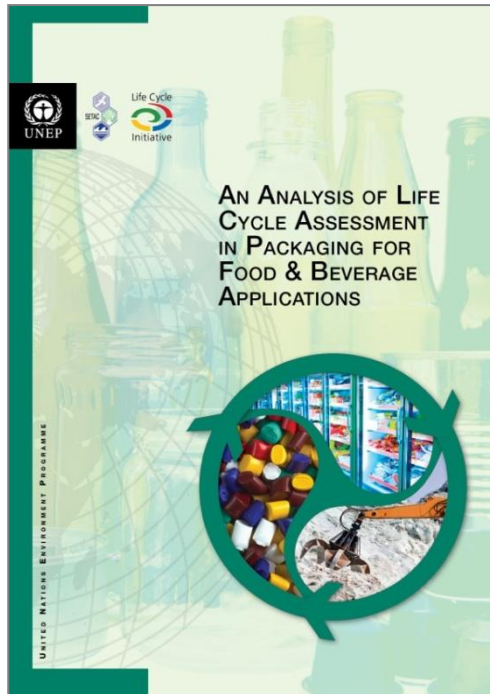




Life Cycle Initiative

A joint organisation  
of UNEP & SETAC



# Packaging for Food/Beverage Applications – Mining Knowledge from LCA

Summary



Life Cycle Initiative

# Contents of the Summary

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- Overview/ Overall Messages
- Results
- Future Research
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# Overall Messages

Life-cycle based approaches provide the most comprehensive picture of the potential environmental impacts of packaging for food/beverage applications

- Life-cycle assessment (LCA) is the most inclusive quantification method for evaluating environmental aspects of packaging. Its greatest value is in providing decisionmakers with a more inclusive set of information to inform decision making.
- Policies based on life cycle approaches better avoid unanticipated consequences compared with those based on more limited considerations (e.g., single impacts such as waste or GHG measures; or single life cycle stage – such as manufacturing).
- Considering multi life cycle stages and impacts should be an integral complement of policy objective and implementation resources, although quantitative LCAs may not be necessary.
- Design approaches for packaging using life cycle attributes will make trade-offs more visible, particularly if the associated packaged product is included.
- LCA does not include all environmental consequences of packaging, nor does it quantify risks. Where necessary and appropriate, LCA should be augmented with other assessment methods.



# Project Objective

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Develop clear articulation of the **relevance and benefits of the life cycle approach** to design, manufacturing, use and end of life management of packaging for food/beverage applications based on **knowledge mining of existing LCA studies.**



# Key Research Questions

- What is the **value and relevance** of:
  - **A life cycle approach** for beverage and food products and packaging?
  - **Including all life cycle stages** in evaluating the packaging/food systems to reduce overall life cycle impacts?
  - **Including multiple impacts** in evaluating the packaging/food systems to reduce overall life cycle impacts?
  - **Including the food and/or beverage** into an evaluation of the packaging life cycle impacts?
- What **characteristics of future LCA studies** should be considered when evaluating the food/packaging life cycle?
- Examples of how the **waste management hierarchy and LCA** results interface/connect or contradict

March 2012



# Summary of Project

Developed a methodology for mining knowledge from LCA studies

Engaged 15 stakeholders from a variety of organizations with their insights on packaging and food/ beverage product sustainability

Reviewed 69 LCA studies on food and beverage products and packaging

Extracted knowledge and other insights specific to the value of LCA in evaluating food/ beverage packaging

Articulated this demonstrated knowledge and the implications for 3 audiences – policymakers, packaging designers, and LCA practitioners



# Participant Roles

## → Sponsors

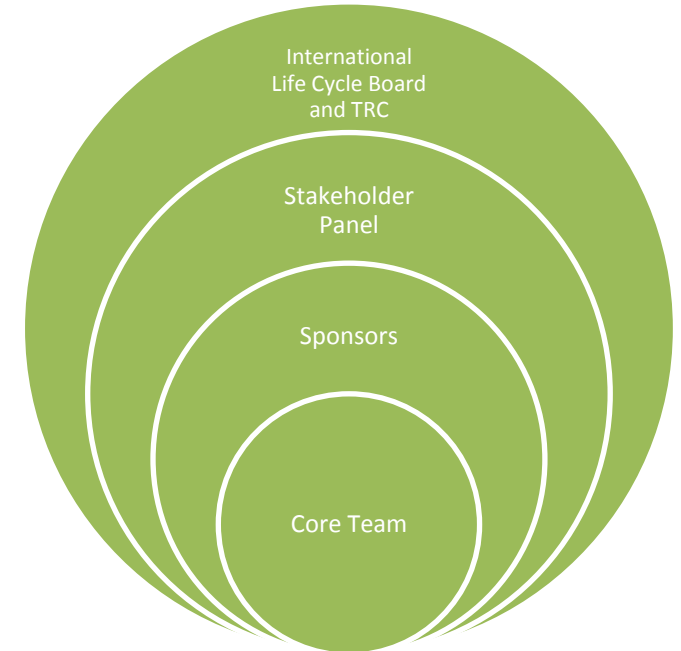
- Participate in kickoff, periodic update, and conclusion meetings
- Identify and provide any known existing reports of relevance to the project
- Review and provide feedback on draft documents
- Serve as a technical resource on packaging and food questions
- Provide financial resource to conduct the study

