

International Workshop on
Hazardous Substances within the Life Cycle of
Electronic and Electrical Products

Vienna – 29-31 March 2011

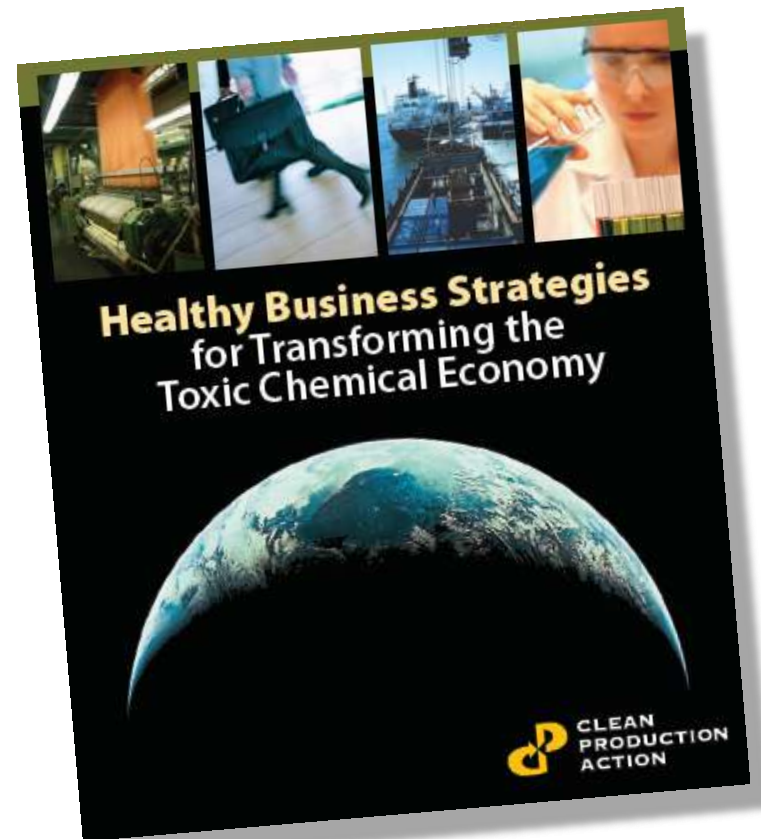
***Upstream Opportunities
for Electronics***

Mark Rossi, PhD



Strategies of Business and Government Leaders

1. Green Design
2. Know and disclose ingredients
3. Assess and avoid hazards
 - a. Prioritize + eliminate chemicals of high concern
 - b. Select safer substitutes
4. Take responsibility from cradle to cradle – Extended Producer Responsibility



Green Design

design for healthy systems for humans and the environment

- Safer chemicals
- Sustainable materials
- Closed loop systems
- Green chemistry – including, inherently safer process chemistry



BizNGO Principles for Chemicals Policy

1. Know and disclose
product chemistry

2. Assess and avoid hazards

3. Commit to continuous
improvement

4. Support public policies and
industry standards

Know Chemical & Material Ingredients

Trailhead
- Know only regulated substances in products (or absence of restricted substances)

