

Tools for the Design and Selection of Safer Chemicals, Materials and Products

Sally Edwards, Sc. D.

Green Chemistry and Commerce Council
Innovators Roundtable

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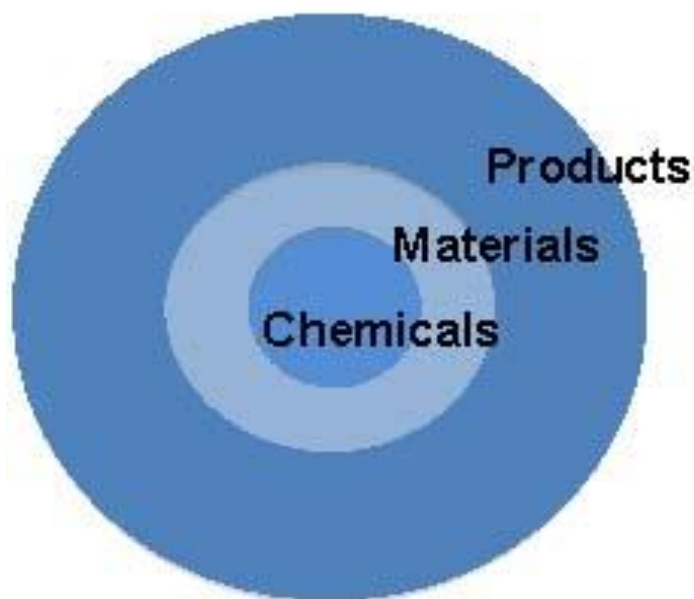
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What is Alternatives Assessment?

- * Set of tools for promoting sustainable production and consumption
- * A process for identifying and comparing potential chemical and non-chemical alternatives that can be used as substitutes to replace chemicals or technologies of high concern
- * Includes assessment and evaluation

Chemicals, Materials, Products



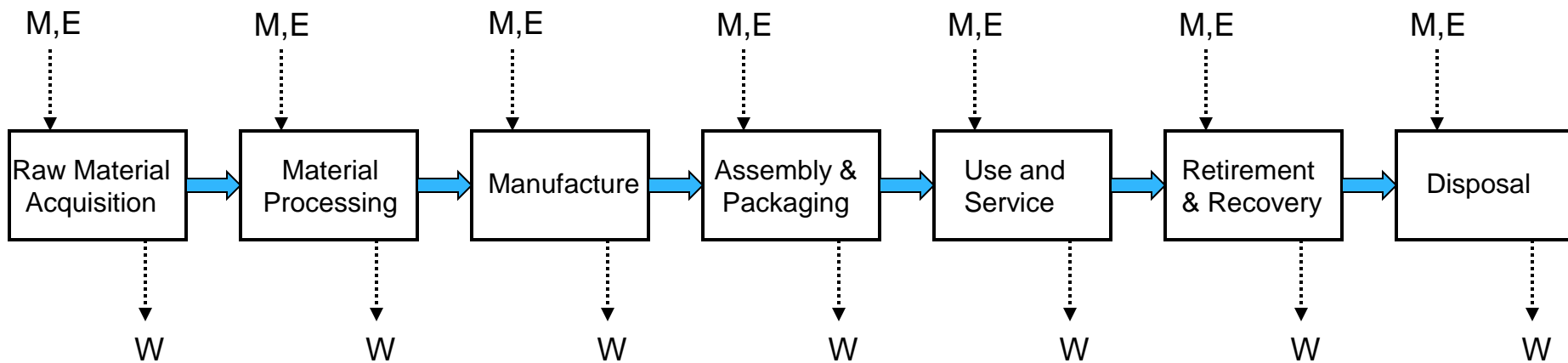
- Phthalates, Flame retardants, Colorants
- PVC with additives
- Shower Curtain



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Chemical/Material/Product Life Cycle

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Feed-
stocks

Chemical
Synthesis

Packaging

Use

EOL

Breakdown products

Metabolites

What is a sustainable product?



