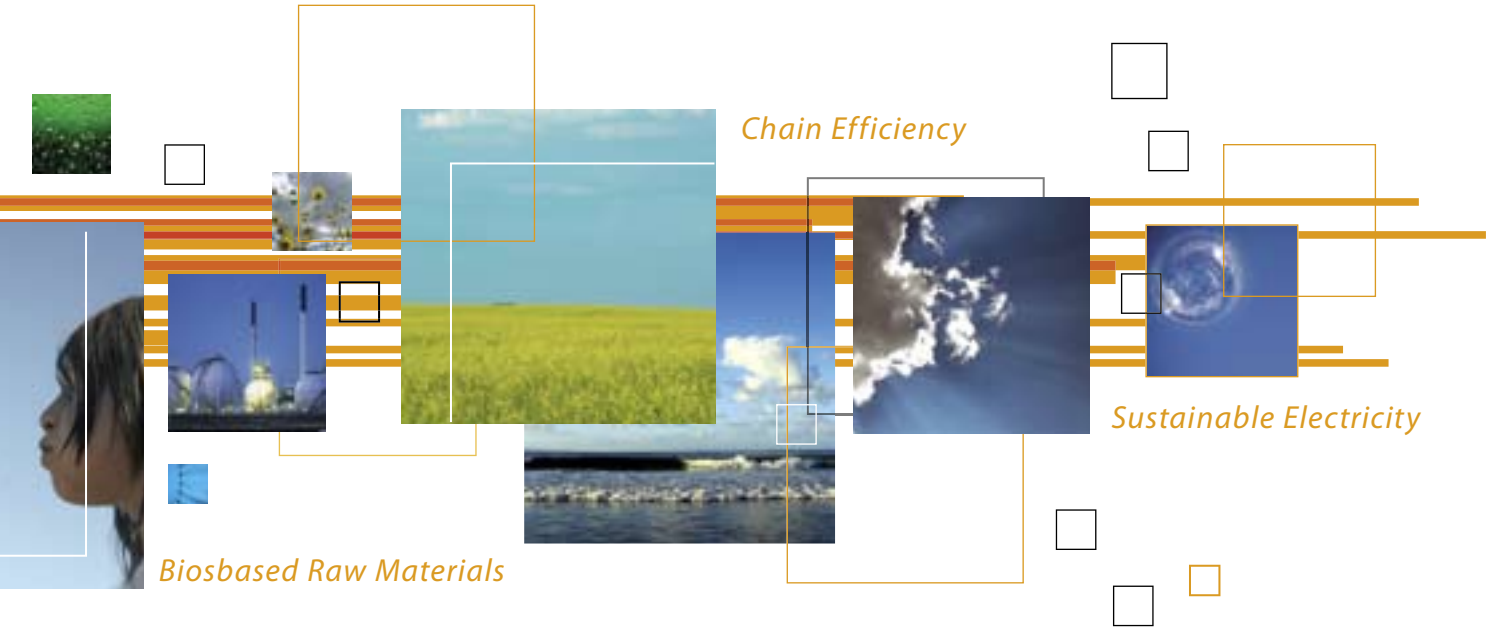
Creative Energy
Energy Transition

Testing framework for sustainable biomass

Final report from the project group "Sustainable production of biomass"



Members of the project group "Sustainable Production of Biomass" are:

- **Jacqueline Cramer** (Sustainable Entrepreneurship B.V.), chairperson (up to February 21, 2007)
- **Erik Wissema** (Ministry of Economic Affairs), project manager (up to August 1, 2006)
- **Mariska de Bruijne** (Ministry of Economic Affairs), project manager (from August 1, 2006)
- **Ella Lammers** (SenterNovem), secretary
- **Daan Dijk** (Rabobank)
- **Hans Jager** (Stichting Natuur en Milieu) (Foundation Nature and the Environment)
- **Sander van Bennekom** (OxfamNovib)
- **Ewald Breunesse** (Shell, the Netherlands)
- **Robert Horster** (Cargill)
- **Caroline van Leenders** (Ministry of Foreign Affairs)
- **Steven Wonink** (Ministerie van VROM) (Department of Housing, Spatial Planning and the Environment)
- **Wim Wolters** (Electrabel)
- **Helma Kip** (Essent)
- **Hugo Stam** (Cefetra) (up to September 1, 2006)
- **André Faaij** (Copernicus Instituut, Utrecht University)
- **Kees Kwant** (SenterNovem)

Contributions to the contents of this report were made by:

