

## *Position of European Bioplastics*

# ASSESSMENT OF THE SUSTAINABILITY OF BIOBASED PLASTICS

Sustainability assessments of biobased plastics should in general take into account key indicators for the three pillars of sustainability – environment, economy and society – in order to give a valid and comprehensive appraisal.

This paper will focus on the pillar of environmental sustainability regarding the assessment of biobased plastics, as it is the pillar based on meaningful, measurable indicators for the time being.

European Bioplastics advocates that indicators for the pillars of sustainability should be clearly defined, strictly science-based and verifiable (measurable). They should also be based on commonly accepted, international standards. Where possible these indicators should be comparable to the standards set for petrochemical products / technologies in order to provide industry customers and partners with a viable comparison of sustainable benefit and promote a level playing field (see info box).

However, to date no internationally agreed framework or legal requirements for biobased products or biobased plastics exist – contrary to the situation regarding biofuels in which legislation and standardisation have already been established.<sup>1</sup>

European Bioplastics advocates focussing on the indicators with commonly agreed methods and processes for measurement. A young and developing industry with ample growth potential such as the European bioplastics industry should not be overburdened with a too broadly defined approach which is not based on truly measurable indicators at this stage. A mature assessment concept with

corresponding indicators is needed. This journey needs dialogue, guidance and support from all stakeholders. The industry is ready to engage in this process.

The following information and suggestions constitute a contribution to the discussion in CEN/TC 411 “Bio-based products”.

### *A level playing field for biobased plastics*

Sustainability assessment schemes discussed and put forward by Member State and EU-committees mainly focus on biobased products such as biobased plastics and not on the impact of the production of fossil-based plastics on the environment and European society. Neither standards nor voluntary schemes for the latter are in place. Bio-based plastics should not be put at a disadvantage to conventional, fossil-based plastics. Therefore, European Bioplastics urges the creation of sustainability standards for the production and conversion of fossil feedstock into conventional plastic materials. This will be a first step towards comparable assessment results for biobased and fossil-based materials in the future.

## **Sustainability benefits of biobased plastics**

### **Pillar 1 Environment**

Biobased plastics save limited fossil resources, reduce greenhouse gas emissions and, consequently, reduce the carbon footprint of products. Bioplastics have the unique potential to be carbon-neutral, as using biomass to create bioplastic products constitutes a removal of CO<sub>2</sub> from the atmosphere.

Bioplastics can make a considerable contribution to increased resource efficiency through biomass use cascades. Furthermore, they are suitable for a range of end-of-life options, such as reuse, mechanical or organic recycling, and

<sup>1</sup> CEN TC 411 is working on a standardised methodology; first results are expected 2015.

energy recovery. Bioplastics can therefore contribute to reduced waste generation and increase the efficiency of waste collection.

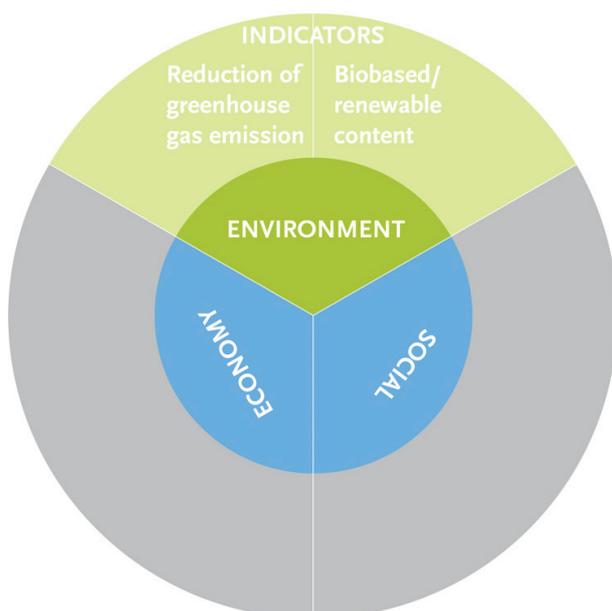
#### Pillar 2 Economy

Bioplastics are economically innovative and still have much potential for further economic growth along the value chain. Europe has the potential to be a front-runner in the development of bioplastics. While Europe leads in R&D and is a large-scale producer of biomass, it needs to step up the transformation of research knowledge to industrial applications. Bioplastics currently have a global market share of less than one percent. However, production capacities are growing. A policy framework supporting market uptake is required to reach economies of scale for production and conversion and so contribute to sustainable economic growth in Europe.

