WP5: Sustainable Product Design (Eco-design), Recyclability, LCA and markets

Assessing the sustainability of demonstrators - Preliminary results

SustainComp 1st Open Conference

October 27th, 2010

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Sustainability

"Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs"
(Brundtland report, World Commission on Environment and Development, 1987)

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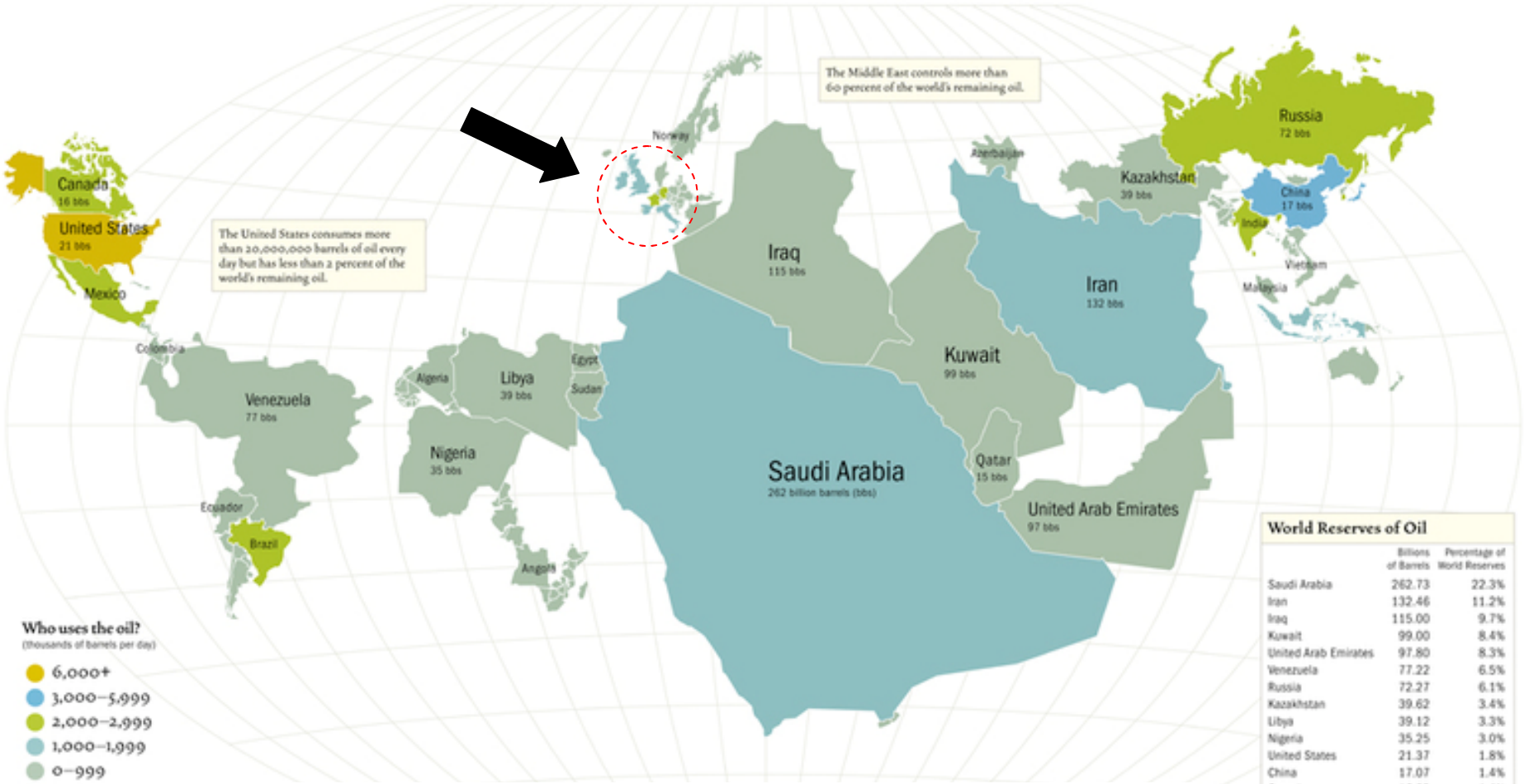
Oil: worldwide distribution based on reserves



