WG2-4 ADVISORY BROCHURE: KEY SUSTAINABILITY ASPECTS AND OPPORTUNITIES TO CONSIDER IN MOVING FROM OIL-BASED PACKAGING TO FIBRE-BASED PLASTIC PACKAGING

KEY SUSTAINABILITY ASPECTS OF FIBRE-BASED PACKAGING

The packaging value chain diagram (Figure 1) demonstrates that sustainability is a concept that can be considered in all stages of packaging life cycle. Furthermore, sustainability issues can be used to develop a roadmap, or a plan, referred to as sustainable development. Sustainable development has three main pillars – environmental, social and economic, which have to be reflected equally to achieve full sustainability.

The following opportunities must be considered when addressing the sustainable development of fibre based plastic packaging:

- **Sustainable Supply** – Fibre-based plastic packaging produced from renewable materials offers a theoretically infinite supply compared to packaging manufactured using fossil fuels.
- **Carbon Cycle** – Fibre-based plastic packaging materials are carbon neutral – i.e. their carbon cycle is very short, because the carbon used for renewable materials is derived directly, via photosynthesis, from the sun and the atmosphere.
- **Innovation** – Fibre-based plastic materials are a novelty and still require improvements in both properties and costs. This is important from the economic and social view of sustainability, and can be used to influence the marketability of packaging.
- **Eco-Design** – Fibre based materials can be designed to promote synergy with the packed products – especially food products – because both the packaging and product are made from renewable materials.

POTENTIAL BARRIERS

- **Education** – For industry to benefit from the sustainable opportunities offered by fibre-based plastic packaging, a robust education system is needed for all packaging stakeholders – especially regarding the end-of-life, because, for the general public, fibre-based plastic packaging is virtually undistinguishable from oil-based packaging.
- **Land use** – the fibre-based material industry has to ensure the public that fibre-based plastic packaging production does not use land that should be utilized to produce agricultural products.
- **Costs** – the costs of fibre-based plastic packaging are still larger than their traditional oil-based counterparts. Although costs are decreasing as greater economies of scale are achieved, it will still take some time for the prices to stabilise.
- **Waste Management** – Fibre-based plastic packaging offers many sustainable benefits in waste management – such as the possibility of composting. This however has to be reflected in waste management strategies on the legislative level as well as in the technology and infrastructure of waste management within the target market for fibre-based plastic packaging.

HOW TO ASSESS SUSTAINABILITY?

Key tools that can be used to assess sustainability can be grouped into four primary categories:

1. Tools for Sustainable Governance (e.g. GGP);
2. Methods and tools for assessing environmental, economic and social impacts (e.g. LCA, LCA, LCC);
3. Tools for environmental management and certification (e.g. EMAS);
4. Tools for sustainable design (e.g. eco-design).

Sustainability is most commonly measured using Life Cycle Assessment (LCA) a standardized (ISO 14040) and objective method for evaluation and quantification of environmental and energy inputs together with outputs and potential impacts associated with a product. This must address the entire life cycle, from the acquisition of raw materials until its end-of-life (often called 'from cradle to grave' LCA). In this technique, all phases of a production process are considered to be related and interdependent, making it possible to evaluate the cumulative environmental impacts. LCA can also be used to assess the social and economic impacts of products.

The Future of Sustainable Development

A number of broad drivers in the packaging sector are shaping innovations in product and process development. These drivers include decreasing material and energy usage, reducing packaging mass (lightweight packaging), increased food safety and quality (through improved performance, additional functionality), and recyclability or biodegradability. The demand for more environmentally friendly solutions is a rising market trend, especially in the packaging sector and is linked to the drive towards sustainability. SMEs in the packaging industry feel the need to produce "greener" solutions due to consumers' awareness and demands. Furthermore, lots of larger companies are creating statements on CSR and find it important to show that their company is sustainable. Using fibre-based, renewable raw material for their products shows they are thinking about the future by securing feedstock and raw materials, and ensuring sustainability in its fullest and broadest meaning.

GLOSSARY OF KEY TERMS

Oil-based packaging

Packaging manufactured from *oil-based plastics*. *Plastic* is a *polymer-based* material that is characterized by its *plasticity*. The main component of plastics (from Greek: plastikos - fit for moulding, plastos - moulded) is a *polymer*, which is formulated by the addition of *additives* and ***fillers*** to yield the technological material – plastic. The majority of plastics in current use are manufactured from *fossil fuels* – a *non-renewable* finite resource.

Fibre-based plastic packaging –

Packaging manufactured from or containing *fibre-based materials*. They are most commonly combined, and/or become so called *bioplastics*. Bioplastics encompass a whole range of materials which can be *biobased, biodegradable*, or both. *Biobased* means that the material or product is (partly or wholly) derived from *biomass* (plants). *Biomass* used for bioplastics stems from e.g. *corn, sugarcane, or cellulose – forest and agriculture* products. The term *biodegradable* depicts a chemical process during which micro-organisms that are available in the environment convert materials into natural substances such as water, carbon dioxide and. The process of ***biodegradation*** depends on the surrounding environmental conditions (e.g. humidity or temperature, exposed or buried), on the material. *Fibre-based materials* – and therefore plastic packaging made from those materials – meet both properties.

