

Sustainability and life cycle assessment guiding the development of new flexible packaging

3rd NorLCA Symposium 16. September 2011

Sini Veuro (VTT)

Catharina Hohenthal (VTT)



Flexpakrenew project

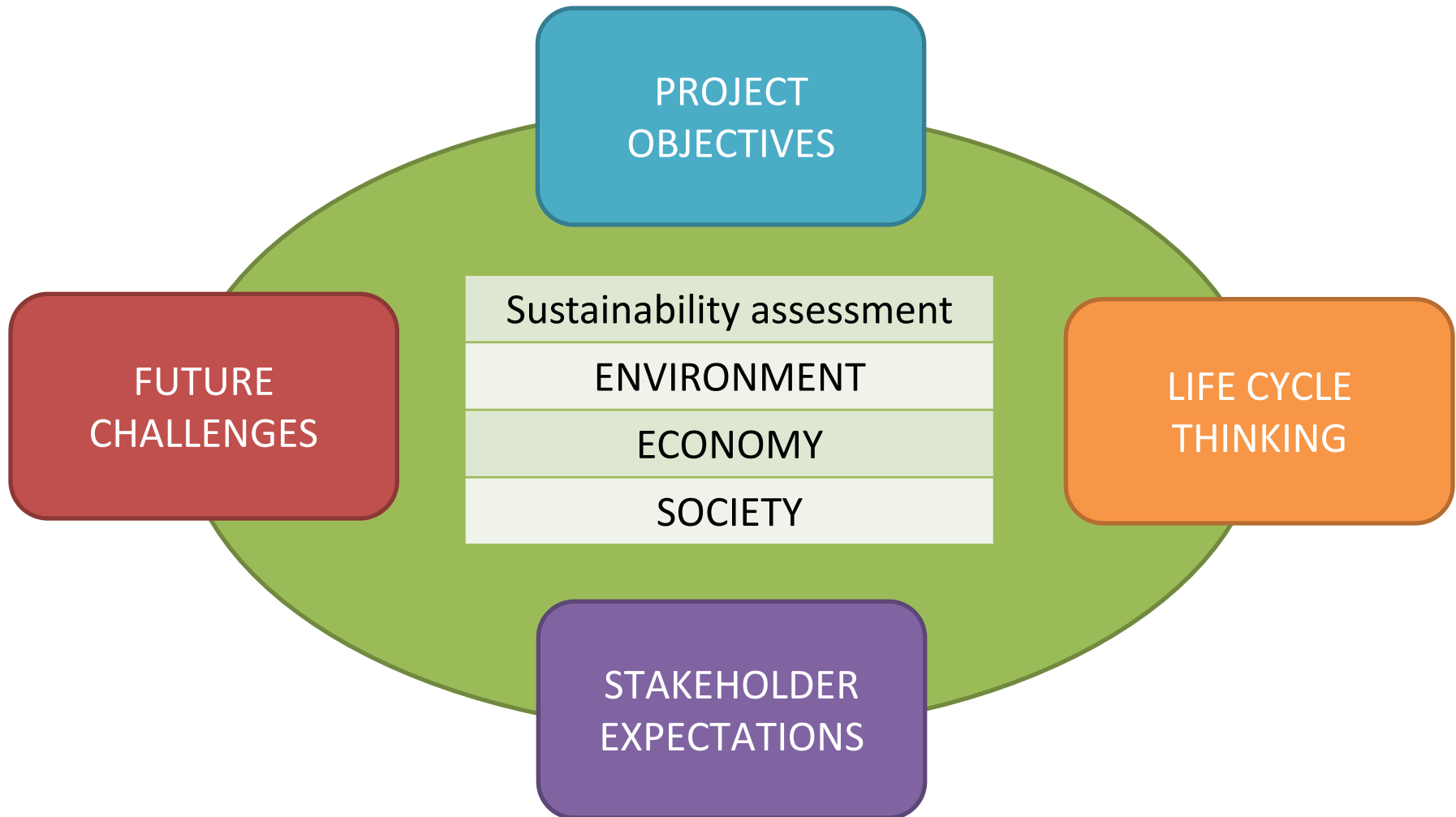
- Part of the project Design and development of an innovative eco-efficient low substrate flexible paper packaging from renewable resources to replace petroleum based barrier films (Flexpakrenew), which is funded by the European Union Seventh Framework Programme Theme - NMP-2007-2.4-03 Renewable materials for functional packaging.