Middle east controls more than 60% of the world's remaining oil

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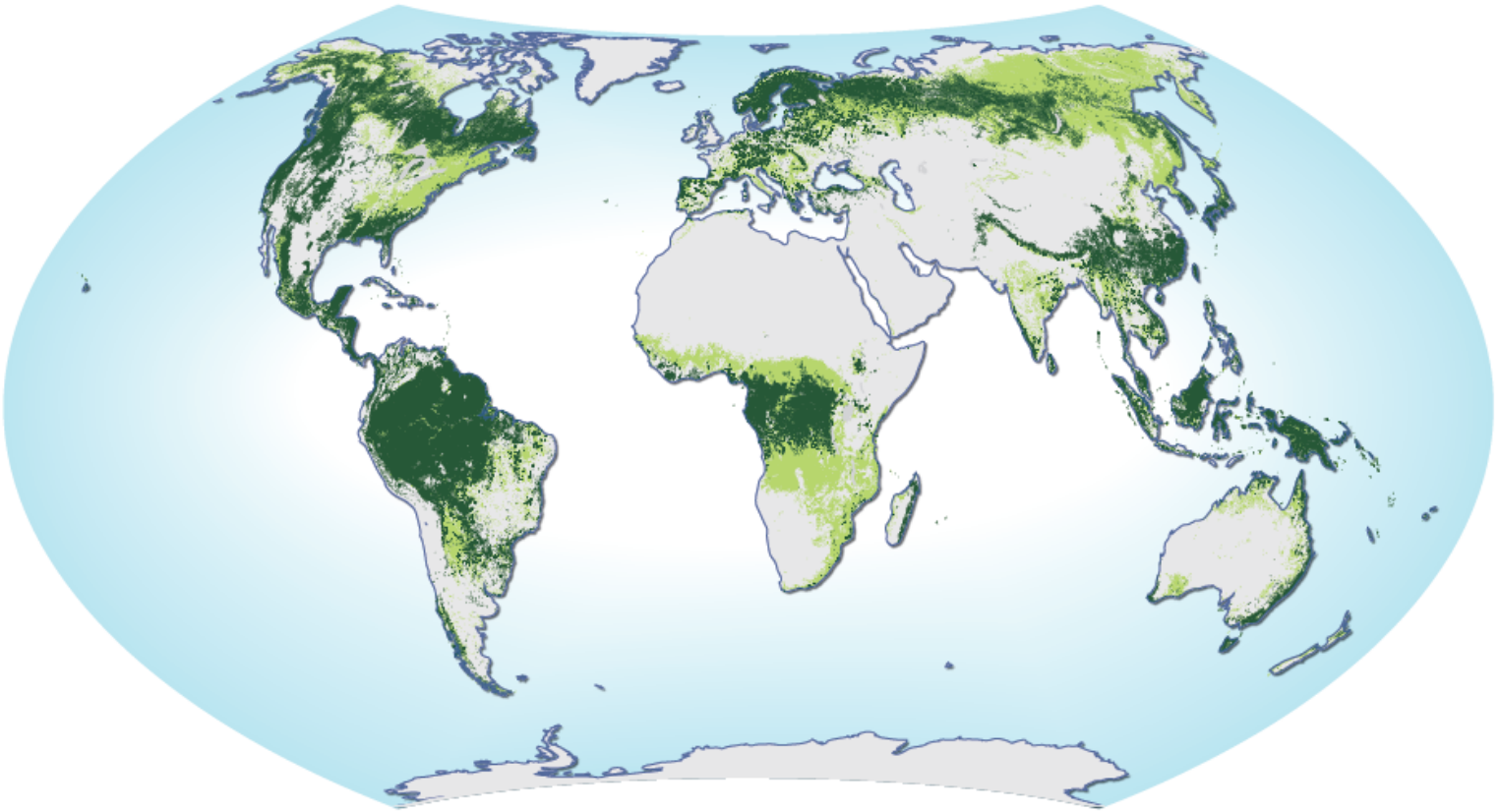
Tree cover: fraction of tree cover (Evergreen and decidous)