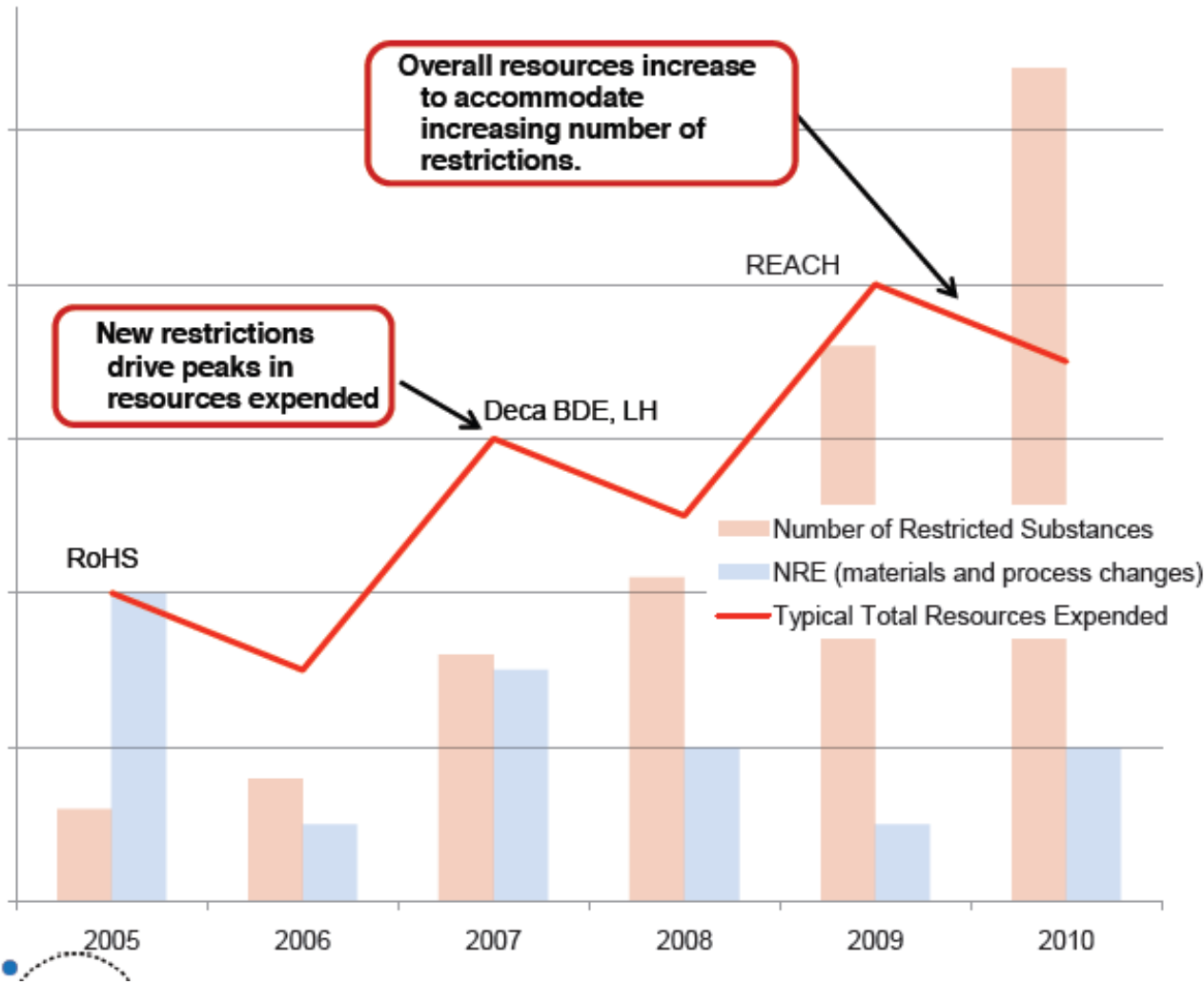
Base Camp
- Ask suppliers if they know substances in products, but do not require disclosure

High Camp
- Require supplier disclosure of substances of very high concern

Summit
- Detailed supply chain requirements
- Know all ingredients
- Know chemistries across lifecycle

Full Lifecycle Insights

Resources required to gather data to meet new substance restrictions typically follow a 'sawtooth' line, and increase over time

