

Life Cycle Metrics for Product Environmental Management: Principles and Practices

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Who is Kimberly-Clark?



- A global health and hygiene leader
 - \$15.9 billion in annual revenue
 - Products in more than 150 countries used by 1.3 billion people everyday
 - Trusted brands such as Kleenex[®], Scott[®], Huggies[®], Pull-Ups[®], Kotex[®] and Depend[®]
 - Dow Jones Sustainability Index #1 rated Personal Products sector company two consecutive years

Kimberly-Clark's Vision

Mission: *Enhance the health, hygiene and well-being of people every day, everywhere.*

- Environmental goals related to our corporate mission:
 - Water and Wastewater
 - Energy and Carbon
 - Manufacturing Waste Reduction and Landfill Elimination
 - **Design for the Environment**
 - Developing and Emerging Countries

Kimberly-Clark's LCA Study Objectives

- Kimberly-Clark is examining the common components of successful applications of LCA in industry
- Best-practices will provide a foundation for expanding the application of LCA at Kimberly-Clark
- Principles and challenges emerging from common themes in our review will be presented here

Case Studies

- Volvo – Car group LCA practices as documented in the late 1990's
- DaimlerChrysler – European (Mercedes Benz) practices
- BASF – Eco-efficiency as provided in service offerings
- GlaxoSmithKline – Green Technology Guide internal practice

#1: Customize to Your Business

- No one-size-fits-all solutions exist
 - Each implementation is customized to the situation, strategy and resources of the organization

#2: Evolve Over Time

- Implementation evolves over a long time period
 - Many companies have been experimenting with LCA for more than ten years
 - Evolving process that generally follows the plan, do, check, act cycle

#3: Know the Audience

■ Internal Audiences

- Executives
- Marketing
- Product Developers
- Facility Managers
- Process Engineers

Need: understand product performance relative to corporate goals and objectives

Broad Multi-Product Interest



Product Attributes or Individual Process Interest

■ External Audiences

- NGO's
- Investors
- Customers
- Communities
- Consumers

Need: understand corporate and product performance relative to expectations and alternatives

Know the Audience – Case Study Examples

■ Volvo

■ Internal Audiences

- Provide varying levels of results detail for users

■ External Audiences

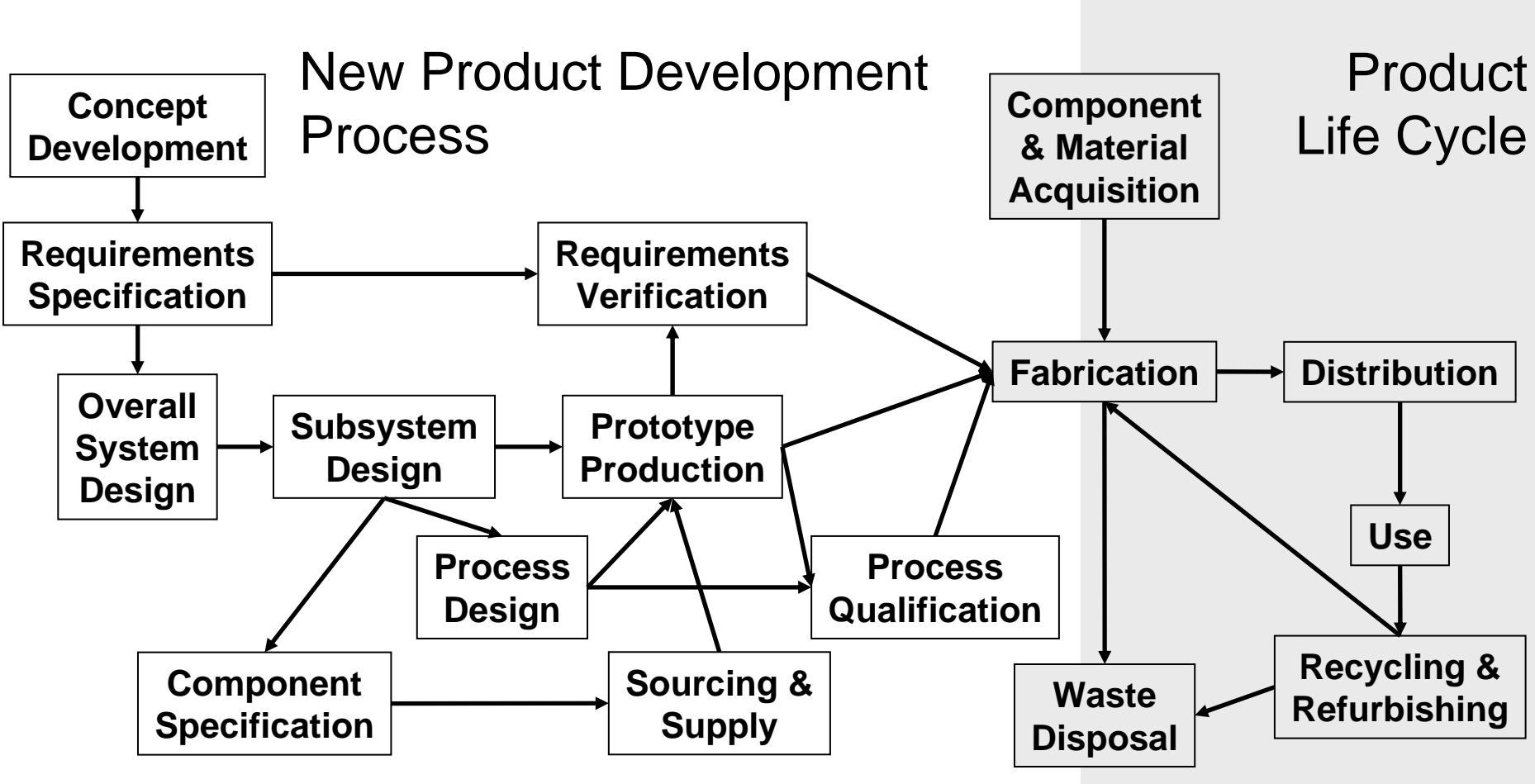
- Support declarations and product labels