Source: EC Joint Research Centre 2003

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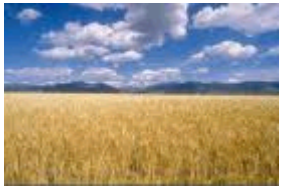
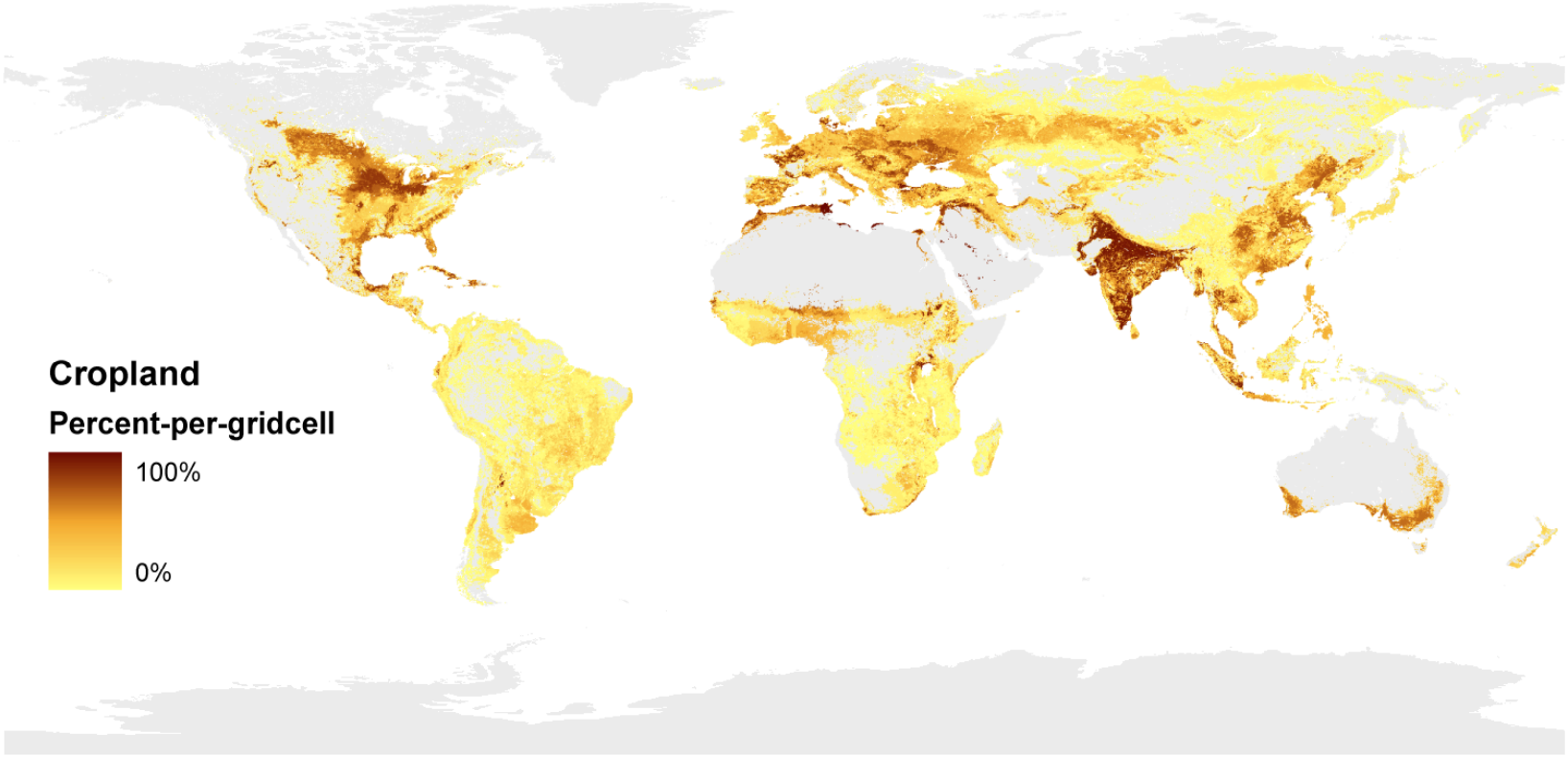
Cropland: fraction of cropland (arable land and permanent cultures)