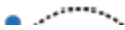
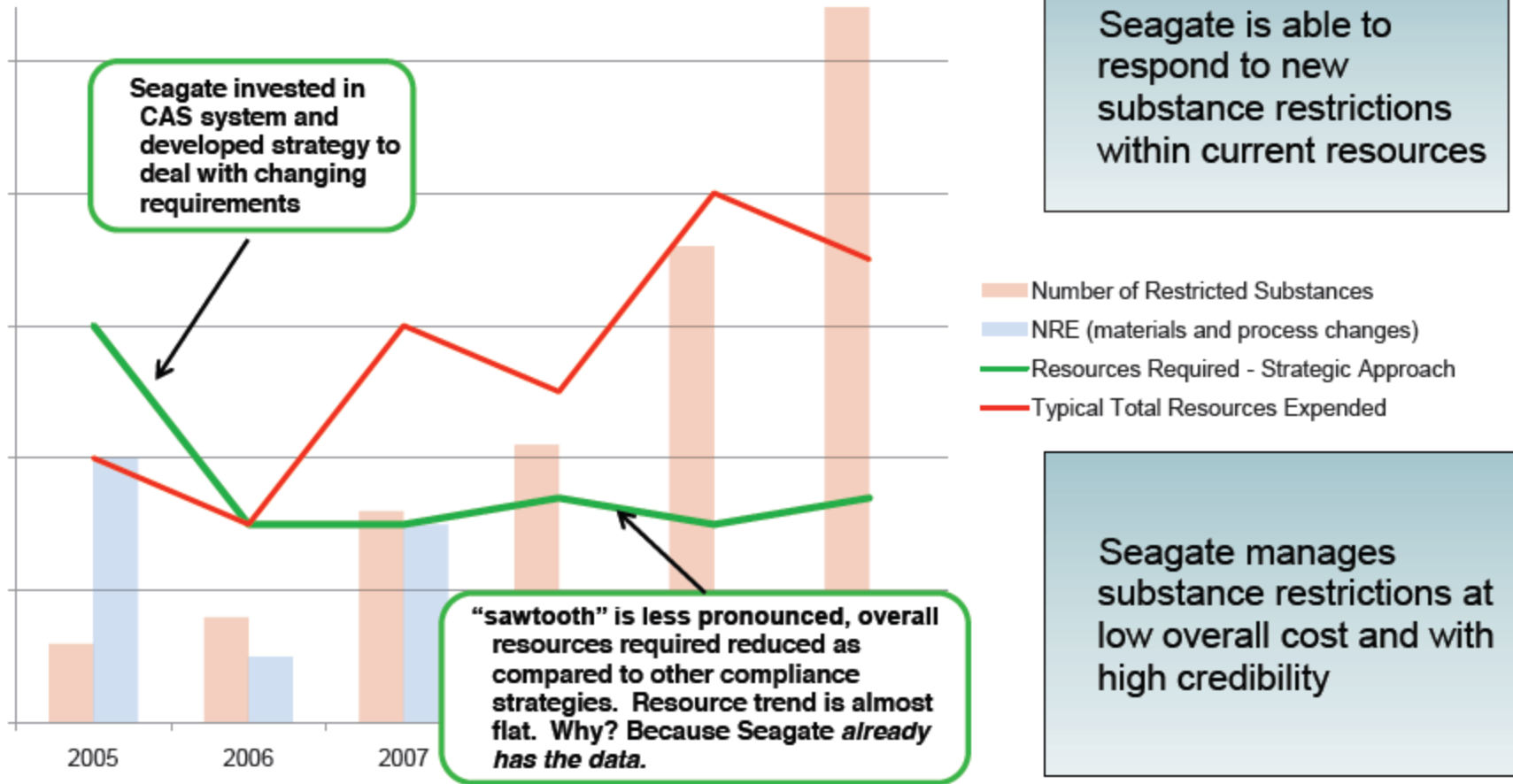


Emerging new restrictions result in spikes of NRE, business process change, and resource requirements

