury



Source: <http://www.petsfortheenvironment.org/research/pets>