SUSTAINABILITY CRITERIA FOR BIOMASS AND BIOFUELS

Introduction

This chapter discusses the sustainability principles and criteria for biomass for energy applications, with a special focus on biofuels for transport applications. While in the previous chapter *on Classification, Standardization and Certification* we had reviewed the general sustainability schemes for bio-energy and the certification requirements, we now lay down the details and principles governing most of the exiting sustainability schemes, with a specific focus on the following three dimensions: social, economic and environmental. Next, we will lay down criteria and indicators, for exemplification purposes only.

The aim of this chapter is not to create a sustainability standard per se. On the contrary, we aim to create a framework presenting the main principles and criteria, based on existing standards[1]. Finally this chapters elaborates on the greenhouse gas emissions savings principle. This principle is drafted in accordance with key policy indications facilitating the inclusion of legislative provisions in future sustainability meta-standards.

Sustainability principles and criteria

As previously mentioned in the *Classification, Standardization and Certification* chapter, sustainability standards in the field of biomass for energy applications or other end-uses should follow a generic structure:

1. *Principles (1..n)*
    a. *Criteria (i..m)*
        i. *Indicators and verifiers (1..p)*

The sustainability **principles** are the overarching goals that the individual producers should aim at. They encompass the general aspirations that are expressed using broad, open-ended wording. The principles form the actual sustainability framework, by setting the tone of the degree of ambitions.

One step downwards in the sustainability standard hierarchy, we find **criteria** for each principle already laid dawn. The criteria specifies the concrete aspects of each principle and they should detail all necessary steps for compliance with the principle.

Finally, drafting a standard implies laying down individual **indicators** which enable verification and auditing. These indicators should be quantifiable and verifiable. They are essential for the implementation of any standard because they are actually guiding individual auditors in their assessment work.

Sustainability is regarded as a threefold paradigm, entailing ***social, economical*** *and* ***environmental*** dimensions. A sustainability standard should account for all three fields, while adding specifications on the greenhouse gas emissions savings, lifecycle assessment, chain-of-custody, verification and auditing.

Social sustainability

Social sustainability reflects how the production of biomass for energy, including transport applications, impacts local development. In particular, social sustainability aims to ensure that the human, land rights and land use rights are respected. It also tackles issues like labour standards,

[1] The chapter is based on the work of the Roundtable on Sustainable Palm oil (RSPO), Forest Stewardship Council (FSC), the Roundtable on Sustainable Biofuels (RSB) Version Zero of the Standard, Cramer Criteria

safety standards. Any sustainability standard and especially one that touches upon agriculture and local development, dedicates a main important part to social aspects. A standard that aims to be universally applicable is bound to include provisions on the social side.

Following the already implemented sustainability standards, or the ones which are on their way to be delivered, it is possible to list a number of core social principles:

Principle 1: Labour rights of the local indigenous people should be respected

Criterion 1.1. The minimum age requirement for working for the local indigenous people should be guaranteed by respecting the International Labour Organizations (ILO) Convention No. 138

Indicator 1.1.1 Labour contracts of the employees are assessed

Criterion 1.2. The right to association of local, indigenous people should be guaranteed by respecting the International Labour Organizations (ILO) Conventions No.87 and No.97[2]

Indicator 1.2.1 Assessment of the level of association or unionization

Principle 2: Land and land use rights of the local indigenous people should be respected

Criterion 2.1. The land use rights are demonstrable and there is no conflict of claims with the local population[3]

Indicator 2.1.1 The property rights documents are checked for validity

Criterion 2.2. The use of agricultural land for the cultivation of biomass for energy applications will not distort the land and customary rights of the local population

Indicator 2.2.1 Evaluation of documents attesting the customary rights or the documents that attest a change in progress

Principle 3: The relation with the local community and the responsibility-sharing between parties should ensure local development

Criterion 3.1. The local community should be consulted in matters related to the land management

Indicator 3.1.1 Documents attesting that the land under transformation is not part of the cultural heritage of the indigenous population

Criterion 3.2. The negative impacts of land management on the local community should be minimized and the positive impacts maximized[4]

Indicator 3.2.1 Impact assessment and documents assessment

The above list of principles is not exhaustive. It rather tries to capture the essence of the social sustainability aspects and its impacts on the local community.

[2] Forest Stewardship Council "FSC Principles and Criteria for Forest Stewardship", 2002, p. 5 ; « Final RSPO Certification System Document », May 2007, p. 27; Roundtable on Sustainable Biofuels RSB "Version Zero", 2008, p. 3

[3] « Final RSPO Certification System Document », May 2007, p. 27

[4] Idem, p. 30

Economic sustainability

The economic sustainability is a prerequisite for sustainable production of biomass for energy applications including transportation purposes. Local development issues are not only relevant from a social sustainability perspective, but also from the economic sustainability angle. In addition, economic viability of individual operators has to be ensured.