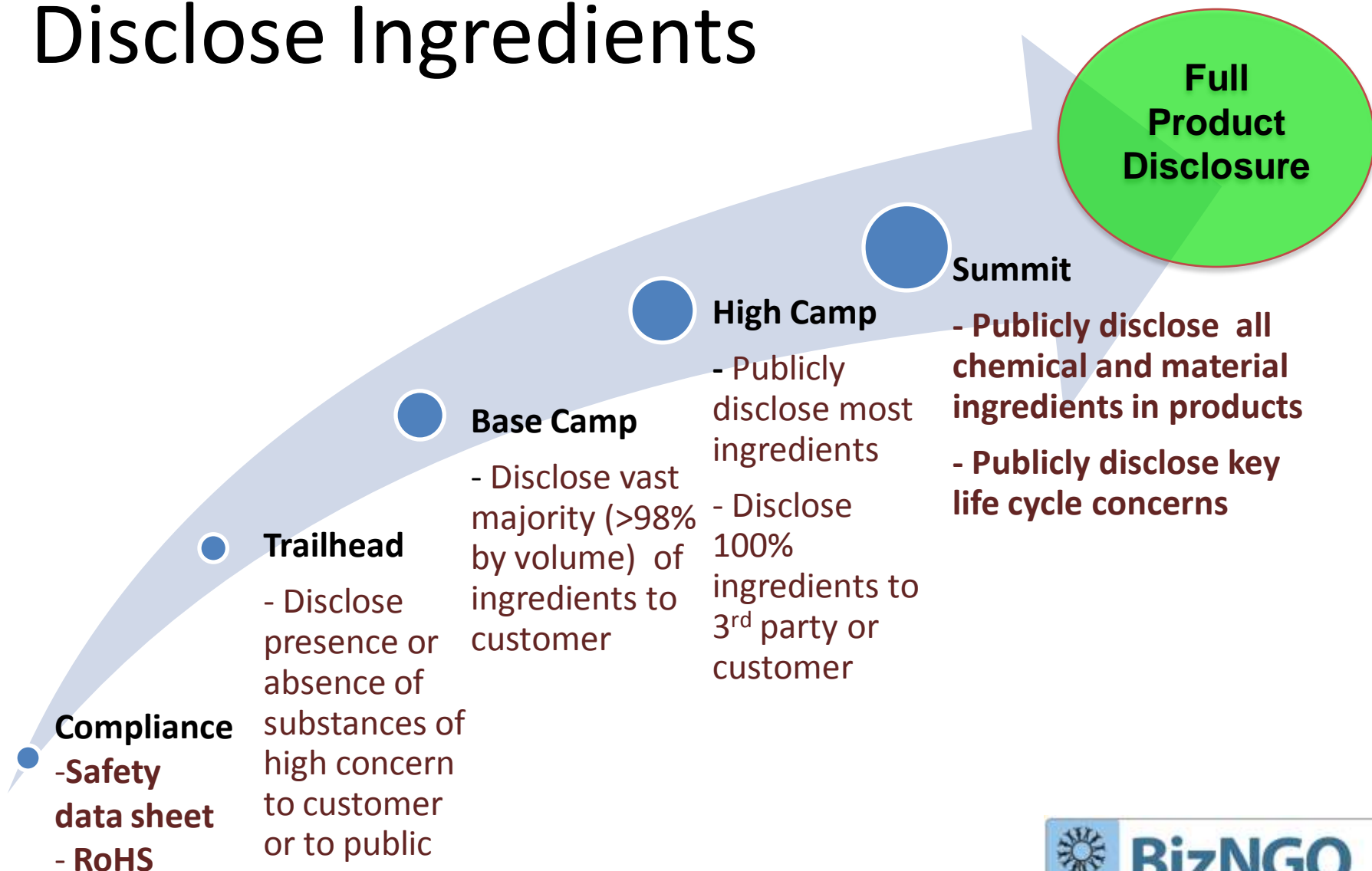
Non-regulatory restrictions, like low halogen, add even more requirements

Challenge: Produce environmentally friendly products that meet all regulatory and customer requirements while controlling overall cost of compliance.

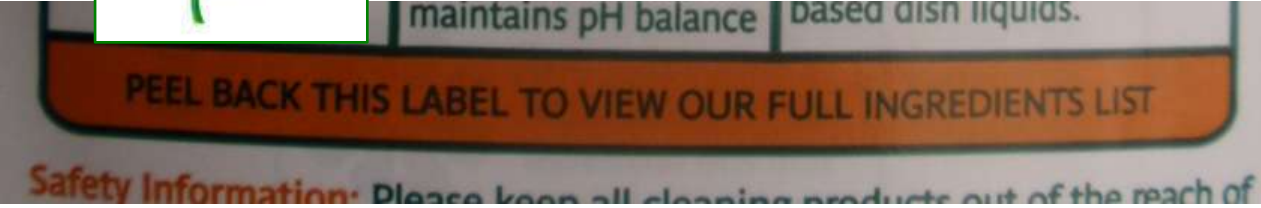
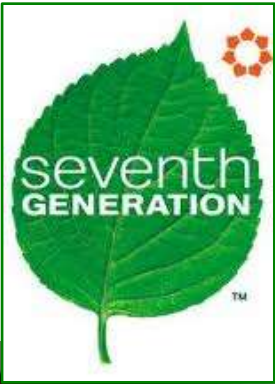
By investing 'early' in full data disclosure, Seagate has been able to flatten the 'sawtooth' in resource requirements for gathering substance data



Increasing Transparency – Disclose Ingredients



Disclosing Ingredients in Products



Assess Hazards and Select Safer Substitutes

● **Trailhead**
- Prioritize
known
chemicals of
high concern
to avoid
(e.g., SIN
List)