Source: Alpen-Adria-Universität Klagenfurt http://www.uni-klu.ac.at/main/inhalt/1.htm

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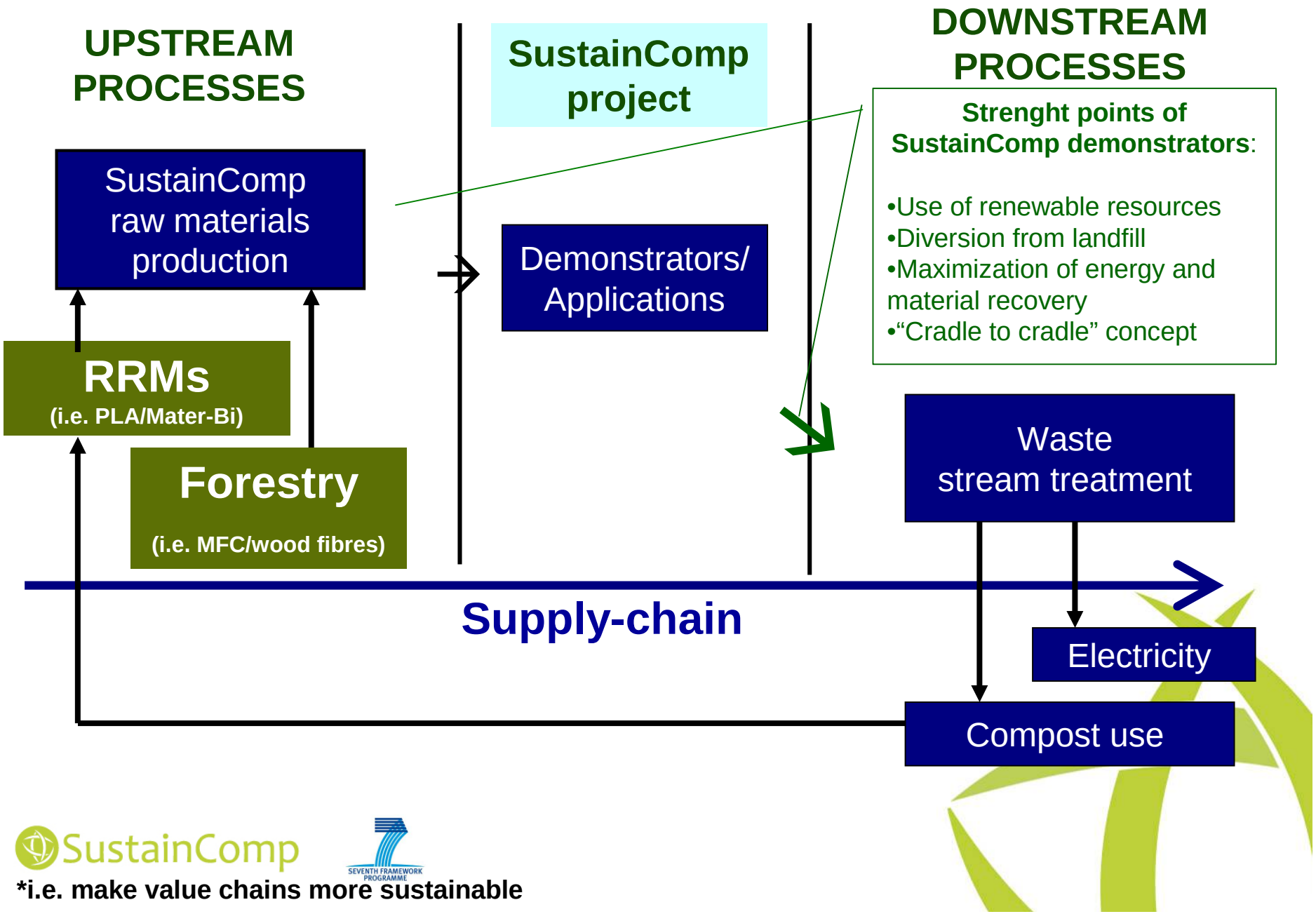
The use of SustainComp materials can contribute in increasing the value* of supply chain



