Green Chemistry and Chemicals Policy: Influence of the E.U. in California

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Total daily U.S. chemical production and importation (TSCA): 76 billion pounds (excluding fuels, pharma, pesticides, food).

Oil is feedstock for 90%

About 80,000 industrial chemicals in TSCA inventory

3,000 High Production Volume = 99% by volume in commerce.

Source: TSCA IUR (2006) and CA Air Resources Board (1997)
Global Chemical Production
Growing 3% per year
Doubling every 25 years
U.S. Chemicals Policy: Three Gaps in the Toxic Substances Control Act of 1976 (TSCA)

Failures in the U.S. chemicals market

- DATA GAP: (Information)
- SAFETY GAP: (Accountability)
- TECHNOLOGY GAP: (Capacity)
35 Chemicals Bills in California, 2005-2006

AB 121 (Vargas)  AB 908 (Chu)  SB 419 (Simitian)
AB 263 (Chan)    AB 912 (Ridley-Thomas) SB 432 (Simitian)
AB 289 (Chan)    AB 966 (Saldana)     SB 484 (Migden)
AB 319 (Chan)    AB 985 (Dunn)        SB 490 (Lowenthal)
AB 342 (Baca)    AB 990 (Lieber)      SB 600 (Ortiz)
AB 597 (Montanez) AB 1125 (Pavley)    SB 838 (Escutia)
AB 623 (Aanistad)AB 1337 (Ruskin)    SB 849 (Escutia)
AB 639 (Aghazarian) AB 1342 (Assem ESTM) SB 982 (Sen EQ comm)
AB 752 (Karnette) AB 1344 (Assem ESTM) SB 989 (Sen EQ comm.)
AB 815 (Lieber)  AB 1354 (Baca)       SB 1067 (Kehoe)
AB 816 (Lieber)  AB 1415 (Pavley)     SB 1070 (Kehoe)
AB 848 (Berg)    AB 1681 (Pavley)     SB 1070 (Kehoe)

**WEEE:** Waste in Electrical and Electronic Equipment (2005)

**RoHS:** Restriction on Hazardous Substances (2006)

**REACH:** Registration, Evaluation, Authorization, and Restriction of Chemicals (2007)
2006: UC report to the Legislature

Green Chemistry in California: A Framework for Leadership in Chemicals Policy and Innovation

2008: UC report to California EPA

Green Chemistry: Cornerstone to a Sustainable California

127 UC faculty signatories from seven campuses

Google: COEH GREEN CHEMISTRY
U.S. Chemicals Policy: The Green Chemistry Opportunity

The green chemistry opportunity

DATA GAP (Information)

SAFETY GAP (Accountability)

TECHNOLOGY GAP (Capacity)
Green Chemistry: The design of chemical products and processes to reduce or eliminate substances hazardous to human health and the environment.

1. Design safer products
2. Use less-toxic feedstocks and processes
3. Design for cradle-to-cradle use
4. Account for energy efficiency

California Precedent: Linking Environment, Economy

Per Capita Electricity Consumption, 1960-2007

Source: California Energy Commission, 2007
Controlling disposal and dilution
(Discharge permitting)

Controlling, monitoring pollution
(RCRA, OSHA, TRI)

Toxics policy: chemical-by-chemical regulation
(TSCA, state bans)

Chemicals policy: comprehensive, transparent, market driven, functioning governance, cross-disciplinary, new science, systems-thinking

California’s Green Chemistry Initiative

Timeline

Launched: April, 2007

Phase One: Develop options
• Symposia and expert input
• Stakeholder meetings: industry, public, NGOs
• Web-based input “Conversation with California” 818 policy recommendations
• Culminated in an “Options Report”

Phase Two: January, 2008 Analyze options and produce recommendations
• Public workshops, consultations and web-based input
• Key element teams (information dissemination, consumer protection, pollution prevention, education, state procurement)
• Science Advisory Panel

Final report issued: December, 2008
California’s Green Chemistry Initiative

Policy Recommendations

- Expand Pollution Prevention and product stewardship programs
- Develop Green Chemistry Capacity via workforce education and training, research and development, and technology transfer
- Create an Online Product Ingredient Network to disclose chemical ingredients for products sold in California
- Create an Online Toxics Clearinghouse, a database of chemical toxicity and hazards to help prioritize chemicals of concern and data needs. (SB 509)
- Accelerate the Quest for Safer Products, create a process to evaluate chemicals of concern and their alternatives. (AB 1879)
- Move Toward a Cradle-to-Cradle Economy, leverage market forces to produce products that are “benign-by-design” develop green metrics and tools (e.g., environmental footprint calculators, sustainability indices).
California’s Green Chemistry Laws

**SB 509**

Toxics Information Clearinghouse (TIC)

- Publicly-accessible web-based system for the collection of “chemical hazard trait and environmental and toxicological end-point data”
- Agency sets the chemical hazard traits and end-points “and any other data” that are to be included in the TIC.
- Agency sets data quality standards
- Trade secrets go in a “virtual vault”
- No current data requirement beyond existing information
- Linked by law to AB 1879
California’s Green Chemistry Laws

**AB 1879**

The “Safer Alternatives for Consumer Products Rule”

Requires DTSC to develop a process to:

- Identify and prioritize chemicals of concern in consumer products
- Evaluate the lifecycle impacts of their alternatives
- Specify a regulatory response
- Defines a “consumer product” as: a product or part of the product that is used, brought, or leased for use by a person for any purposes.
Overview of AB 1879 Process

Identification of Chemicals of Concern

Prioritization of CoC

Alternatives Analysis

Regulatory Response

List of lists (EU directives, SIN list, biomonitoring)
Lack of “adequate” hazard data (OECD -- SIDS)
Catch-all: potential hazard
Elements of AB 1879
Identification of Chemicals of Concern

Recommendations

• Helpful to stigmatize chemicals which lack data
• SIDS insufficient to evaluate hazard
• Need clear hazard criteria in addition to “list of lists”
Overview of AB 1879 Process

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1. chemical of concern found in consumer products
   → triggers “use” data requirement
2. volume, exposure potential, biomonitoring,
sensitive sub-population, data gaps, catch-all criteria
Elements of AB 1879

Chemical Prioritization

Recommendations

• Benefits: presence of CoC in product triggers requirement for “use” data
• Exposure measures not applied earlier
• Highlights effects on sensitive populations; use of biomonitoring
• Needs clear inclusion of workplace hazards from commercial products
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Required for products with prioritized CoCs
Agency develops tools; industry performs analysis
Multimedia lifecycle evaluation required
(at least 13 parameters)
Elements of AB 1879

Alternatives Assessment

**Recommendations**

- Focus alternatives assessment on “hot spots” in lifecycle
- Classify extent of alternatives assessment based on data availability
- Alternative should not be another candidate list chemical
Overview of AB 1879 Process

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Regulatory Response

Outcome determines regulatory response
Options: data requirement, labeling, use restrictions,
end-of-life management, or ban
Exempted from regulation if manufacturer
Is researching alternatives
Elements of AB 1879

Regulatory Response

Recommendations

• Broad range of regulatory options
• Regulatory response should be calibrated based on available information (e.g. inadequate data for full alternatives assessment should trigger a data requirement)