Sustainability

Sustainability is most commonly described by the definition that arose at the Rio conference on climate change: The *use of resources* without *jeopardizing* the ability of *future generation* to do so as well - in other words ensuring that today's growth does not jeopardize the growth possibilities of future generations. *Sustainable development* comprises of three elements - ***economic, social and environmental*** - which have to be considered in ***equal measure at the political level***. The strategy for sustainable development, adopted in 2001 and amended in 2005, is complemented inter alia by the principle of integrating environmental concerns with European policies, which impact on the environment (source: http://europa.eu).

Packaging Value Chain

A value chain is a chain of activities that companies operating in a specific industry perform in order to deliver a product or service for the market.

The packaging value chain encompasses the *whole life cycle of packaging*, including many companies from the producers of feedstock materials, packaging materials manufacturers, package fillers to distributors. It also takes into account the users of the packaging – usually the consumers, and all the infrastructure and industries that deal with packaging when it becomes a waste – the waste management industry.

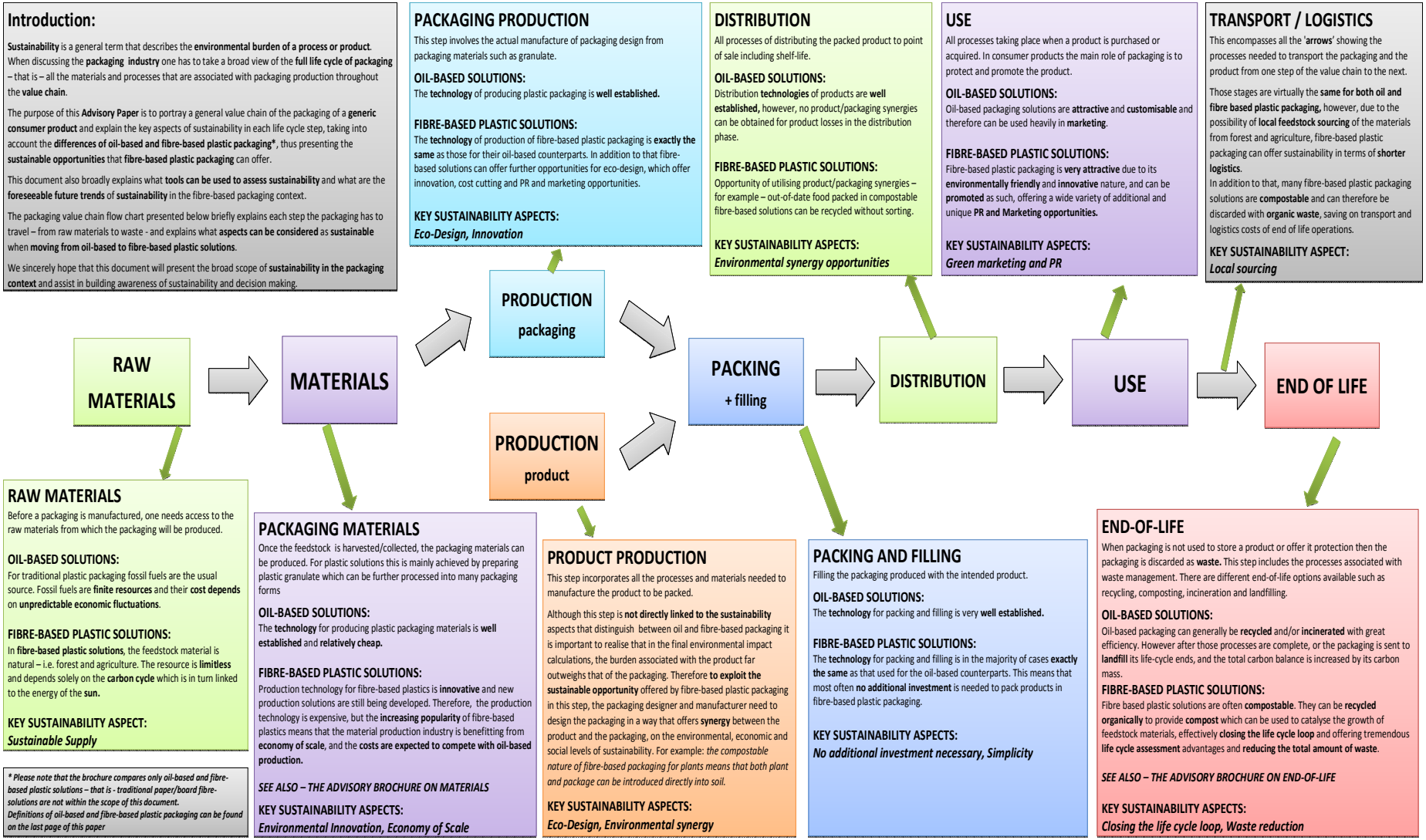

Figure 1: Diagram of packaging value chain