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*i.e. make value chains more sustainable

Bioplastic sector – facts and figures

- In 2007, all bioplastics applications comprised approximately 75,000-100,000* ton of the total 48 million ton European plastics market (i.e. ≈ **0.17%** of European plastic market and ≈ **0.031%** of World plastic market (260 million ton in 2007)
- Global production capacity will quadruple from nearly 300,000 tons, are today to well over a million tons by 2011.
- Land used for producing 100,000 tons of bioplastic ≈ 30,000 hectars (i.e. ≈ **0.02%** of total agricultural area in Europe which is 162,000,000 hectars)

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*biofuels production has reached multi-million tonnes

Source: www.europeanbioplastic.org

First sustainability assessment

- Data for the first assessment derives from the first tests and early stages of development of the materials → high uncertainity

- With new concept materials, it is often difficult, in the early stages of development, to fully describe their possibilities and qualities

- High margin of improvement (e.g. MFC production)

The application of Ecodesign is a key stage that needs to be performed correctly in order to obtain an improvement in environmental and economic performance.

Material/Demonstrators selected:

Industrial Partner	Materials	Applications (Demonstrators)
SCA	PLA + MFC	Cushioning system for LCDs
Novamont	Mater-Bi® (Polyester grade) + MFC and/or wood fibres	Food packaging
3ATM	PLA foam reinforced	Display panel
Polykemi	PLA + wood fibre nanocomposite	Building blocks
Elastopoli	PLA or Mater-Bi® + MFC + wood fibres composite	Bus seats
Novamont	Mater-Bi® Injection Moulding grade + MFC and/or wood fibres	Catering items