● **Base Camp**
- Assess
hazards of
chemicals in
products
and process
chemistry

● **High Camp**
- Benchmark
chemicals
using Green
Screen or
equivalent
tool

● **Summit**
- Select safer
substitutes for
both products
and process
chemistry

**Safer
Substitutes**

The SIN List

a tool for identifying high concern chemicals



Greening Consumer Electronics

– moving away from bromine and chlorine

SONY ERICSSON

Bromine- and Chlorine-Free Mobile Phones

APPLE

Restriction of Elemental Bromine and Chlorine
to Achieve Elimination of BFRs and PVC
in Consumer Electronics Products

DSM ENGINEERING PLASTICS

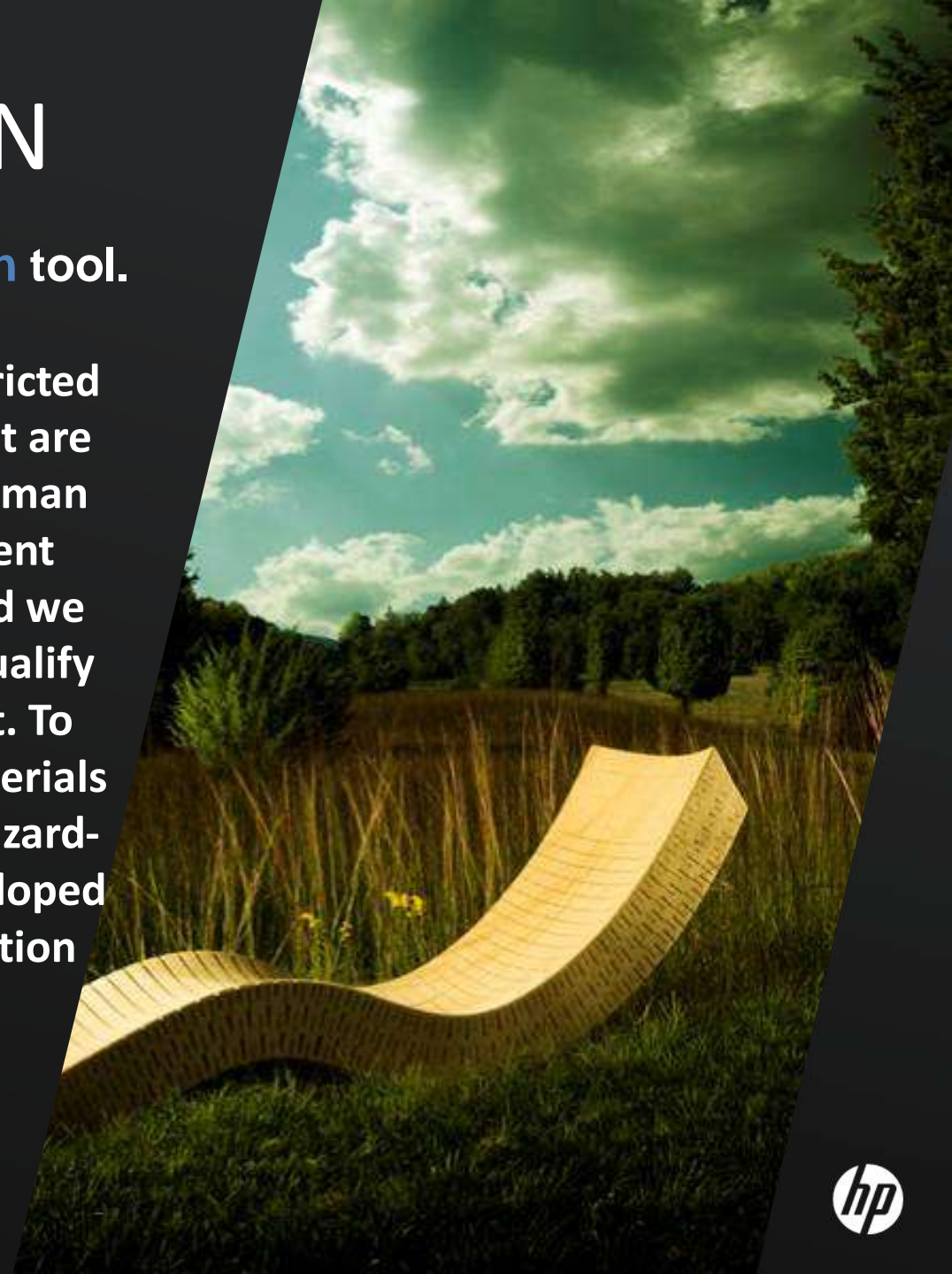
Bromine- and Chlorine-Free Plastic Components

GREEN SCREEN

HP is the world's leading practitioner of the **Green Screen** tool.

