

# Decision Methodologies for Alternatives Analysis



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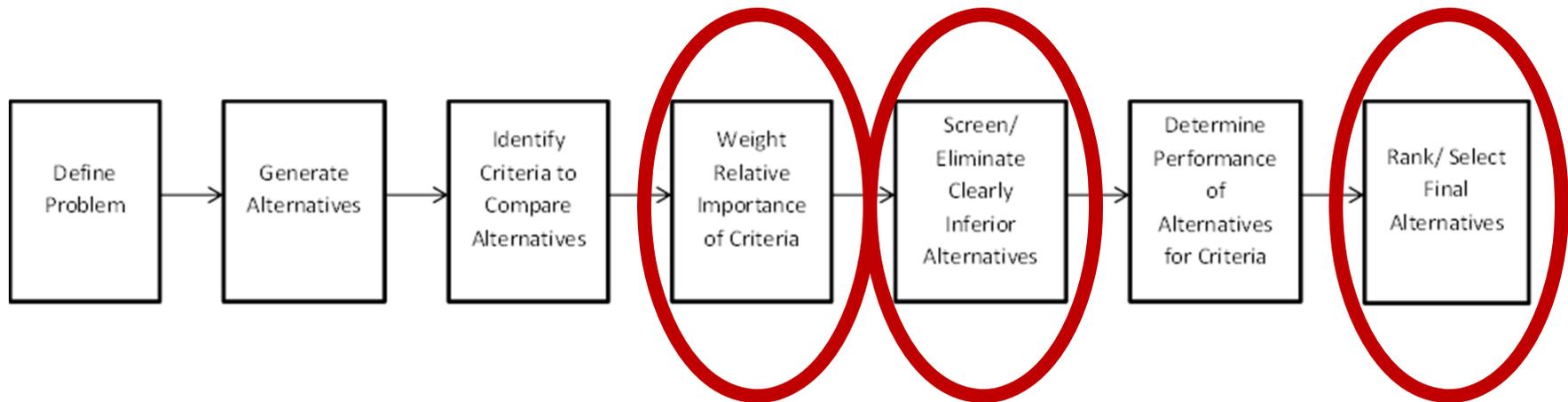
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Alternatives Analysis Workshop

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# What Decision Needs To Be Made In Alternatives Analysis for AB1879

- Is there a viable safer alternative to a priority product?

# Generic Decision-Making Process



# Generic Example: Alternatives Analysis of a Priority Product

Criteria						Alternatives					
Criteria	Sub-criteria	Measure	Scale	Min/ Max	Weight	Priority Product	Alt 1: Drop- In	Alt 2: Drop- In	Alt 3: Drop- In	Alt 4: process Δ	Alt 5: process Δ
Public Health Impacts	Hazard	Carcinogenetic	1-5	Min		5	5	3	2	1	1
	Exposure	Dispersion	mg/kg	Min		3	3	5	2	1	1
Environmental Impacts	Hazard	Aquatic toxicity	mg/L	Max		10	10	10	1	0.5	0.5
	Exposure	Bio-accumulation	BAF	Min		500	500	500	1000	200	200
Physical Chemical Haz		Combustibility	1-4	Min		3	3	3	3	1	1
Resource Use		Energy	kWh/kg	Min		100	50	100	100	25	400
Technical Performance		Technical Feasibility	1=No 2=Yes	Max		2	2	2	2	2	2
Economic Impact		Economic Feasibility	1=No 2=Yes	Max		2	2	2	2	1	2

# Alternatives Analysis Methods

Method Type	Sub-Method	Description	Tools
Screening		Uses checklists or simple decision rules/algorithms to assist decision-makers in identifying chemicals, products or processes to be avoided or preferred based on one or more attributes, but does not perform an overall evaluation or ranking of the alternatives across all attributes	Green Screen; EPA Alternatives Assessment Methodology
Narrative		Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria using narrative decision rules and guidelines.	Environmental Effects Analysis; ECHA Authorisation Guidance
MCDA	Elimination by Aspect	Performs a full assessment coupled with ranking of the alternatives across all criteria based on the importance of criteria	BizNGO Chemical Alternatives Assessment Protocol; Cradle to Cradle Assessment Protocol
MCDA	Optimization/Outranking Approach	Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria assisted by multi-criteria decision analysis using an outranking or optimization approach	GoodGuide? (proprietary)
Hybrid-MCDA	Optimization Approach	Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria assisted by multi-criteria decision analysis using an optimization approach	Integrated Industrial Ecology Function Deployment; QFD; UCLA/Decerns
Hybrid-MCDA	Outranking Approach	Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria assisted by multi-criteria decision analysis using an outranking approach	UCLA/Decerns
Hybrid-Robust Scenario Analysis		Performs a full assessment coupled with an overall evaluation using robust scenario analysis.	

# Screening

- **Description:** Uses checklists or simple decision rules/algorithms to assist decision-makers in identifying chemicals, products or processes to be avoided or preferred based on one or more attributes, but does not perform an overall evaluation or ranking of the alternatives across all attributes
- **Tools:** Green Screen; EPA Alternatives Assessment Methodology

# Narrative

- **Description:** Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria using narrative decision rules and guidelines.
- **Tools:** Environmental Effects Analysis; ECHA Authorisation Guidance.

# MCDA: Elimination by Aspect

- **Description:** Performs a full assessment coupled with ranking of the alternatives across all criteria based on the importance of criteria
- **Tools:** BizNGO Chemical Alternatives; Assessment Protocol; Cradle to Cradle Assessment Protocol

# MCDA: Optimization/Outranking Approach

- **Description:** Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria assisted by multi-criteria decision analysis using an optimization or outranking approach.
- **Tools:** GoodGuide? (proprietary)

# Hybrid-MCDA: Optimization/Outranking Approach

- **Description:** Performs a full assessment coupled with an overall evaluation or ranking of the alternatives across all criteria assisted by multi-criteria decision analysis using an optimization approach.
- **Tools:** Integrated Industrial Ecology Function Deployment; QFD; UCLA/Decerns.

# Hybrid-Robust Scenario Analysis

- **Description:** Performs a full assessment coupled with an overall evaluation using robust scenario analysis.

# What Decision Methods Do You Use? What Tools?

- Screening
- Narrative
- MCDA
  - Elimination by Aspects
  - Optimization
  - Outranking
- Hybrid/MCDA
- Hybrid/Robust Scenario Analysis