- **Ecofys:** Carlo Hamelinck, Eric van den Heuvel, Bart Dehue
- **CE:** Geert Bergsma, Harry Croezen, Bettina Kampman, Jan Vroonhof
- **Copernicus Instituut, Utrecht University:** André Faaij, Martin Junginger, Edward Smeets, Veronika Dornburg
- **Control Union:** Johan Maris, Mark Prosé
- **AID Environment:** Jan Joost Kessler, Sven Sielhorst

Foreword

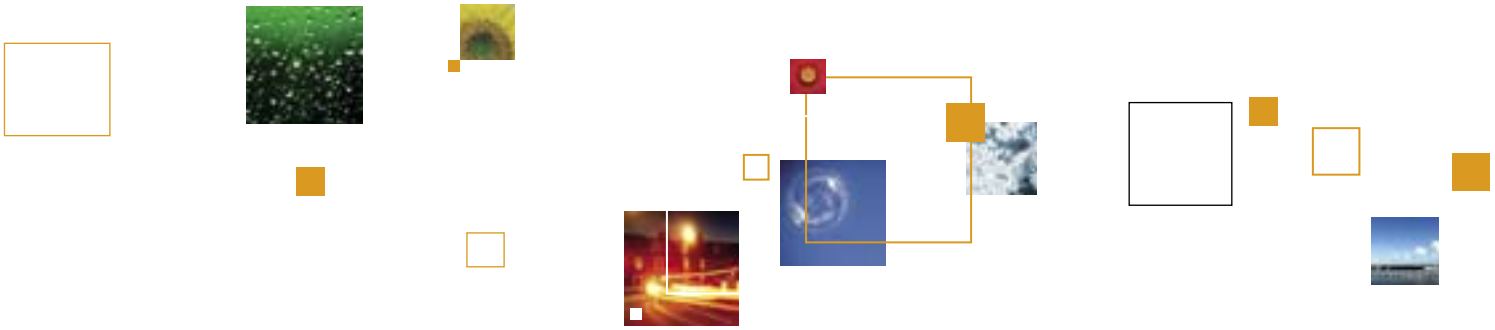
The expectations with regard to biomass as a source of sustainable energy are high. But there are also certain risks attached to the large-scale use of biomass. It may lead to damage to nature and the environment and to detrimental social and economic effects. To ensure that biomass as a source of renewable sustainable energy is produced and processed in a responsible manner the Dutch government wishes to incorporate sustainability criteria for biomass into the relevant policy instruments. In the short term this regards the Dutch subsidy arrangement for electricity production and the obligation for biofuels for road transport. In the longer term the Dutch government wishes to promote a wider application of these sustainability criteria.

In preparation for the above policy the Dutch government has set up the project group "Sustainable production of biomass". The task of the project group is to formulate criteria for the production and the processing of biomass in energy, fuels and chemistry. Here it does not make any difference if the biomass originates from the Netherlands, from the EU or outside the EU. In this matter the project group has always consulted the different parties involved, to ensure a broad support base. Also as much as possible consistency with similar initiatives in other EU countries has been sought.

This report describes the testing framework for sustainable biomass, as it has been worked out by the project group.

This report could not have come into being without the active commitment and cooperation of the members of the project group, the participants of the various working groups, the accurate official and secretarial support, the know-how of a group of experts and the contribution of all those who have taken the trouble to give their views during the various consultative meetings. I herewith would like to thank everyone for their contribution to this final report. The responsibility for its contents, however, lies exclusively with the project group "Sustainable Production of Biomass".

Jacqueline Cramer
February 2007



Summary

Introduction
Expectations are that the worldwide use of biomass in the energy supply will increase considerably in the coming decades. This will be accompanied by the large-scale planting of energy crops. New areas will be opened up for agriculture. Countries and producers will see opportunities for new activities. But at the same time there is a growing concern that this must not be at the expense of other important values for nature, environment and society. To accommodate these feelings, criteria will be needed that indicate whether biomass has been produced in a responsible manner.

The opportunities for new activities in the field of biomass must not be at the expense of other important values for nature, environment and society.

At the request of the government the project group 'Sustainable production of biomass', under the chairmanship of Prof. Dr. Jacqueline Cramer, from the beginning of 2006 has been bringing together the different views on sustainable production. On this basis the project group has drawn up a framework for the testing of the sustainability of biomass production. This report describes this 'testing framework for sustainably produced biomass' and its elaboration in the form of criteria and indicators.

The report is an advice, in the first instance to the Dutch government, but also to all other parties involved. In the time to come the government will translate this testing framework into its policy for the application of biomass in the Dutch energy supply. The government can for instance incorporate sustainability criteria into instruments supporting the use of biomass.