“HP has committed to replace restricted substances only with materials that are better for the environment and human health, and when there is sufficient assurance of required volumes and we have enough time to design and qualify the new material into the product. To assess alternative replacement materials we now use the Green Screen, a hazard-based assessment framework developed by the nongovernmental organization Clean Production Action.”

HP's Global Citizens Report





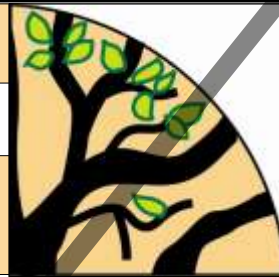
Benchmark 4

Prefer – Safer Chemical



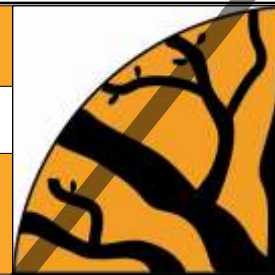
Benchmark 3

**Use but Still Opportunity
for Improvement**



Benchmark 2

**Use but Search for Safer
Substitutes**



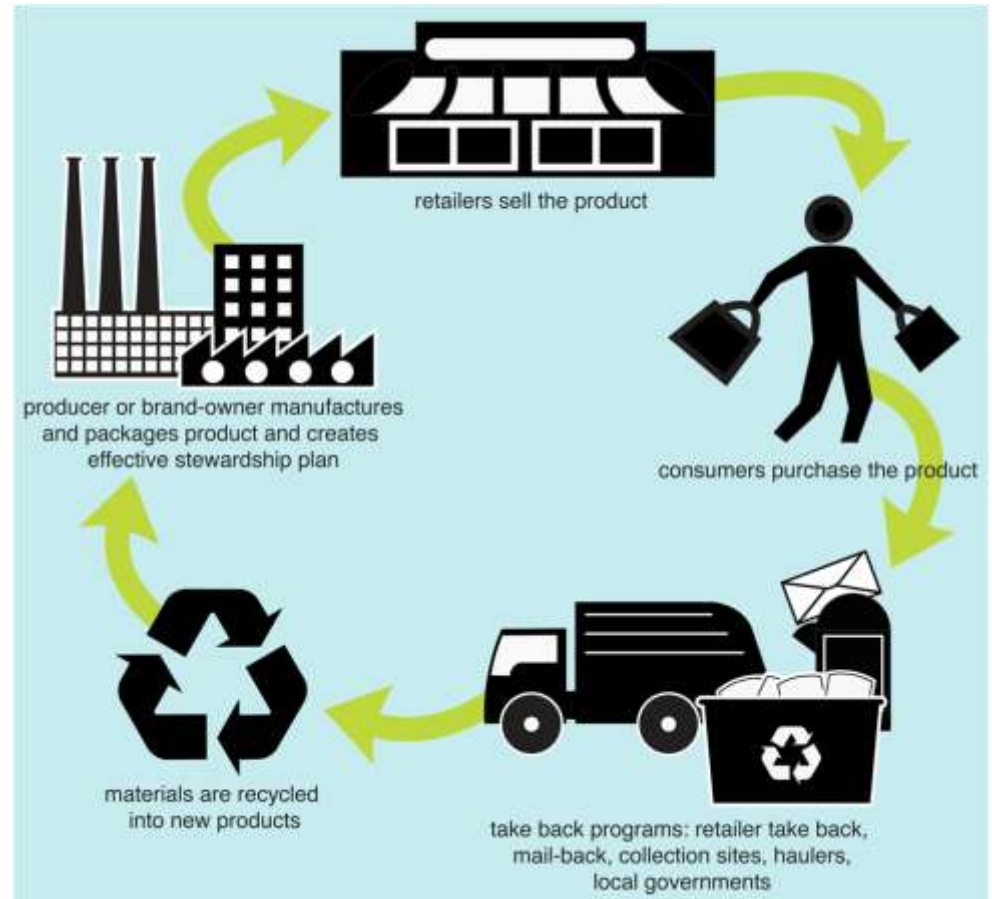
Benchmark 1

**Avoid – Chemical of
High Concern**



Extended Producer Responsibility

- Design for disassembly & recyclability
- Establish product take back programs



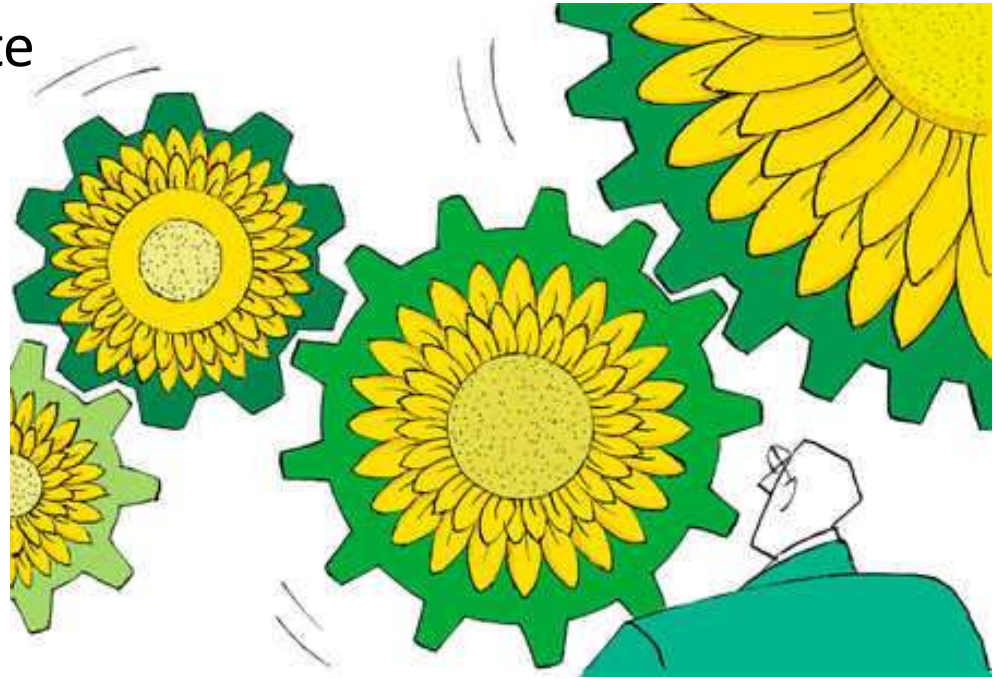
Recommendations

1. Green Design
2. Know & Disclose Chemicals in Process Chemistry and Products
3. Assess Hazards and Select Safer Substitutes
4. Green Procurement
5. Extended Producer Responsibility
6. Clean Technology Transfer



Recommendations – Green Design

- Create systems that promote designs for
 - waste prevention
 - disassembly
 - recyclability
 - durability
 - decreased obsolescence
 - reuse
 - safer chemicals
- Support innovation with tax credits and taxes



Recommendations – Know & Disclose Ingredients