■ BASF

- Customized delivery for product development/design (system optimization), corporate strategy/communications, and marketing

Eight Principles

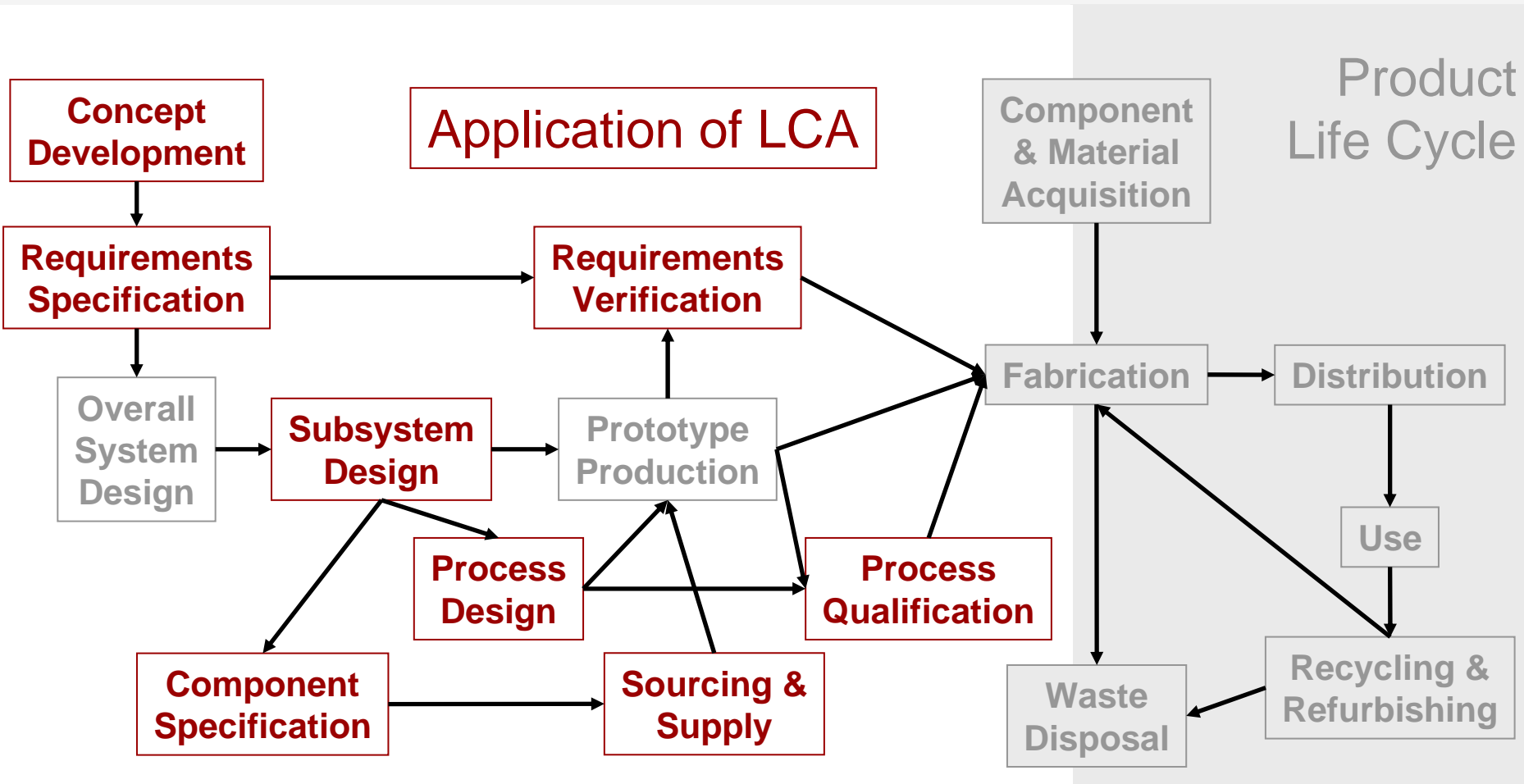
#4: Integrate with Existing Business Processes