This testing framework puts the emphasis on biomass for electricity and heat production and as transportation fuel, but the framework can also be applied to biomass as raw material in chemistry. The framework is applicable to biomass of all origins, so coming from the Netherlands, from the EU or from outside the EU.

The international context is the red thread running through this advice. Where possible the project group has made use of existing standards for specific biomass flows. For this the project group has always sought to achieve maximum consistency with similar initiatives abroad, such as in the United Kingdom. This international coordination will eventually improve the desired practical feasibility of the framework, for instance in the fields of verification and enforcement.

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Sustainability themes
The global climate policy is currently gaining biomass a great popularity. The large-scale use of biomass in the energy supply makes it possible for fossil carbon (stored in oil, gas or hard coal) to remain in the soil, instead of ending up in the atmosphere as greenhouse gas. But it is a common view that these advantageous lower emissions of greenhouse gases must not be exchanged for the detrimental consequences of large-scale production of crops for energy or transportation fuels. Biomass must therefore be sustainably cultivated, processed and used.

The project group defines the sustainability of large-scale production of biomass on the basis of six relevant themes. These themes are for the greater part linked to the 'Triple P' of sustainable development: People, Planet and Profit, supplemented with specific themes for biomass.

At the company level six themes are important, for the greater part linked to the 3 P's: People, Planet and Profit.

The project group distinguishes six relevant themes:
- Greenhouse gas emissions: How much emission reduction does the use of biomass yield for a specific producer, calculated from its source up to its use, and compared with the average use of fossil fuel?
- Competition with food and other local applications: Does large-scale production of biomass for energy supply supplant other use of the land, for example for the cultivation of food or wood as building material, and what are its consequences?
- Biodiversity: Does the local natural ecological system of land and water lose any variation in forms of life because of the large-scale cultivation of energy crops?
- Environment: Are there any effects of the use of pesticides and fertilizers, or are there other local effects on soil, water and air because of the large-scale production of biomass?
- Prosperity: Does the production of biomass contribute towards the local economy?
- Social Well-being: Does the production improve the social living conditions of the local population and employees?

Criteria in the testing framework
On behalf of the project group separate working groups have analysed the above themes in detail. In accordance with the method followed in similar international initiatives, the project group has subsequently, via some interim steps, worked towards the possible testing for each theme. For each (sub)theme the project group has determined as clearly as possible the sustainability criteria and indicators. In this the emission reduction by the use of biomass, calculated in the greenhouse gas balance, has a special character. This criterion (different from the sustainability criteria) is applicable to the whole chain inclusive of the end use, and not only to the production.

The heart of this advice is formed by these criteria and indicators, which can be rather different in character for each theme. As much as possible, testable indicators have been formulated for each theme, which the biomass has to meet in order to qualify for the designation 'sustainable'. An example of this is the minimum requirement that the production of biomass must not take place in protected areas.

Methodology for the calculation of the greenhouse gas balance

The project group has developed a method for the calculation of the emission reduction of greenhouse gases by the use of biomass instead of fossil fuels. As a sequel to this an instrument is currently being developed to calculate the 'greenhouse gas balance' in a simple way

This instrument, which will be finished just after the summer of 2007, will be necessary to establish unambiguously if biomass meets certain minimum requirements. This calculation model will also be used to evaluate if the minimum requirements for emission reduction as mentioned (30% for biofuels, 50-70% for electricity production) will be feasible in practice.

The balance compares the emissions in the whole chain of production up to and inclusive of end use of biomass with those of the reference situation with fossil fuels. In the methodology all possible sources of emissions in the whole chain have been incorporated, such as those of the production of fertilizer, of the preliminary treatment for the use in a power station, or of transport.

Some themes are tested on the basis of a quantitative indicator. But it is by no means possible in all cases to use such a yardstick.

But sometimes it is (still) impossible to use such a quantitative indicator as a yardstick. In these cases the advice confines itself to the requirement of reporting on a certain aspect of a theme, such as on the local prosperity effects of the large-scale production of biomass. On the basis of such a report the government will gain an insight into the sustainability of biomass with regard to this theme.

In the table attached the sustainability criteria for each theme are summarized. For each theme it will be necessary to collect the relevant data in consultation with the parties involved in the producing countries. A detailed description of all the criteria and indicators is to be found in the final report.