## → Stakeholder Advisory Panel

- Provide input into project approach and key questions
- Provide a phone interview to capture perspectives on key issues
- Review and provide feedback on draft documents
- Participate in one stakeholder advisory panel group discussion

## → International Life Cycle Board and Technical Review Committee

- Provide technical quality assurance prior to final publishing



- Core Project Team
  - Conduct research and develop content
  - Manage meetings and administrative aspects of project

March 2012

# Sponsors and Core Team

Sponsors	Contact
ACC	Mike Levy
Amcor	Gerald Rebitzer
ARECO	Pere Fullana
EAFA - European Aluminium Foil Association	Graham Houlder (on behalf of Stefan Glimm)
Flexible Packaging Association (FPA)	Marla Donahue and Ram Singhal
Flexible Packaging Europe	Graham Houlder
Plastics Europe	Guy Castelan and Aafko Schanssema
Pepsico	Andreza Araujo
SIG	Christian Bauer
TetraPak	David Cockburn
World Steel	Greg Crawford, Richard Tavoletti
Project Team	Contact
UNEP	Sonia Valdivia
SETAC	Bruce Vigon
PE INTERNATIONAL	Jim Fava, Laura Flanigan, and Trisha Montalbo
treeze, Ltd.	Rolf Frischknecht





# Stakeholder Advisory Panel

- Agriculture Canada
- Canadian Agri-Food Policy Institute (CAPI)
- Centro de Tecnologia
- Environment Canada
- Resource Recycling Systems
- Nestle
- Save Food Initiative
- Solid Waste Association of North America
- UN Environment Program
- Unilever
- US EPA
- World Wildlife Fund
- Walmart
- Waste and Resources Action Programme (WRAP)

## Engagement Process

- Representative introduced to the effort and invited to participate on the panel on a volunteer basis (with regional and value chain representation)
- Interviews conducted with each stakeholder to capture insights and perspectives on the research topics and questions, criteria for evaluating research, and possible references to existing studies
- Panel asked to comment on the draft report



# Key Takeaways

Analysis validated the intuition of the LCA community in a credible and rigorous research project

- Life Cycle Assessment helps encourage a **transition away from a focus on single-issue environmental priorities and avoid shifting burden.**
- LCA is a **tool to support decision making** by providing environmental data and information.
- **Few, if any, generalities** about what makes a package environmentally preferable in terms of materials or design attributes.
- **Considering multiple life cycle stages and impacts** should be an integral complement of policy objective and implementation resources.
- **Detailed cradle-to-grave LCA may not be required** for every type of decision to be made about packaging design, manufacturing, and governmental policymaking.
- LCA is a **highly valuable tool** driving more environmentally preferable packaging, and **can be supplemented by other tools** to measure other economic, technical, or social characteristics depending on the objectives and values of the user.
- The **waste management hierarchy can be a good rule of thumb** for directional evaluations and can give appropriate recommendations in specific cases (e.g., single-material analyses), but **may not be appropriate for some evaluations**, such as comparisons involving packaging designs manufactured from different materials.



# Implications for Policymakers

- Leveraging the value of a life cycle approach requires the following tactics in developing governmental policy
- Address the root causes of environmental problems.
- Identify policy objectives.
- Incorporate regional variations in policies.
- Create material-neutral policies.
- Link policies to broader environmental priorities.
- Apply policy to guide environmental trade-offs.
- Conduct life cycle assessments when appropriate.
- Clearly articulate the goal of the study.
- Describe the object of investigation in detail.
- Understand implications of the functional unit choice and account for real-life conditions.

# Implications for Packaging Designers

Leveraging the value of a life cycle approach requires the following tactics in packaging design --

- **Optimize efficiency and effectiveness** of packaging, keeping the product at the forefront.
- **Expand tool box** to include qualitative thinking about the life cycle as well as specific quantitative life cycle tools to address the breadth of issues.
- Initiate design with a **material-neutral perspective**.
- Where relevant, **include the packaged product** in the LCA
- Account for **multiple attributes simultaneously** across life cycle stages and impacts.
- Conduct life cycle **assessments when appropriate**.
- Make **informed trade-offs**.

# Implications for LCA Practitioners

Leveraging the value of a life cycle approach requires the following tactics in conducting LCA

- Consider **relevant life cycle stages** in an analysis or justify exclusions.
- Account for **relevant differences in packaging designs**.
- Where relevant, **include the packaged product** in the LCA.
- Account for **regional variation** in packaging disposal analyses.
- Consider a **variety of inventory metrics and impact categories**.
- Explicitly mention and justify **end-of-life allocation approach** for recycled packaging.
- Ensure **high data quality** for processes and emissions that contribute substantially to the overall environmental impacts.
- **Identify the target audience** to guide the analysis.
- Use LCA results to make **informed trade-offs**.

# Future Research

Identified the following potential future research efforts to further demonstrate and actualize the value of LCA

- Expand knowledge mining methodology to include studies beyond LCAs.
- Conduct data mining to inform further decision-making
- Investigate the role of LCA to address national or global level issues
- Evaluate extent of differences in LCAs conducted for OECD countries versus developing economies
- Understand the influence of LCA-derived messaging on consumer behavior
- Quantify environmental benefits of the function of food and beverage packaging itself
- Analysis of more product systems that include both food product and package
- Understand implications to small and medium sized enterprises (SMEs)



# Thank you for your attention!

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