- Goal of the project
 - *‘To design and develop an innovative eco-efficient low substrate flexible paper for packaging from renewable resources to reduce packaging industry’s reliance on barrier films derived from petroleum’*

What is flexible packaging?

- Flexible packaging is defined as the manufacture, supply and conversion of plastic and cellulose films, aluminium foils and papers that are used separately or in combination for primary food packaging or non-food applications.
- They are relatively small on size and weight compared to packages in general.
- Majority of the products that are packed to flexible packages (with barrier capacity) are in small portions.
- Examples
 - Dehydrated soup packaging
 - Tea envelopes
 - Chewing gum packaging

Sustainability framework



Sustainability goals of the project

ENVIRONMENT	ECONOMY	SOCIETY	TECHNOLOGY
<p>Recyclable product</p> <p>Biodegradable in less than 6 months</p> <p>Reduced amount of packaging going to landfill</p> <p>Reduced use of petroleum based materials in packaging</p> <p>Increased use of biobased materials in demonstrated package (barrier layer 70% biobased)</p> <p>Reduced greenhouse gas emissions</p> <p>Improved environmental performance during the life cycle of product</p>	<p>Competitive compared to petroleum based solutions</p> <p>Improved process efficiency</p> <p>New business opportunities for fibre based packaging</p> <p>Europe strengthens its position as lead market in the area of fibre based flexible packaging</p>	<p>Compliance with direct food contact legislation</p> <p>Free of odor and taste</p> <p>Increased shelf-life of (food) products</p> <p>Reduced amount of packaging going to landfill</p> <p>Promoting sustainable packaging</p>	<p>High level of barrier</p> <p>Antimicrobial action</p> <p>Easy processability</p> <p>Compatibility with standard papermaking and converting equipment</p> <p>Transferability to other packaging grades</p>

Indicators describe performance

ENVIRONMENT (examples)

- Greenhouse gas emissions
- Total amount of energy required (electricity, heat and fuels)
- Amount of renewable materials

ECONOMY (examples)

- Investment costs
- Raw material costs and availability
- Estimated demand for fibre based flexible packaging

SOCIETY (examples)