Sustainability criteria for each theme
Greenhouse gas emissions

- **Calculated over the whole chain, the use of biomass must produce fewer emissions of greenhouse gases net than on average with fossil fuel.** For electricity production the emission reduction must now amount to at least 50-70%, for the application in transportation fuels at least 30%[1]. These percentages must increase further by innovation in the future. The percentages are minimum requirements.
  Here the basic principle must be that policy instruments should promote a higher percentage above the minimum requirement by differentiating strongly on the basis of the emission reduction of greenhouse gases
  The project group thinks it desirable to achieve, in about ten years' time, at least 80 to 90% emission reduction in relation to the current fossil reference. This means that in 2010 it will have to be evaluated to what degree the minimum requirement will have to be tightened up in 2011 to attain the objective of 80 to 90% in ten years' time.

1 *With the calculation model for the greenhouse gas balance also the feasibility of the minimum requirements will be evaluated. The percentages will be adjusted upwards if necessary and also a percentage for electricity production will be determined.*

  This aim can be achieved when innovative biofuels are applied and a much more efficient cultivation for the production of energy.
- The development of new acreage for the planting of biomass for energy must not lead in the longer term to the release of large quantities of carbon that had been stored there (in soil or vegetation).

Competition with food or other local applications

- **The production of biomass for energy must not endanger the food supply and other local applications (such as for medicines or building materials).** Criteria for this have not been determined yet; reporting on changes in land use in the region and in prices for food and land is of great importance here.

Biodiversity

- **Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity.** Often local laws and regulations have already been grafted on international agreements about biodiversity. Vulnerable areas and areas with a high value for biodiversity must be spared, where possible restoration of biodiversity is desirable.

Environment

- **In the production and processing of biomass, the quality of soil, surface and ground water and air must be retained or even increased.** This makes demands, for example, on the use of fertilizers and pesticides, but it also requires the application of the 'best practices' for instance to prevent erosion or additional emission of harmful substances.

Prosperity

- **The production of biomass must contribute towards local prosperity.** Criteria for this have not yet been developed. Reports that fit in with descriptions according to the Global Reporting Initiative can indicate if, for instance, the economic value of the biomass production will directly benefit the local community.

Social Well-being

- **The production of biomass must contribute towards the social well-being of the employees and the local population.** The production of biomass must at least

comply with international principles that have been laid down by the International Labour Organisation, in the UN Universal Declaration or Human Rights and in other treaties. Reports must also bring to light any violations of property rights or corruption.

Testing at the macro level
Further analysis by the project group shows that the consequences of large-scale production are felt at two scale levels. At the company level, for instance, the effect of the use of biomass for the emission reduction of greenhouse gases can be determined well. Also other elements of sustainability, such as conservation of soil quality and biodiversity, the local social impacts and a clean production and processing of the biomass play a part at this micro level. At this level the first responsibility for sustainable biomass production lies with the businesses in question themselves.

Consequences of large-scale production are felt at two scale levels.

But some effects can only be assessed well at the macro level and then they are primarily a responsibility of authorities. These are often effects that cannot be directly attributed to one company, but are only visible on a national or regional scale. Then what is involved is, for example, the crowding out of agrarian production or indirect effects due to changes in land use, such as the rise of land and food prices. Indirect effects of land use are particularly important with the themes greenhouse gas emissions, biodiversity and competition with food and local applications of biomass. The testing framework makes a distinction between these two levels.

Sometimes consequences will only become clearly visible at the national or regional level.

The testing of macro effects has at the moment not yet been worked out so far. At the same time the social organizations are greatly concerned about these macro effects in particular, since they may have serious consequences for the countries where the large-scale production is taking place. In this matter a special responsibility lies with the Dutch government, which will have to follow these macro effects carefully. Individual companies are not in a position to undertake action in this matter, but the government is. Moreover the Dutch government is pursuing an incentives policy for biomass. At the macro level the project group attaches great importance to the monitoring of the following data:
- Land prices,
- Food prices,
- Property relations,
- The availability of food,
- Relocation of food production and cattle breeding,
- Deforestation,
- Change in the type of vegetation.

Such monitoring cannot take place without cooperation with the producing countries and the various companies, in which international organizations such as the World Food Organization FAO can offer assistance. If the negative effects according to these reports prove to be too great, only the Dutch government – and not an individual company– can exert its influence to talk with these local authorities about responsible land use. The project group preferably sees this happening on an EU level. If the producing country should not comply with this, the Netherlands, whether on an EU level or not, can consider discouraging the use of biomass from that country.

Certification
According to the project group certification of biomass flows will eventually be an absolute necessity, since it is the only way to determine the sustainability of global biomass flows properly. Companies will then be able to prove with certificates that they are complying with the testing framework.

Companies will be able to prove by means of certification that they are complying with the testing framework.