Modified from J. Fiksel, *Design for Environment* (1996)

Eight Principles

#4: Integrate with Existing Business Processes



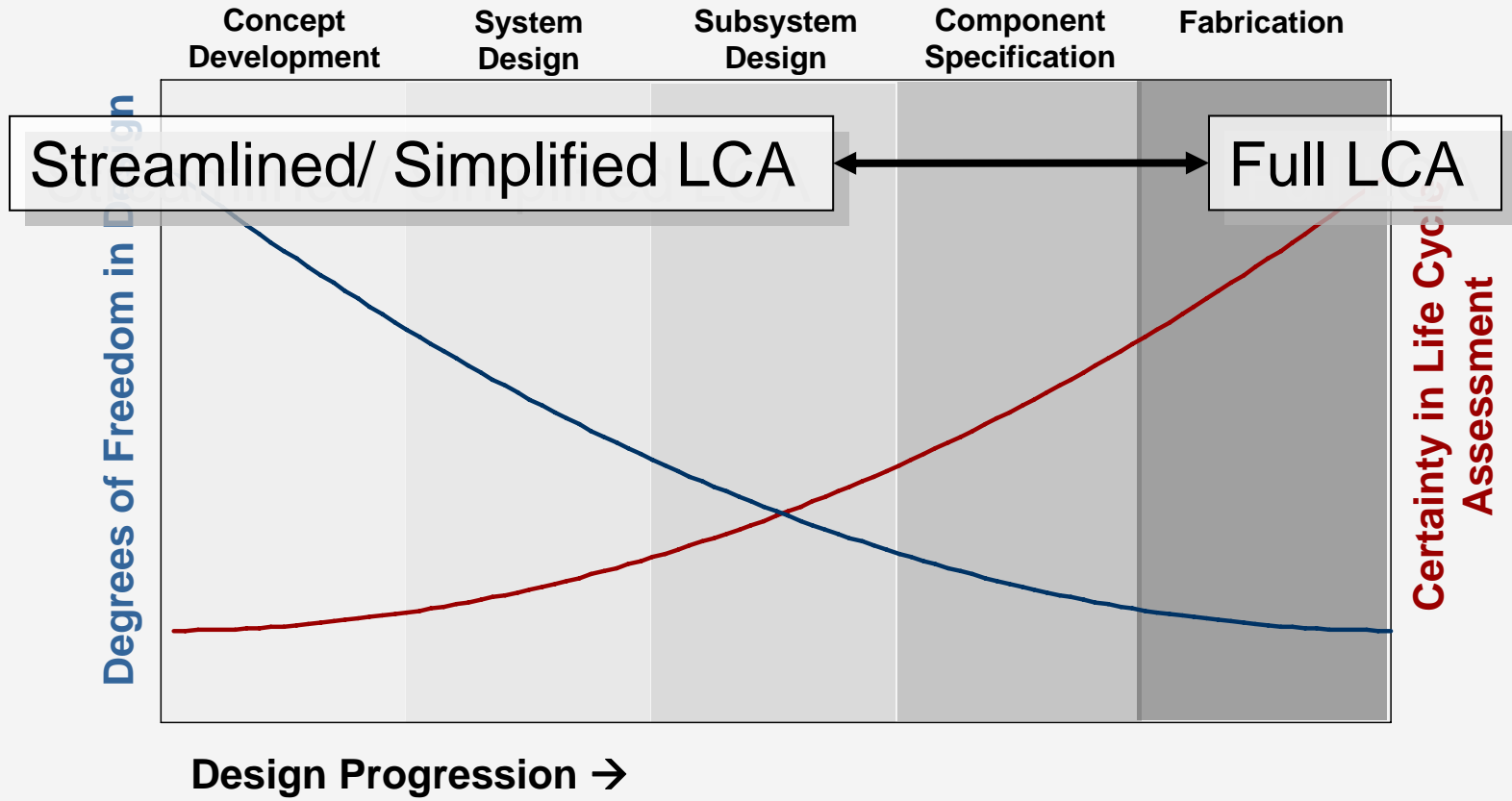
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Integrate with Existing Business Processes – Case Study Examples