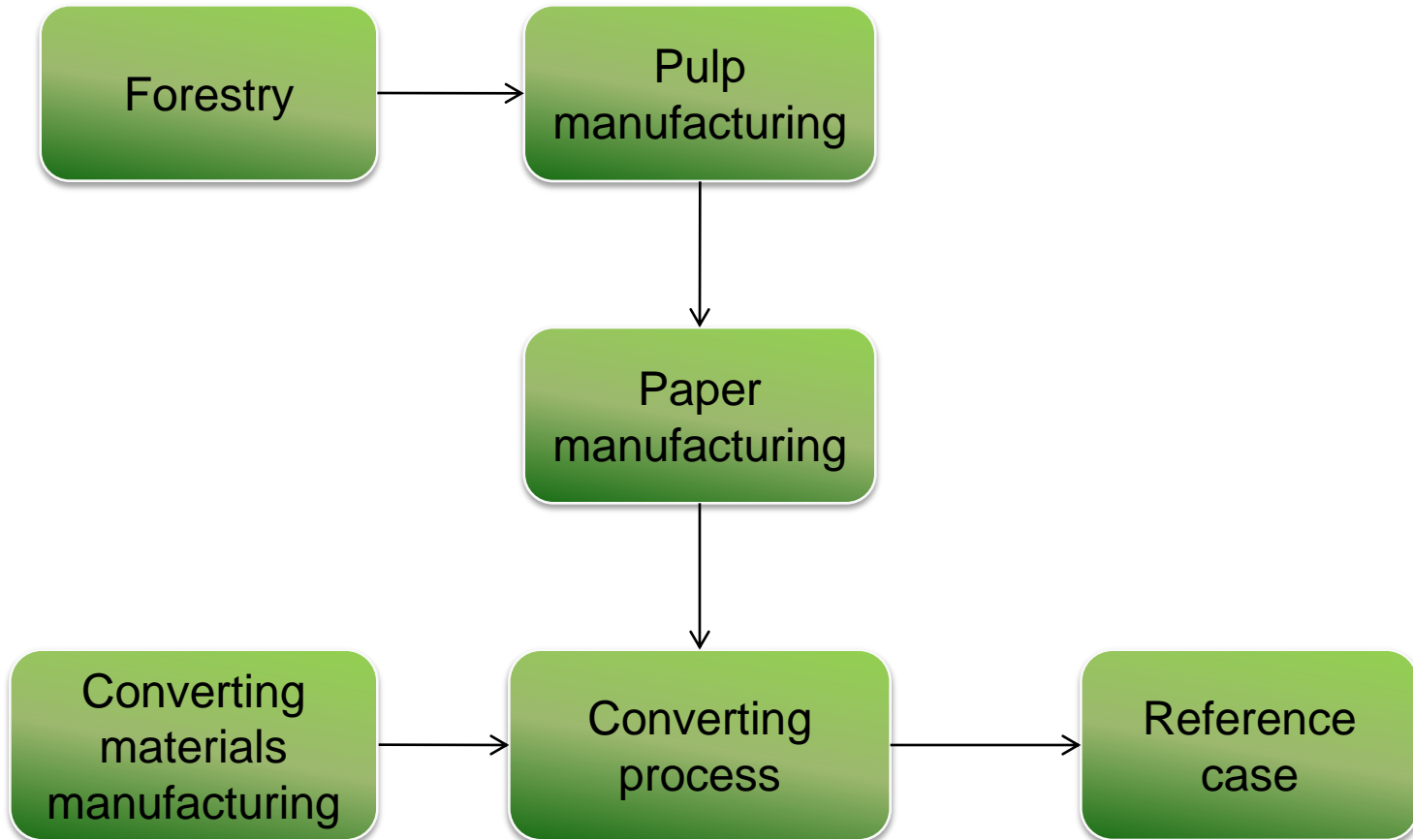
- Compatibility with product safety regulation
- Sustainable raw material sourcing
- Attitudes towards fibre based packaging

Different data sources!