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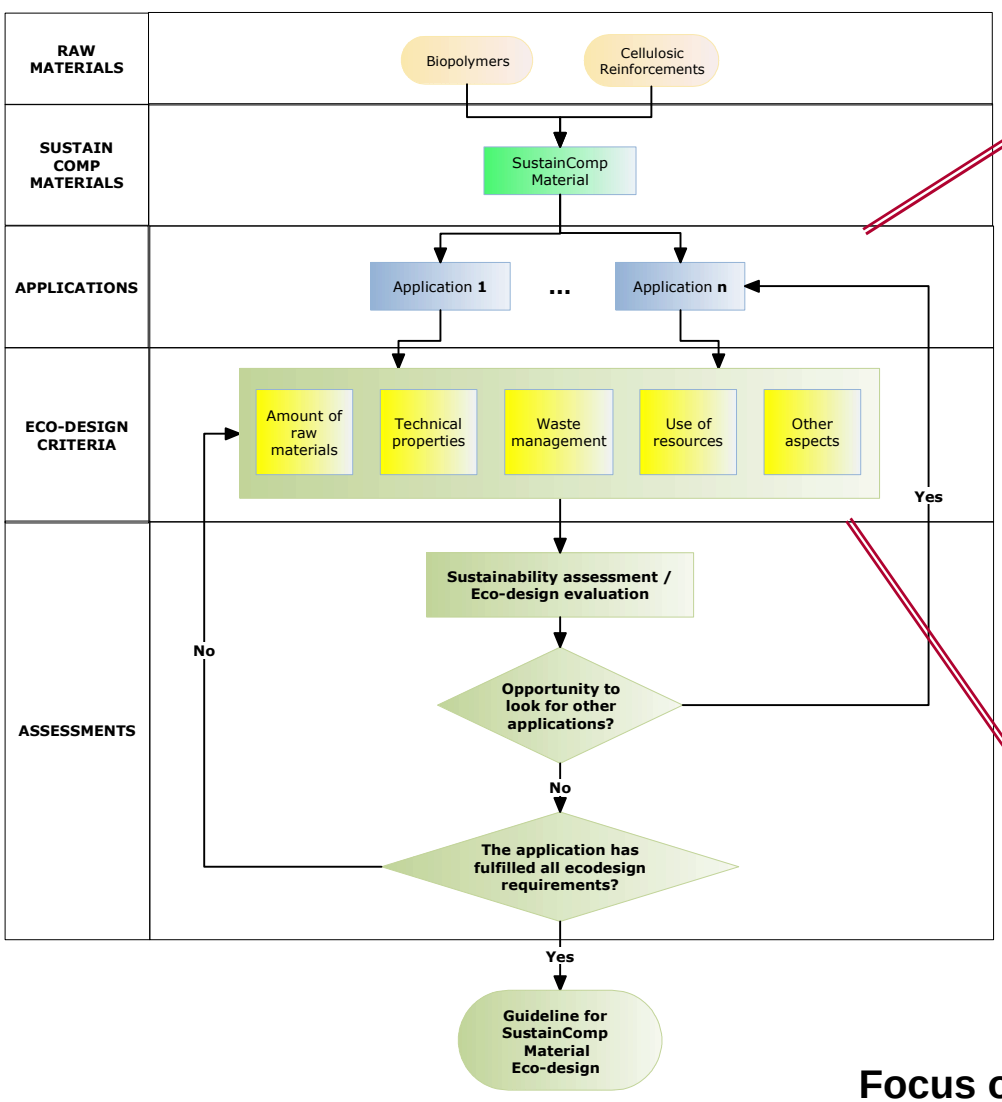
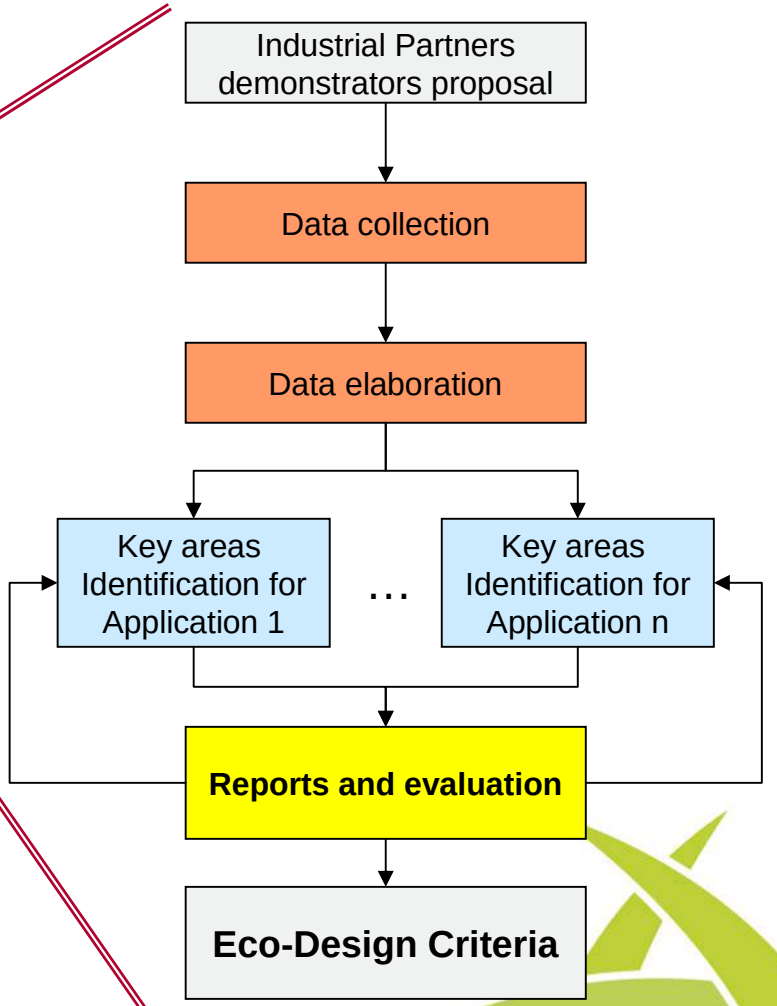
Ecodesign approach logical scheme