Certification of biomass flows is not generally accepted yet, but for some types of biomass there already exist systems for certification of the (sustainable) quality, or such systems are currently under development. An existing system is the system for wood (Forest Stewardship Council, FSC), which has led to a standard for a sustainable timber trade. Furthermore certification systems and standards are being developed for palm oil and soja. For that matter all these systems have not been specifically set up for the energy crop application.

These certification systems already include many sustainability criteria for biomass and also contain minimum requirements. In the testing framework the project group has sought to keep in line as much as possible with these existing systems. Some certification systems already comply with a large part of the criteria of the testing framework. A comparison between the certification systems involved and the Dutch testing framework can lead to a declaration of equivalence. The emission reduction of greenhouse gases by a specific source for biomass does not form a part of any certification system, so this will always have to be tested additionally.

The project group recommends that the Dutch government support and stimulate the further international development of a certification system for biomass.

The implementation
The present testing framework is the result of an extensive analysis of all sustainability themes around the future large-scale production of biomass, and the views on it of various parties involved. The testing framework has now been worked out sufficiently to be tested in practice in the months to come. In the years to come, however, research will be needed into the indicators that are still lacking at the moment.

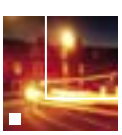
The testing framework is an important contribution to the social debate about the large-scale use of biomass. It creates clarity about the conditions for the sustainable production of biomass, so that the producers, traders

and buyers involved know which types of biomass will be acceptable for application. Ultimately this will be the best foundation for the desired – and necessary – broad base of social support.

> *The testing framework creates clarity about the sustainable aspects of biomass and is therefore the best foundation for the desired – and necessary – broad base of social support.*

The government can now take further steps to incorporate sustainability criteria into its policy. An important recommendation made by the project group is to implement the testing framework as soon as possible in government policy, for example for sustainable electricity production and for biofuels. The project group realizes that this cannot be done without a careful coordination with national and international legislation and regulations. The effects on a macro scale mentioned above also demand action from the Dutch government. The first priority here is a programme to follow these macro effects carefully.