Lowell Center Framework for Alternatives Assessment

- * Foundation – goals and objectives, guiding principles, and decision-making rules
- * Processes – screening, comparative, design, etc.
- * Evaluation modules – human health, environment, technical and economic feasibility, social justice, life cycle impacts

Alternatives Assessment Tools

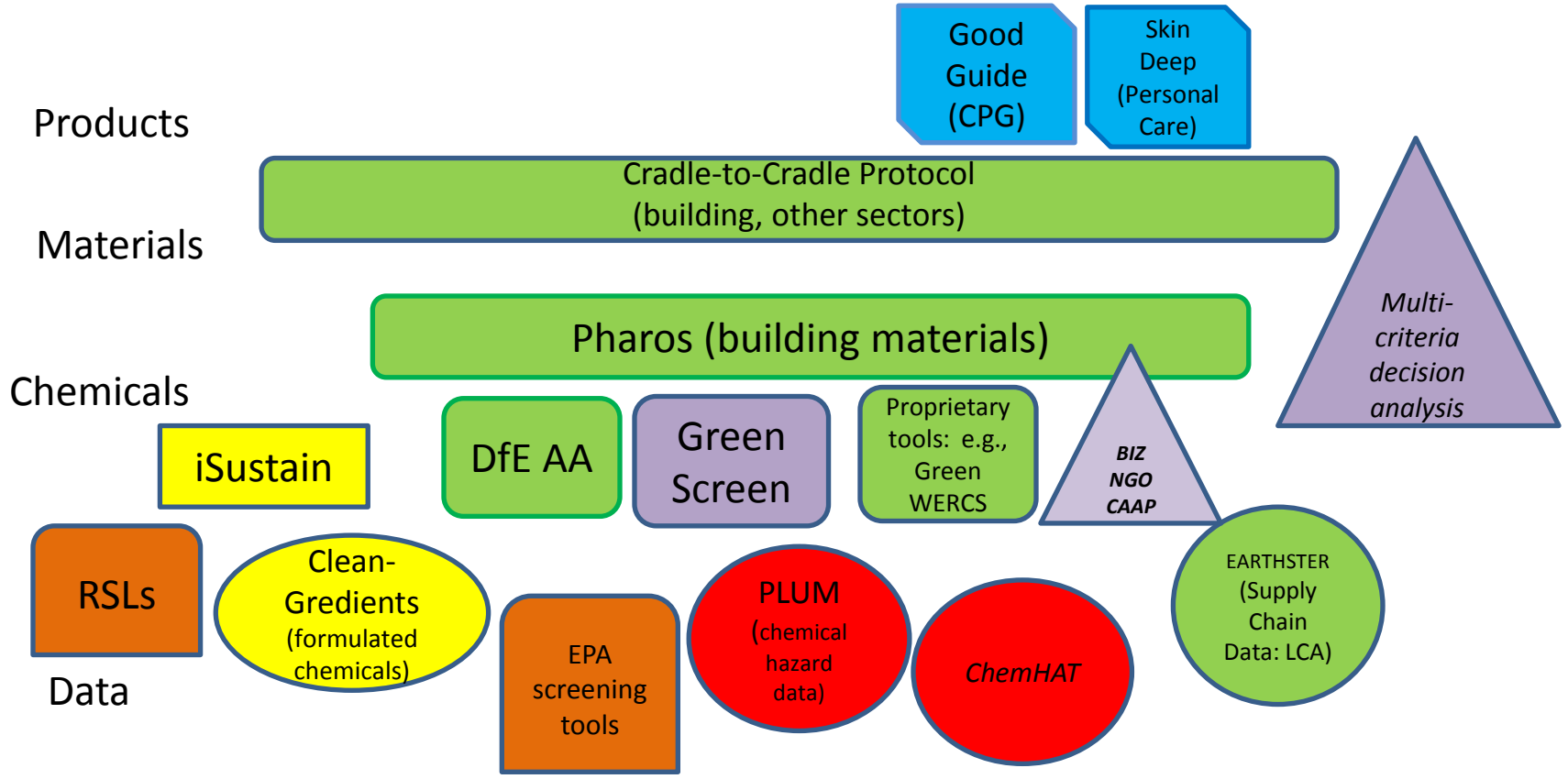
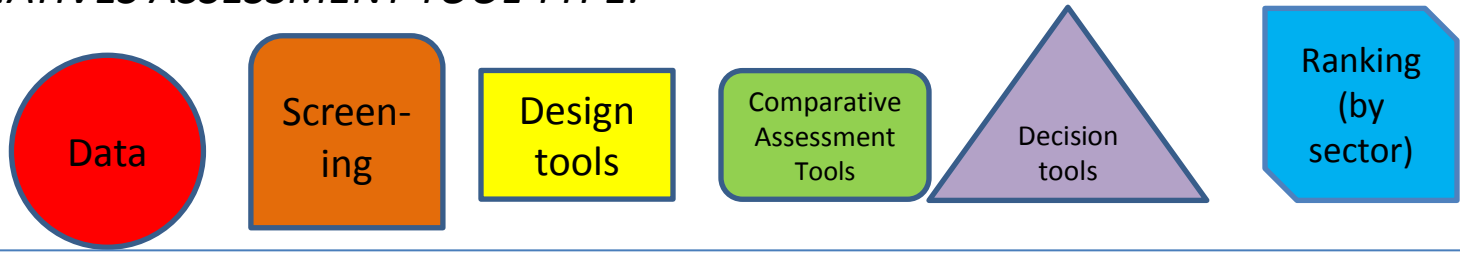
- * Screening
- * Comparative
- * Design
- * Decision
- * Ranking