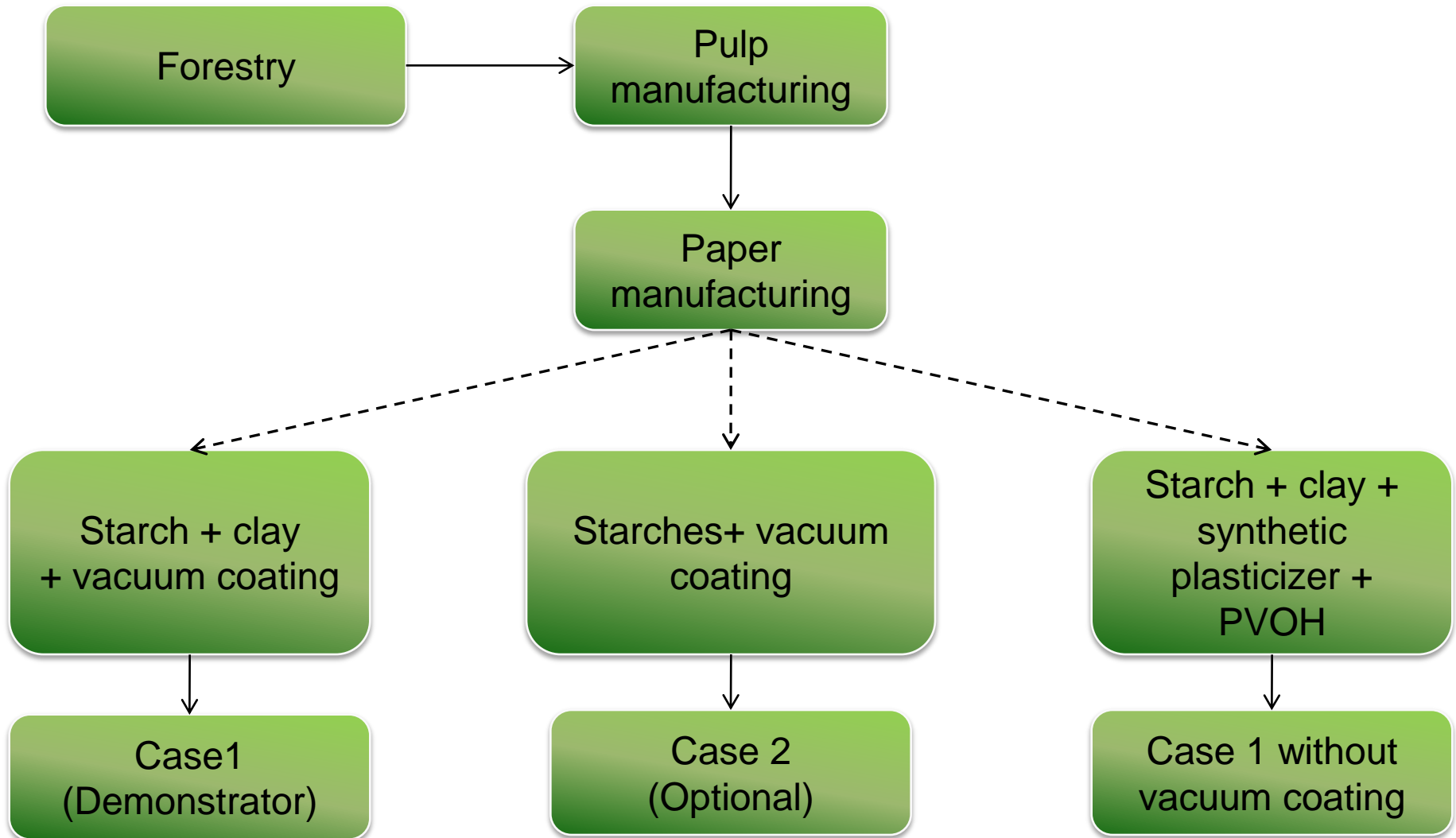
Tools for the sustainability assessment

1. Environmental evaluation using life cycle assessment (LCA) an ISO standardized method
 - KCL-ECO software were used for the calculations
 - LCIA-method ReCiPe
2. Economic & social feasibility
3. SWOT analysis