#### Pillar 3 Society

As a growing industrial sector, bioplastics can provide future European employment growth. Bioplastics can make a contribution to rural development by providing income in rural areas that might otherwise decline economically. Furthermore, a European knowledge base could grow around the bioplastics industry providing highly skilled employment for generations.

#### Recommended indicators for assessing the environmental sustainability of biobased plastics



European Bioplastics proposes focussing on the following two initial key indicators. These may be extended in the future; however, taking potential parallel trade-offs into consideration is recommended:

#### Indicator 1: Biobased content<sup>2</sup>

The term biobased content describes the part of a material or product that originates from biomass. Using biomass is one of the major benefits of biobased plastic products and of key importance to the circular economy.

European Bioplastics recommends quantifying biobased content using one of the two methods below:

##### *Biobased carbon content*

This variable describes the amount of biobased carbon (in relation to total amount of organic carbon) contained in a material or product. It is measured using the <sup>14</sup>C method that adheres to the technical specifications CEN/TS 16137 or the standard ASTM 6866. Biobased carbon content describes, if expressed as a percentage, the amount of carbon in a product that is derived from biobased materials in relation to the total amount of organic carbon/total carbon in the entire product. Certification schemes and derived product labels based on the European technical specifications and the US standard are in place and offered, for example, by the Belgian certifier Vinçotte or German DIN CERTCO.

##### *Biobased mass content* (method based on radiocarbon and elemental analysis)

This variable describes the amount of biomass contained in a material or product. It is complementary to the determination of the biobased carbon content, but also takes into account other elements present in biobased products in large quantities (oxygen, hydrogen, nitrogen, etc.).

Further approaches are based on mass balance methods. These methods are currently under development.

<sup>2</sup> Biobased content in this context is understood as the part of a material or product that originates from renewable feedstock – it can either be measured as biobased carbon content or biobased mass content. When communicating this aspect of a material or product the element measured/calculated should be clarified.

### Indicator 2: Reduction of greenhouse gas emissions

Climate change is a priority in environmental policy world-wide. Efforts are under way to reduce human-made emissions of greenhouse gases (GHG) by switching to more environmentally sustainable transportation and industrial production. Biobased plastics offer the potential to reduce GHG emissions by substituting fossil carbon in the polymer with biobased carbon.

European Bioplastics recommends quantifying reductions in greenhouse gas emissions in accordance with one of the most widely used guidelines below:

- ISO/TS 14067 Carbon footprint of products - requirements and guidelines for quantification and communication
- GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard
- PAS 2050:2011

Both non-renewable energy consumption and carbon footprint / greenhouse gas emissions are often part of LCA studies performed in accordance with the above methodologies.

#### Assessing economic and social sustainability of bioplastics in the future

These two indicators – renewable content and reduction of GHG emissions – largely influence the social and economic environment of Europe. They should be the starting point for assessing the sustainability of biobased products, such as biobased plastics, as they can be measured, and commonly accepted measuring methods are available,.

#### LCA – a tool to provide a meaningful sustainability assessment?

A Life Cycle Assessment (LCA) looks solely at the environmental part of the assessment. It is an established tool to assess the environmental impact of products and processes. However, a few shortcomings need to be considered:

- it is time consuming and often expensive
- the process can encompass a lot of assumptions
- good data is sometimes unavailable or inconsistent
- final interpretation of results requires further development and can lead to debatable results
- studies become obsolete quickly due to fast moving developments.

LCA can support

- the identification of hot spots in the production of biobased plastics
- the better understanding of areas of environmental impact

It is also important to note that a quantitative comparison between petro-based and biobased chemicals is not meaningful at this point in time. An LCA would generally be able to assess the differences, but only if the same rules were applied. Similar standards for fossil-based plastics – as currently are developed and being set-up for biobased plastics – would need to be established in order to get there.

Other indicators such as a job creation in rural areas should be added to the set of indicators when corresponding data and measurement methods are available.

#### About European Bioplastics

European Bioplastics represents the interests of around 70 member companies throughout the European Union. With members from the whole value chain, European Bioplastics serves as both a contact platform and catalyst for advancing the objectives of the growing bioplastics industry. For further information, please visit <http://en.european-bioplastics.org>