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ALTERNATIVES ASSESSMENT TOOL TYPE:



PRODUCT LIFE CYCLE:

Design

Manufacture/ Assembly

Retail/ Consumer Use

Disposal/EOL

Life Cycle Assessment (LCA), Risk Assessment and Comparative Chemical Hazard Assessment

- * LCA helps to answer, *“What are the environmental impacts of a product throughout its life cycle?”*
- * Risk assessment considers hazard, dose-response, and exposure and helps to answer, *“Is it safe enough?”*
- * Comparative chemical hazard assessment helps to answer, *“Which alternative is safer?”*

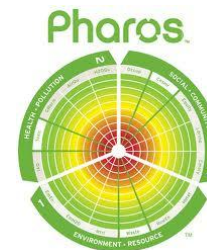
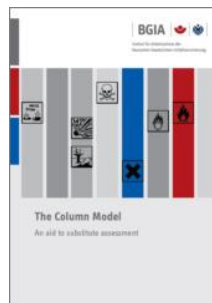
Examples of Screening Tools

- * Company and industry sector RSLs
- * SIN list
- * PRIO
- * US EPA screening level tools:
 - * Sustainable Futures Initiative – e.g., PBT profiler



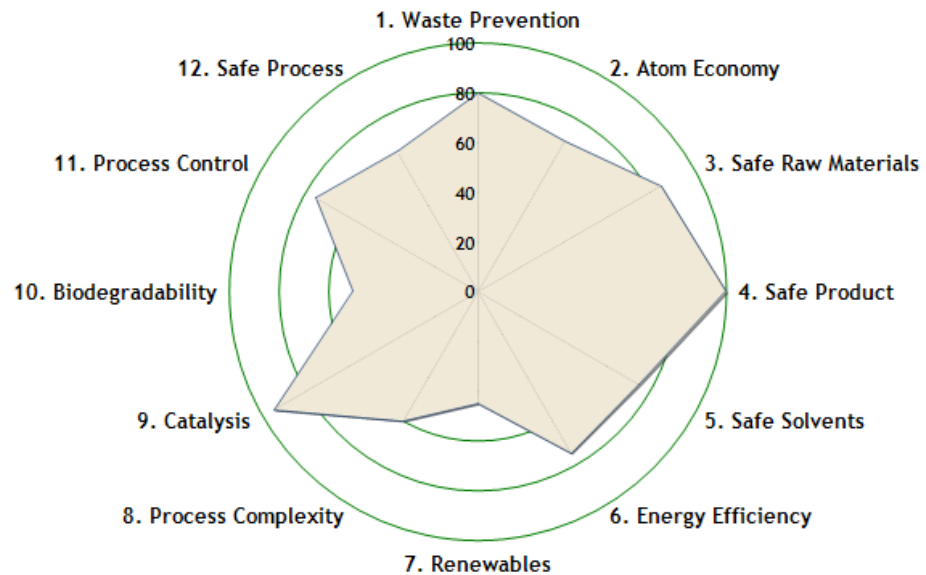
Examples of Comparative Tools

- * US EPA – DfE Chemicals Alternatives Assessment
- * Green Screen - includes decision framework
- * Column Model
- * Proprietary tools – e.g., GreenWERCS
- * Pharos (building products)



Examples of Design Tools

- * iSustain
- * CleanGredients



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Examples of Decision Tools

- * Green Screen
- * Multi-Criteria Decision Analysis
- * BizNGO Chemicals Alternatives Assessment Protocol



Examples of Ranking Tools for Consumers

- * GoodGuide
- * SkinDeep
- * Eco-labels and certifications



Key Elements to Consider When Selecting a Tool

- * What is the purpose?
- * What is your expertise in toxicology and chemistry?
- * What is your budget and timeframe?
- * How important is transparency of approach and data?

Some Key Issues

- * What endpoints to evaluate?
- * How cut-offs are determined for ranking impacts as H, M, L?
- * Include consideration of exposure potential?
- * Include life cycle considerations?
- * Include metabolites/degradation products?
- * How to weigh different endpoints?
- * How to address data gaps?



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