- Volvo – Specific application of LCA for material selection in design
- DaimlerChrysler
 - Full integration of LCA in vehicle development with computer interface to support direct import of data from tracking systems
 - Cross-functional product development teams include LCA expertise

#5: Scope the System Appropriately



Scope the System Appropriately – Case Study Examples

■ GlaxoSmithKline

- Focus upstream with no consideration of transportation and waste treatment

■ Volvo

- Focus on differentiation – common part/materials excluded and minor activities frequently ignored

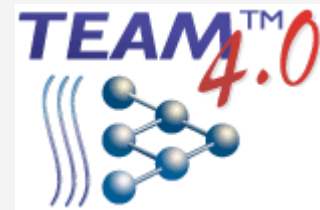
■ BASF

- Focus on differentiation – only consider stages where the alternatives differ

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#6: Apply Tools and External Data Sources Effectively

- Customized tools vs. off-the-shelf offerings vs. hybrid approaches
- External data sources:
 - Suppliers – business concerns may limit data availability
 - Literature – identifying useful case studies is resource intensive
 - Purchased databases and national databases – coverage may be incomplete and data quality may be a concern



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Apply Tools and External Data Sources Effectively – Case Study Examples

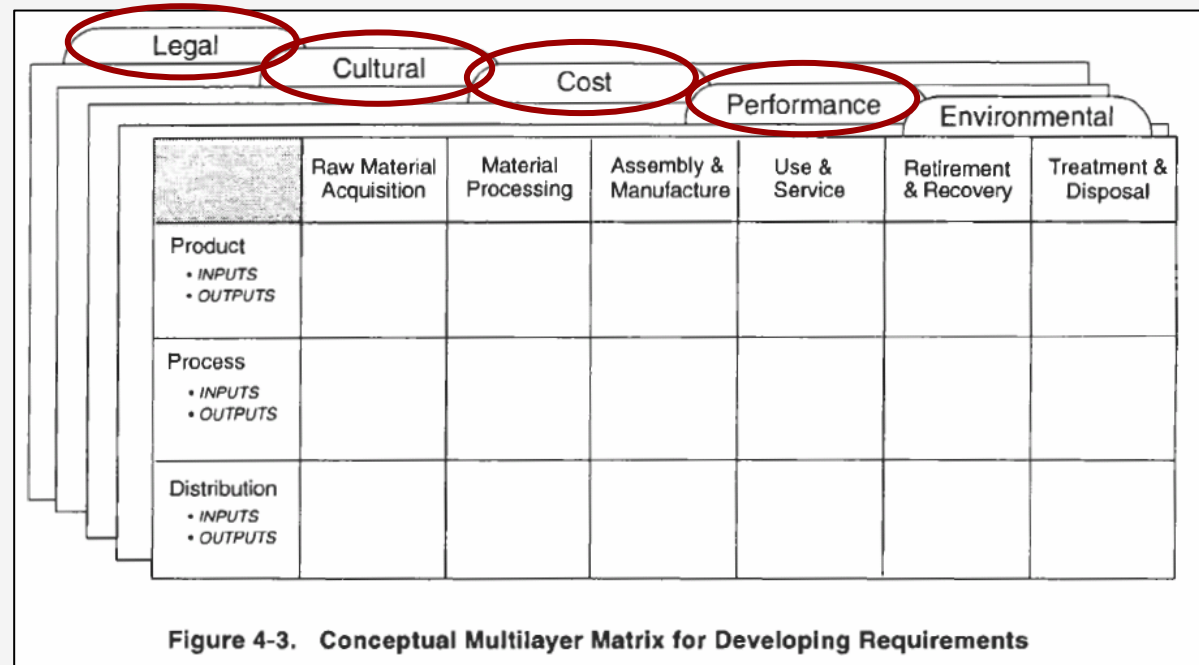
- GlaxoSmithKline
 - Tools: ECOPRO and PEMS 4
 - Data sources: literature and databases
- Volvo
 - Tools: Internally developed Environmental Priority Strategies (EPS) tool
 - Data sources: supplier data requirements
- DaimlerChrysler
 - Tools: GaBi 4.0
 - Data sources: database, VDA format databases from archive analysis and suppliers