- Need systems for knowing, disclosing and labeling ingredients in electronics across supply chain, including:
 - Inventory of hazardous chemicals across life cycle
 - Inventory of chemicals and materials used in process chemistries and products
 - Source of minerals and metals
 - Disclosing all chemical and material ingredients in products and sharing that information across the supply chain
 - Labeling products that contain substances of concern: RoHS, POPs, organhalogens, REACH SVHCs, etc.



Recommendations – Assess Hazards

- Need public database of hazard and toxicological properties for chemicals used in electronics life cycle
- Need transparent, scientifically robust, replicable tools for evaluating chemical hazards and identifying substitutes that are safer for humans and the environment.
- Apply these tools to both process chemistry and product ingredients
- Develop watch list of chemicals of concern



Recommendations – Avoid Hazards & Select Safer Substitutes

Create and implement plans to:

- Avoid chemicals and materials known to be of high concern to humans or the environment, including:
 - Halogenated flame retardants
 - Other materials that generate POPs at end of life (such as PVC)
 - SIN List chemicals / REACH SVHCs: vPvBs, PBTs, CMRs, endocrine disruptors and neurotoxicants
- Select safer substitutes for process chemistry and products that reduce the potential for harm to human health or the environment
- Create lists of preferred substitutes
- Document when substitutes are unavailable, including assessment of latest R&D developments