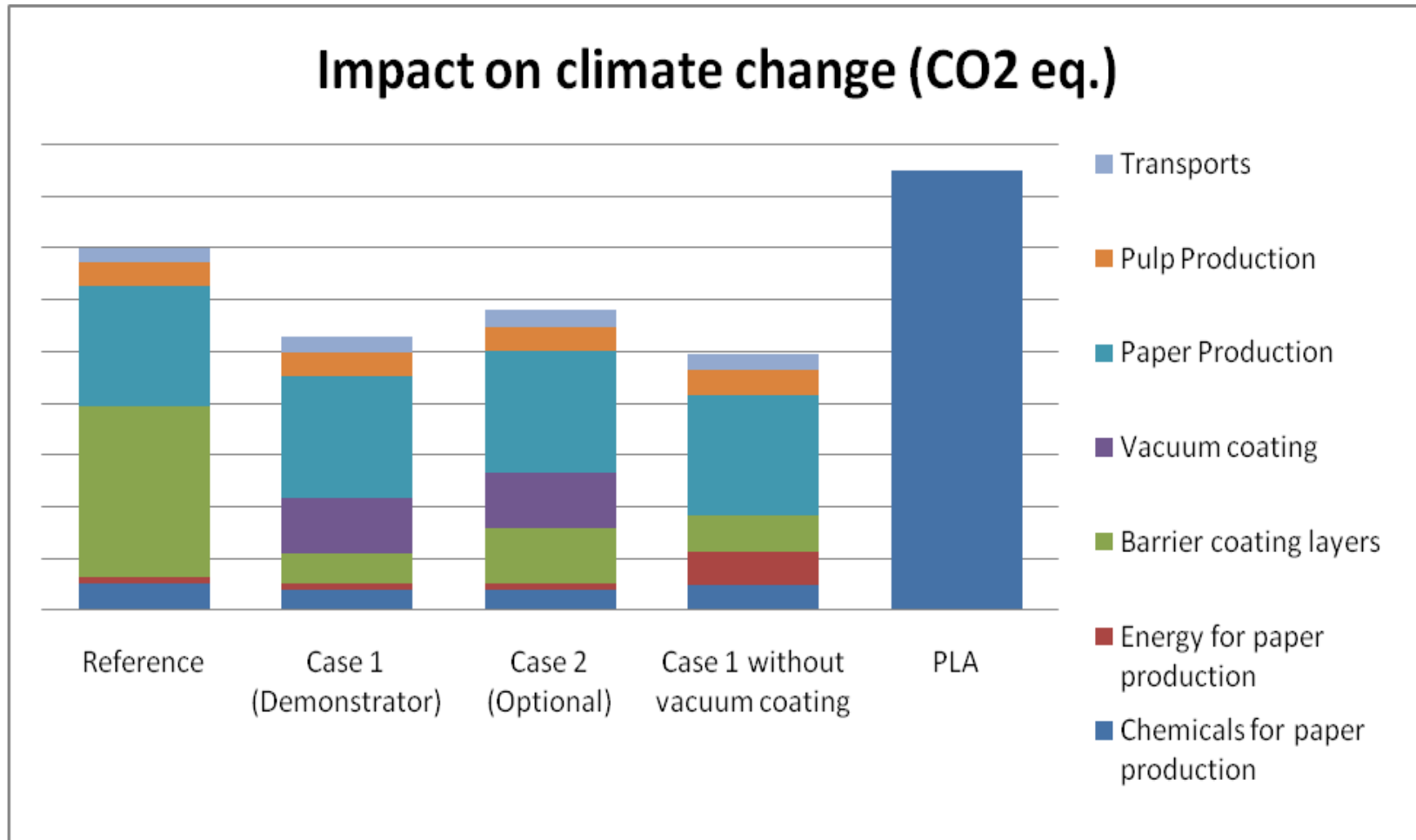
Reference Case



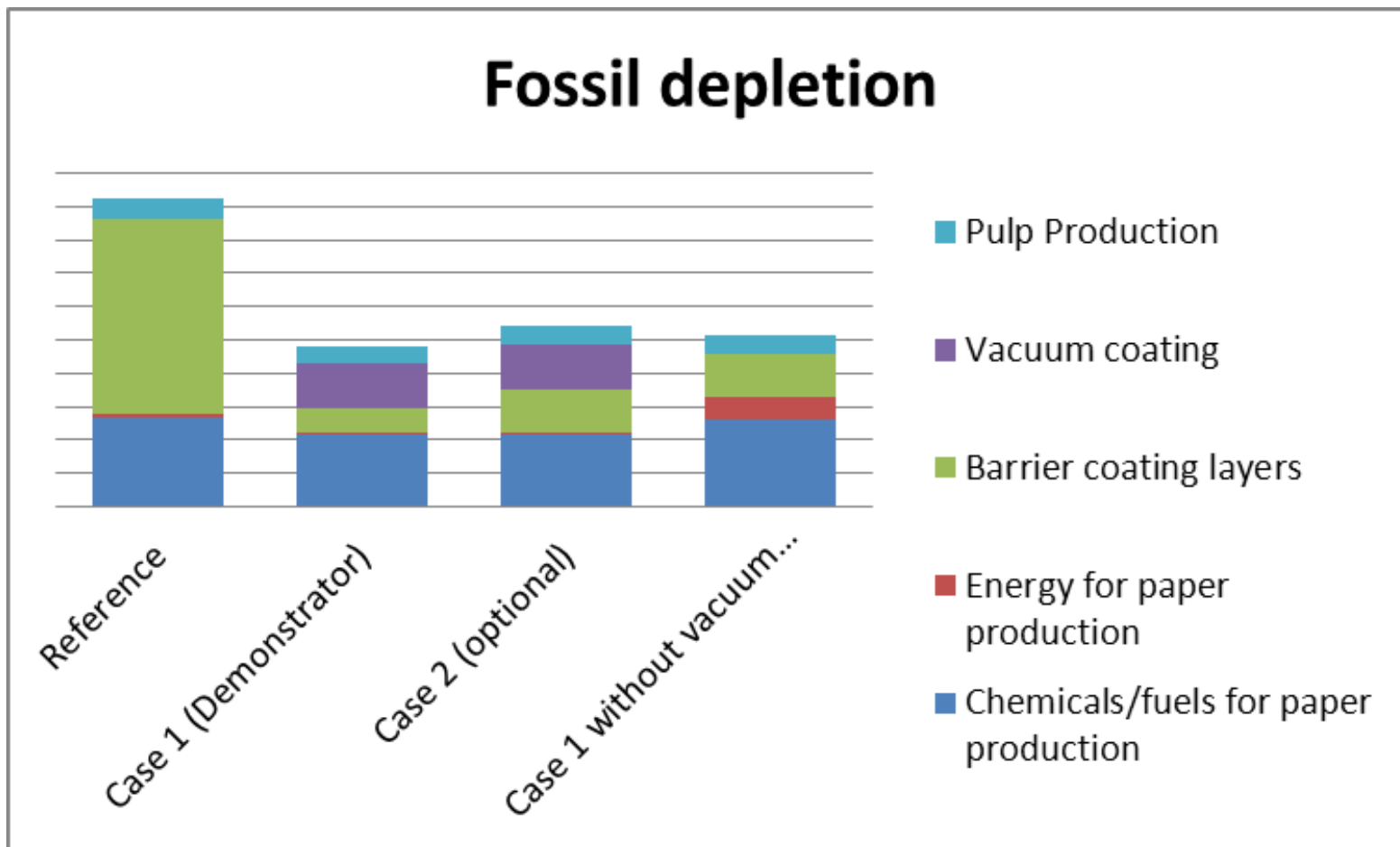
Flexpakrenew Cases



Climate change (kg. CO₂ eq) per 10 000m² packaging material

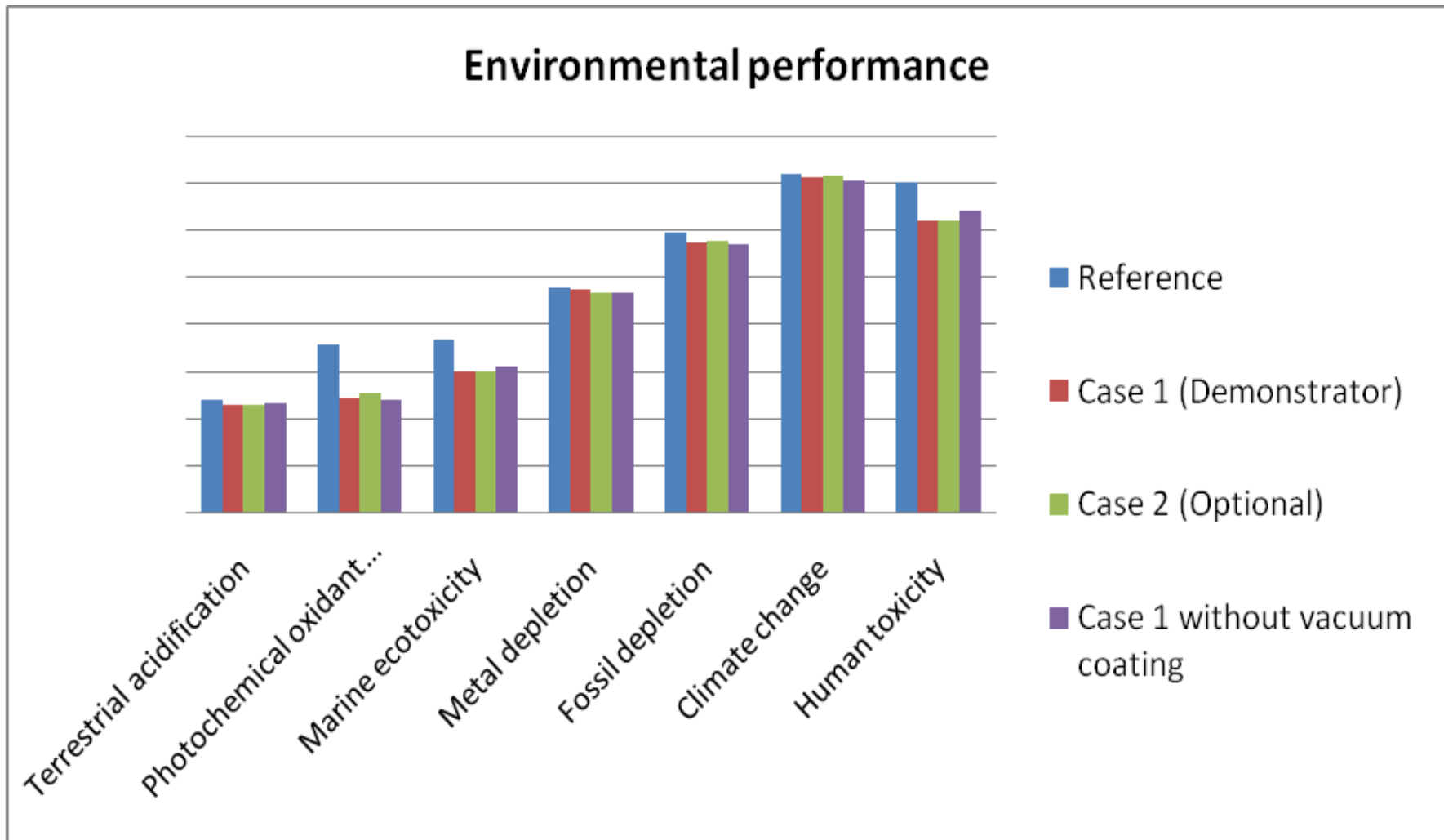


Impact on fossil depletion (kg oil. eq.) per 10 000m² packaging material



Environmental performance

Environmental performance



Sustainability assessment with SWOTs

- SWOT = Strengths, Weaknesses, Opportunities, Threats
- Strengths and weaknesses are organization's internal factors
- Opportunities and threats refer to organization's external factors
- Results were reflected against the sustainability goals of the project

Summary of results

- Clear positive trends in terms of ecological sustainability
 - Climate change impact will be decreased
 - Biodegradability will be increased
 - Petroleum based materials use will be reduced
- Many opportunities
 - Material efficiency and waste management
 - Increased shelf life
- Some uncertainties and disadvantages
 - Barrier properties needs development in some cases
 - Solutions not yet available in industrial production scale
 - No clear improvement in process efficiency
 - Acceptability
 - Availability and price of some raw materials



Thank You !