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#7: Bring in Supporting Data as Necessary

- Additional data and information can help decision makers when considering alternatives

Possible
Categories of
Supporting
Information



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Bring in Supporting Data as Necessary – Case Study Examples

- **GlaxoSmithKline**
 - “Green Technology Guide” provides information on operational considerations, safety considerations, mass intensity, and process energy requirements
- **DaimlerChrysler**
 - Dismantling/recycling information and secondary/renewable material integrated in LCA tools
- **BASF**
 - Eco-Efficiency analysis includes economics, health and safety – further criteria such as noise, land use and quality performance are occasionally considered as well

#8: Communicate Results Clearly

- All audiences expect succinct results presentation
- 6 – 12 metrics generally work best
- Summarization is useful, but aggregation of all results to a single value is not necessary
- The more graphical the better

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Communicate Results Clearly – Case Study Examples

- **GlaxoSmithKline**

- Stoplight color system used to communicate summarized results in four categories

	<u>Environment</u>	<u>Safety</u>	<u>Efficiency</u>	<u>Energy</u>
Alternative 1	Yellow	Yellow	Red	Yellow
Alternative 2	Green	Yellow	Yellow	Green

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Communicate Results Clearly – Case Study Examples

■ GlaxoSmithKline

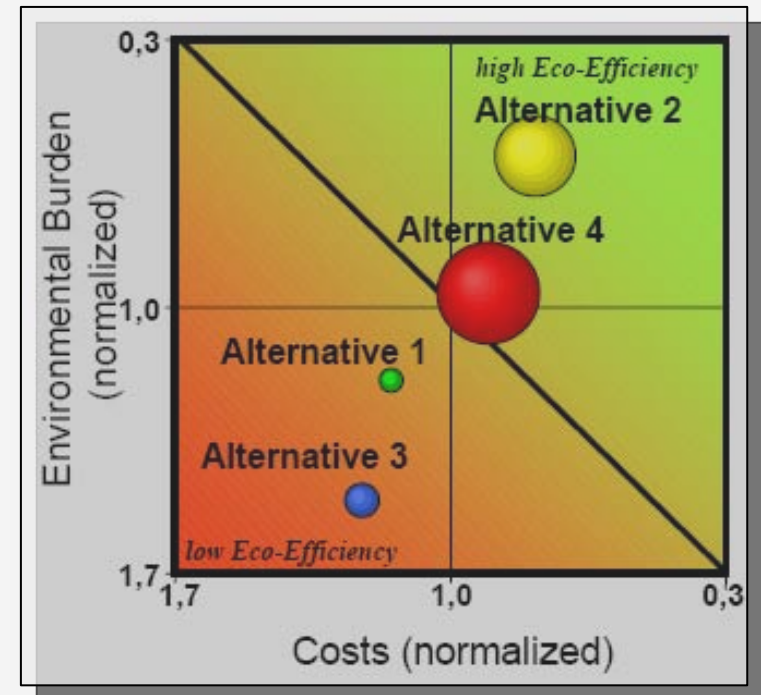
- Stoplight color system used to communicate summarized results in four categories

■ Volvo

- LCA data summarized to a single score (Environmental Load Unit – ELU)

■ BASF

- “Environmental Fingerprint by BASF”



Key Challenges

- Data availability
 - Limitations on data from suppliers
 - Limitations on availability and applicability of data from databases
- Data summarizations
 - Tradeoffs associated with limiting impact category reporting or summarizing to a single metric
- Time/resources required for LCA data management

Conclusions

- LCA provides the ideal framework for understanding product environmental performance
- Some key practices and principles can be observed in successful implementation examples
- Many of these principles likely apply equally well in public sector LCA practices

Thank You

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Selected References

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