Procurement

- Government and private sector purchasers should develop procurement processes that give preference to electronic and electrical products that do not contain substances or materials of concern



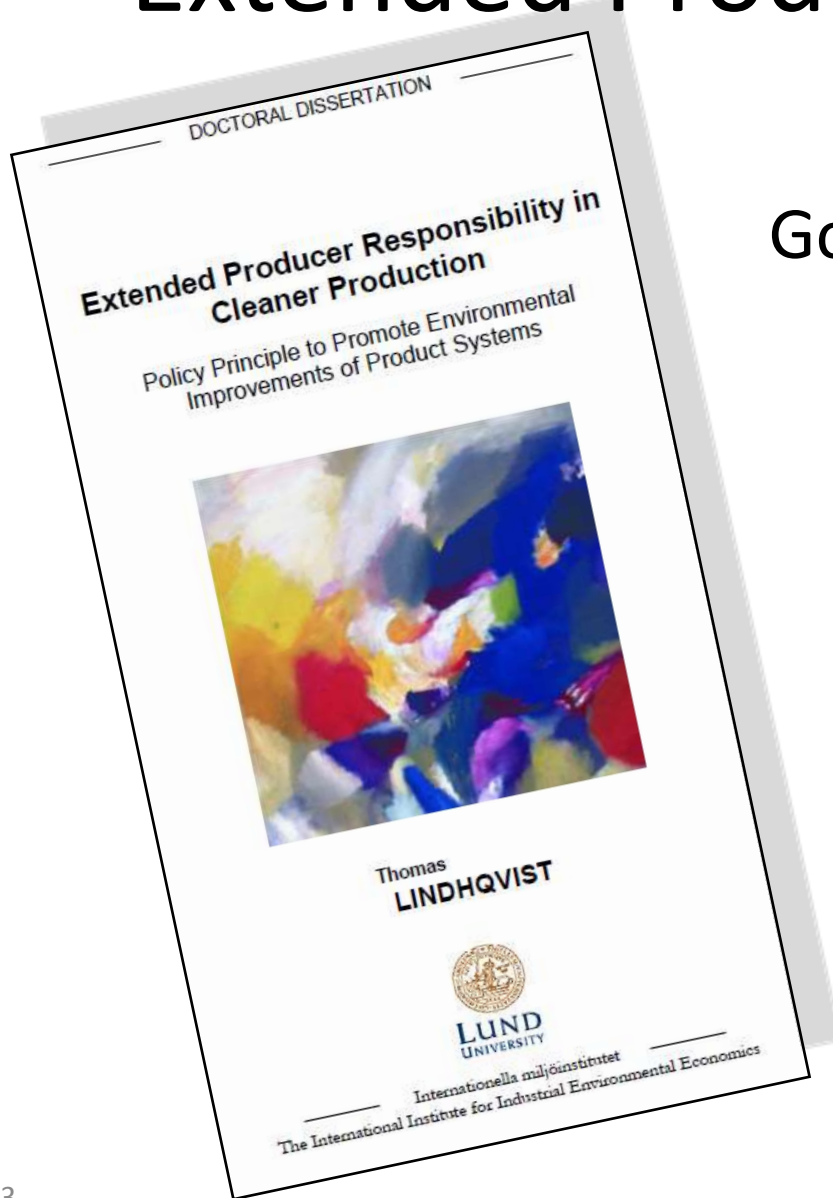


Kaiser Permanente Environmental Supplier Disclosure Form - Electronics

- Do you have a program to **track the chemical constituents/ingredients in your products?**
- Do you have a program to **identify and reduce the use of components that contain chemicals of high concern?**
- Are **brominated flame retardants, PVC, or phthalates** used in any of the product's components?
- Does your product contain any other chemical listed under **CA Prop 65 or as PBT by WA State, European Union or the US EPA?**



Extended Producer Responsibility



Governments should develop legislation requiring extended producer responsibility for manufacturers of electronic and electrical products including information on chemicals present in the lifecycle

Clean Technology Transfer

- Promote the transfer of technology and knowledge for cleaner production and manufacture of alternatives.
- Do not transfer environmentally unsound designs, technologies and products that are prohibited or controlled in developed countries are not transferred to developing countries and countries with economies in transition





Thank You!

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