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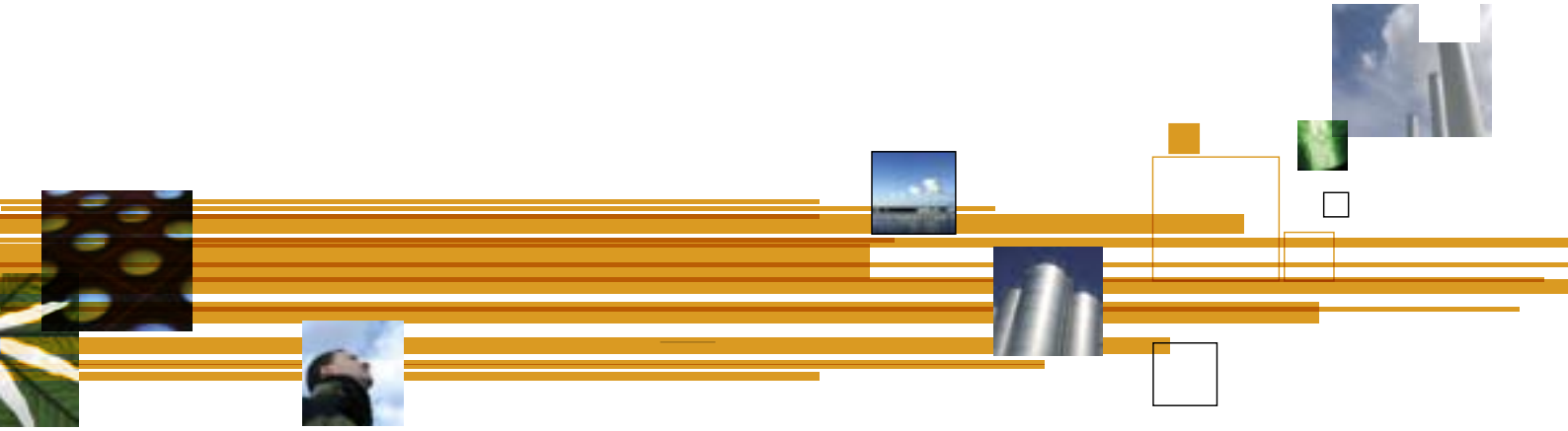
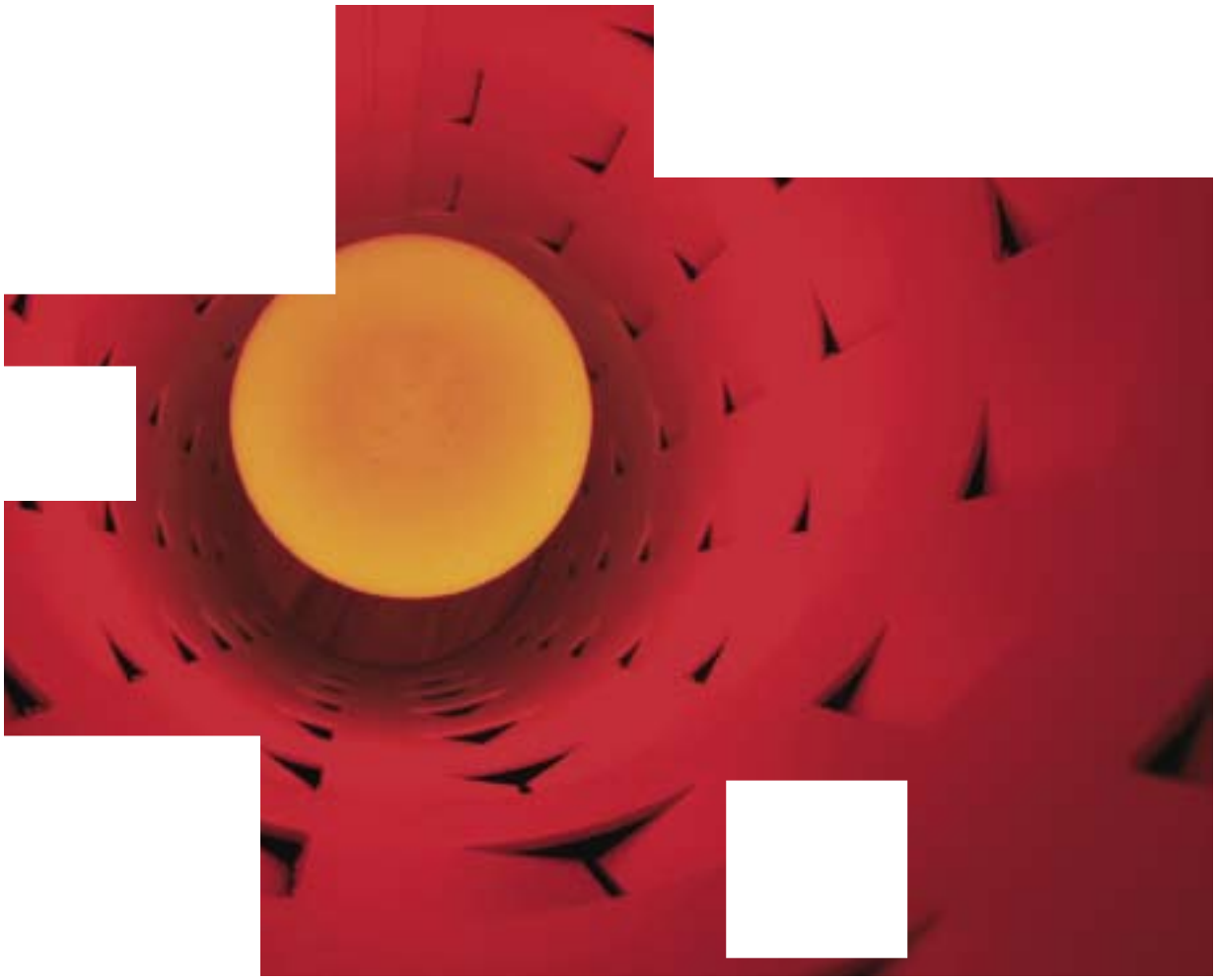
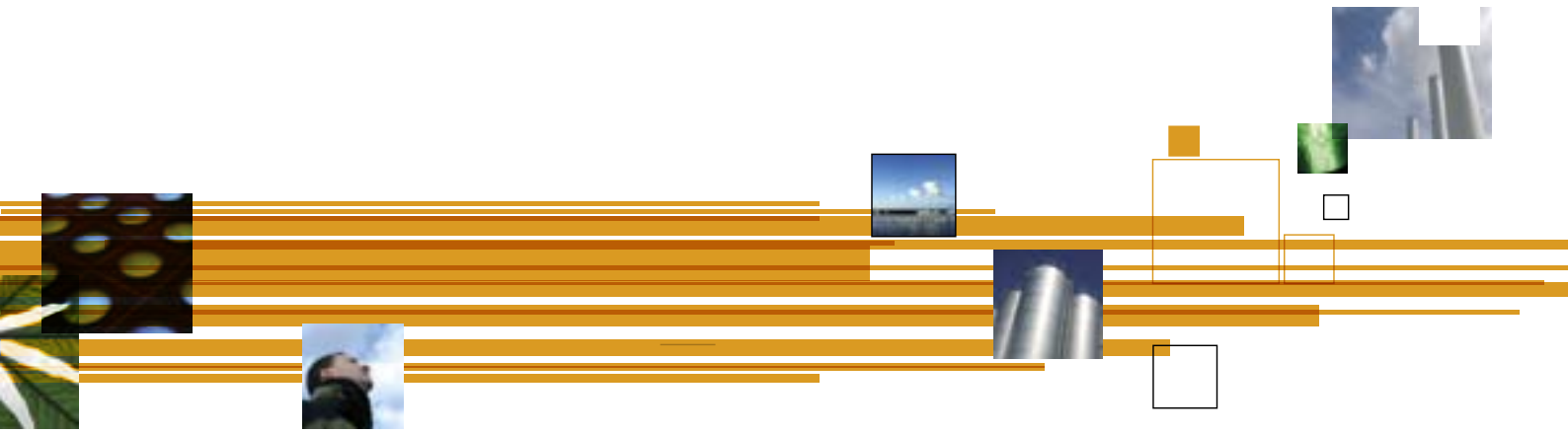