Focus on SustainComp Materials development, considering the best applications available to exploit their properties

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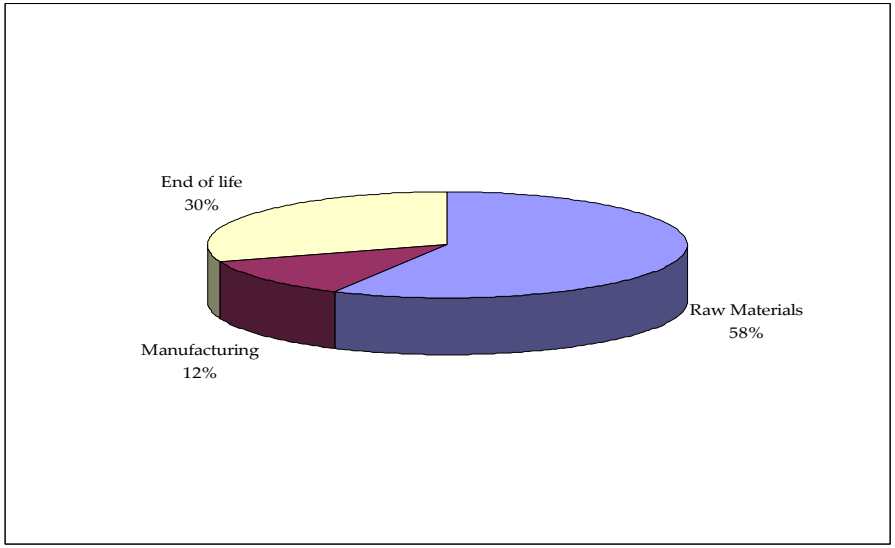
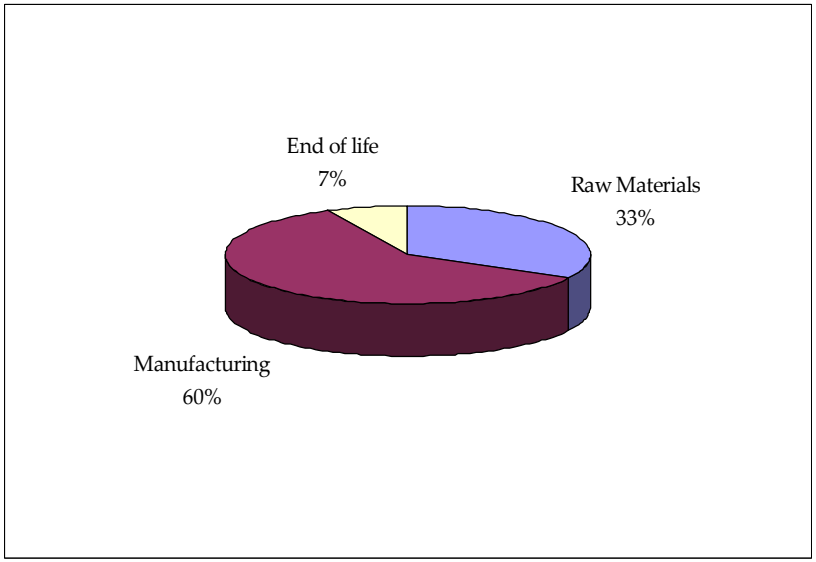
Preliminary sustainability results (1/4) - LCA



Benchmark



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An example of LCA comparison between a Benchmark and a SustainComp material: the main phase is the raw material acquisition for the benchmark while the SustainComp material exploits its renewable nature by reducing the impacts linked to the end of life.

The majority of the single assessments for the materials show the same trend: the SustainComp materials are promising in terms of impacts in the end of life stage.