Below is a list of the main principles, criteria and examples of indicators that can be included under the economic sustainability and that have been used by the already implemented standards:

Principle 5: New projects (e.g. plant building, crop cultivation etc.) should ensure economic profitability and contribute to the local development of the region

Criterion 5.1. An economic impact assessment (EIA) of the business plan should be conducted[5]

Indicator 5.1.1 Assessment of the EIA documents

Criterion 5.2. An assessment on the economic impact on the local community should be carried out and the positive impacts should be emphasized

Indicator 5.2.1 Assessment of the EIA documents

Principle 6: An equitable profit sharing should be carried out between the owners, the employees and the local community

Criterion 6.1. Assessment of the compliance with the national labour rules in terms of minimum wages

Indicator 6.1.1 Inspection of the labour contracts and wages of employees

Criterion 6.2. The local economic conditions should improve in time

Indicator 6.2.1 Assessment of the (macro)-economic indicators in statistical documents

The two principles gather the main information about the economic impact of a bio-energy project on the local community. All existing sustainability initiatives tackled the economic area either in a separate part of the standard, or by including it in the social area and the local development.

[5] Final RSPO Certification System Document », May 2007, p. 35

Environmental sustainability

Sustainability standardization of biomass (e.g. for biofuels) cannot overlook the environmental aspects. Environmental sustainability of a biomass- related project is essential for the conception of sustainability standards and finally plays a key role in the phase of compliance with principles and criteria laid down in such standards.

Environmental sustainability will address issues related, but not restricted to biodiversity, land preservation, water and soil preservation. In a first step it will set clear definitions of concepts, thresholds, etc.

Overall, in environment-related issues, the "Precautionary Principle" is preferred over the alternative, namely the "Polluter pays principle". As a result, the principles and criteria will be drafted taking into account a strong "avoidance factor".

The main principles to be considered in this area are laid down in the box below. Also examples of criteria and indicators are given:

Principle 7: The conservation of the biodiversity, ecosystems and the protected areas must be ensured by the production of biomass for energy or other applications.

Criterion 7.1. An ex-ante assessment of the biodiversity, ecosystem and protected areas should be conducted in case there is no other assessment for reference

Indicator 7.1.1 Checking of documents, mapping, or usage of Integrated Biodiversity Assessment Tool (IBAT)[6] or High Conservation Areas (HCV) Tool

Criterion 7.2 The endangered species and areas should be identified and their protection should be evaluated

Indicator 7.2.1 Impact assessment to be carried out or existing documents assessment

Principle 8: The use of best practices in the production of biomass for energy and other applications should be guaranteed so as to ensure the soil preservation and the minimization of negative impacts

Criterion 8.1. The employed practices ensure soil preservation and fertility, while accounting for obtaining balanced yields

Indicator 8.1.1 Evaluation of the methods used including pesticides and fertilizers use and assessment of the technical methods employed

Criterion 8.2. Wastes and by-products use/disposal is conducted to preserve soil health and fertility

Indicator 8.2.1 Documents attesting the practices employed for usage of wastes and by-products

Principle 9: The use of best practices in the production of biomass for energy and other applications should be guaranteed so as to ensure the water preservation and the minimization of negative impacts like contamination or induced scarcity

Criterion 9.1. The employed practices ensure conformity with water management rules, usage rights and water availability factor

Indicator 9.1.1 Impact assessment of the production of biomass on the water use

Criterion 9.2. The employed practices ensure water availability both on the surface and in the ground

Indicator 9.2.1 Impact assessment of the production of biomass on the water availability

[6] Roundtable on Sustainable Biofuels « Version ZERO », Ecole Polytechnique Fédérale de Lausanne, 2008, p. 7

Greenhouse gas emissions savings

The whole aim of replacing conventional energy with renewable sources is gravitating around the greenhouse gas emission reductions that the latter bring. Accordingly, a standard for sustainably produced biomass for energy and/or transport must refer to the greenhouse gas (GHG) emission reductions.

The GHG aspects have triggering important debates and controversies. We limit ourselves to underlining the main discussion points that are consistently at the core of the sustainability standardization process.

Principle 10: The production of biomass for energy applications should ensure greenhouse gas emissions savings when compared with the conventional energy sources

Criterion 10.1 The greenhouse gas emissions savings from the production of biofuels accounting for all the lifecycle emissions should ensure the compliance with the legislation in force on the specific territory

Indicator 10.1.1 Documents attesting the approved methodology for calculations and the data used for proof of compliance

Criterion 10.2. The greenhouse gas emissions savings from the production of biomass for energy and other applications should improve in time

Indicator 10.2.1 Documents attesting the progress in greenhouse gas emissions savings

Criterion 10.3. The greenhouse gas emissions accounting for the production of biomass for energy and other applications should be done in a lifecycle approach, having the system boundaries in accordance with the legislation in force on the territory, if such legislation exists

Indicator 10.3.1 Evaluation of the lifecycle assessment documents

The lifecycle assessment (LCA) of the production of biomass for energy applications or other end uses represents the most widely tool used for the GHG balance accounting. In the chapter *"LCA studies for the harmonization of the international biofuels sustainability assessment"* we have detailed the way LCAs for biofuels have been conducted. We also discussed methodological steps and finally exposed potential risks and limitations of elaborating such assessments.

Conclusion

This chapter developed a sustainability framework for biomass for energy and other end-uses, building a hierarchical structure with principles, criteria and indicators which relies on existing sustainability schemes.

Sustainability has been regarded as a three-fold paradigm, including social, environmental and economical aspects. Accordingly, there is a need to design principles for each of the three areas and finally to elaborate criteria and indicators for exemplification purposes.
GHG aspects have also been taken into account due to their undisputed relevance for any sustainability scheme for biomass and biofuels.