1. Introduction



Biomass as a source of renewable energy
The use of biomass is considered an important solution for the finiteness of the fossil fuels and the greenhouse gas problem. Both in the application in chemistry and in transport and the generation of energy, biomass offers great opportunities for the conservation of the Dutch energy management. Currently biomass is already the main source of sustainable energy in the Netherlands. Expectations are that the use of biomass will grow enormously in the coming twenty years. Since the Netherlands is not suitable for the production of large quantities of biomass, the bulk of the biomass will originate from abroad.

At the moment the possibilities for testing biomass for its sustainability are inadequate. If things do not change, this will entail various risks. Thus the production of biomass may cause damage to nature and the environment. The way in which biomass is produced may also have adverse effects socially and with regard to the health of local farmers, employees and their families. These risks can seriously damage the image of biomass as a sustainable energy carrier and thus hamper the large-scale application of biomass in both the present and the future provision of energy and raw materials. But the use of biomass also offers opportunities for the producing countries. Here we may think of, among other things, soil recovery, rural development, improvement of agricultural efficiency and increase of the prosperity and the social well-being of the local population.

To ensure that biomass as a source of renewable sustainable energy will be produced and processed in a responsible manner, the Dutch government wishes to incorporate sustainability criteria for biomass into the relevant policy instruments. In the short term this regards the Dutch subsidy arrangement for electricity production and the obligation for biofuels for road transport. In the longer term the Dutch government wishes to promote a wider application of these sustainability criteria in other sectors, for instance chemistry.

In preparation for the above policy the project group .Sustainable Production of Biomass. has been set up by the Dutch government. The project group "Sustainable Production of Biomass" is a broadly based project group that consists of representatives of the private sector, social organizations, financial institutions and the government. The task of the project group is to formulate criteria for the production and the processing of biomass in energy, fuels and chemistry. The emphasis here lies on biomass for electricity and heat production and as transportation fuel. It makes no difference if the biomass originates from the Netherlands, from the EU or outside the EU.

The project group has made a distinction in the information that production companies must submit (at the 'company level') and the information that can only be obtained at the regional and/or national level (at the 'macro level'). Dutch providers of bio-energy or biofuel, such as for instance applicants for subsidy or parties that have an obligation for a certain share of biofuel, must prove that they comply with the testing framework at the company level. The Dutch government is primarily responsible for the collecting of information at the macro level. Here the Dutch government can cooperate with governments in the producing countries, the private sector and non-governmental organizations; and make use of international organizations such as the United Nations.

The starting point of the project group is to line up where possible with the various existing initiatives for the development of criteria or certification for the sustainability of biomass. Examples of this are FSC hout (Wood Certification), Round Table for Sustainable Palm Oil, Round Table for Responsible Soy, the Dutch assessment guideline for wood and the Essent Green Gold Label system. Also the testing framework to be developed will gradually have to fit in with developments in the EU and on an international level. With the design of this testing framework the Netherlands, together with the United Kingdom and Germany, currently are ahead of international developments. During the development of the testing framework the project group has closely cooperated with

the United Kingdom. This has led to a good deal of mutual coordination. It is desirable that the Dutch government should communicate the testing framework broadly, so that other countries can also make use of it. On the basis of these initiatives the EU will eventually also be able to use a uniform framework for sustainable biomass production.