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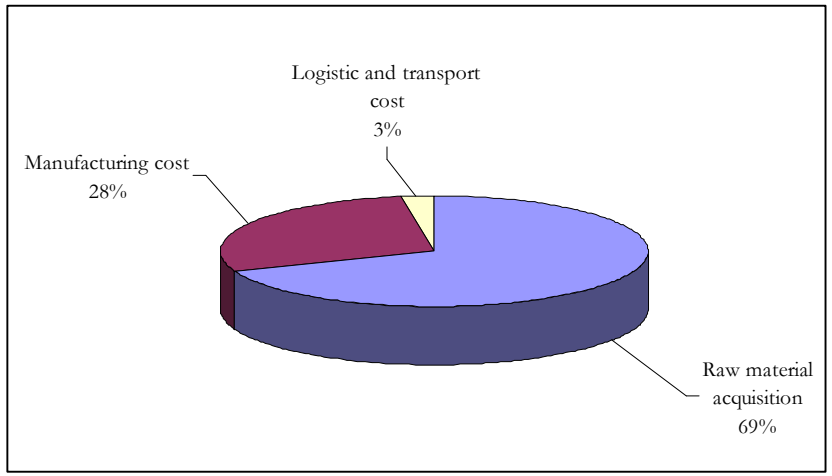
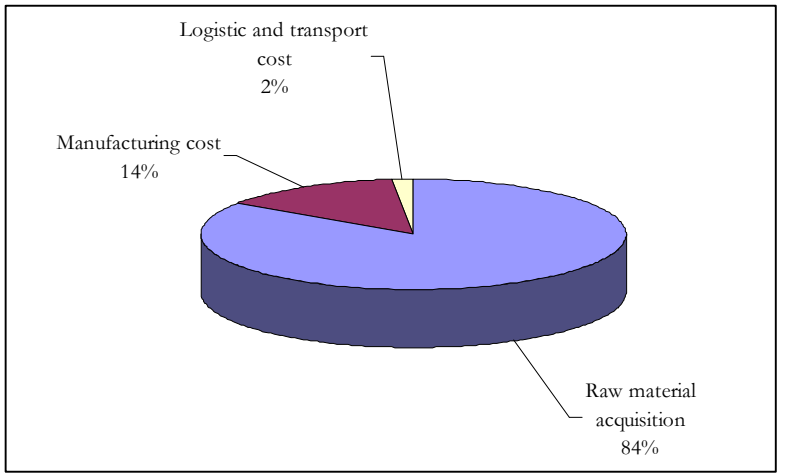
Preliminary sustainability results (2/4) - LCC



Benchmark



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An example of LCC comparison between a Benchmark and a SustainComp material: the main phase is the raw material acquisition.

The majority of the single assessments for the materials show the same trend: the raw materials represent a great part of the total cost of the unit of material (mainly due to the fact that such a cost reflects laboratory tests rather than an industrial scale production)

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Preliminary sustainability results (3/4)

The SLCA analysis has highlighted that the majority of the changes linked to the use of SustainComp materials should refer to the following aspects:

- Contribution to economic development (i.e. development of innovative supply chain, local employment increase etc.)
- Technology development
- Access to local material resources
- New knowledge
- Public commitments to sustainability issues
- End of life responsibility

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Preliminary sustainability results (4/4)

The key findings about the SustainComp materials are:

- A complete and exhaustive use of the technical properties of composite materials needs to be pursued, in order to reduce the density of material used for the Demonstrators → **LIGHTER PRODUCTS SAME FUNCTION**
- The costs of raw materials for new SustainComp materials are highly influenced by the fact that most of the data related to demonstrators are from laboratory scale trials. The equipment used for these purposes is significantly different than the equipment used in an industrial scale.
- The development of productive processes with high energy efficiency needs to be considered and evaluated, in order to reduce the use of resources → **SCALE UP & NEW TECHNOLOGIES ARE THE KEY ISSUES**
- A competitive element for SustainComp materials regarding end of life is their nature, mostly biological and highly biodegradable → **MORE END OF LIFE OPTIONS**
- Another approach that could help reducing the cost of raw materials is to identify cost-effective sources for wood fibres by enhancing the cellulosic by-products chains → **OPPORTUNITY TO EXPLOIT BY-PRODUCTS → Biorefinery**

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Thank you very much for your attention!

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