The project assignment and approach can be found in Appendix A.

The project group has been put together with care to be a good representation of private companies, social organizations, financial institutions and the government. As independent chairperson Jacqueline Cramer, professor of sustainable entrepreneurship at Utrecht University and at the moment of publication of this report Minister of VROM (Department of Housing, Spatial Planning and the Environment), has guided the process and seen to the overall coordination as regards contents. Experts have, where necessary, supported the project group with respect to content. During the project the project group has also consulted a broad group of parties involved (companies from the electricity sector and biofuels, social organizations, financial institutions and the government). When formulating the sustainability criteria, the project group has also, as much as possible, taken into consideration the different points of view that were put forward during these meetings. In Appendix B a list of organizations has been included that have participated in these consultations.

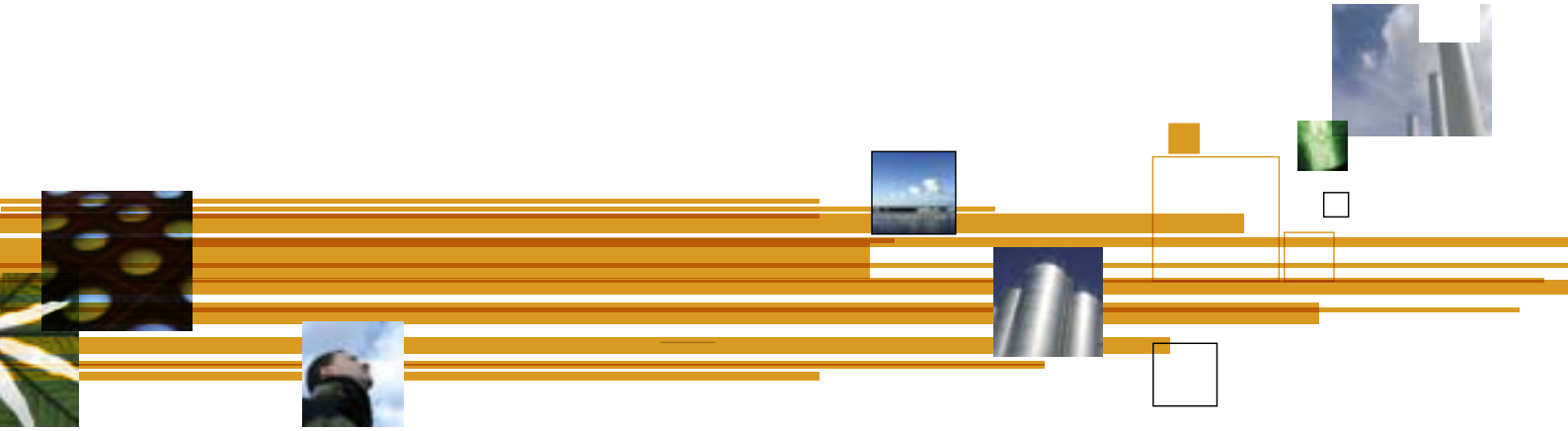
The project has been carried out in two phases. In the period of January until July 2006 the work has been concentrated on the elaboration of a framework, in which sustainability criteria and indicators have been formulated for the different themes. The results can be found in the report "Criteria for sustainable biomass production" (14 July 2006), which contains recommendations for the further elaboration and putting into operation of the sustainability criteria. From August 2006 until February 2007 there followed a second phase for further elaboration, with the support from six working groups (see Appendix C). The result is this report, which can be considered to be the final report from the project group "Sustainable production of biomass", thereby replacing the version of 14 July 2006.

The assignment given to the project group comprises the development of sustainability criteria for biomass. This report does not give any advice about its introduction by the government. It is up to the ministries of VROM (Department of Housing, Spatial Planning and the Environment) and Economic Affairs, and possibly other ministries, to indicate what consequences will be attached to the use of sustainable or non-sustainable biomass. In this the ministries will possibly be bound by the rules of the European Community (EC) and the World Trade Organization (WTO).

How to read this report

This report is composed as follows: **Chapter 2** deals with the general guiding principles for drawing up the testing framework. These are grouped according to their theme in **Chapter 3**, so that a testing framework (at the company and macro level) is created. **Chapter 4** goes into the specific calculation method for the emission reduction of greenhouse gases by the use of biomass (the greenhouse gas balance). After this (**Chapter 5**) the certification is discussed. Finally **Chapter 6** gives a view of the near future in a summary, conclusions and recommendations.

2. Starting points and methodology



2.1 Starting points

Biomass is seen as an essential energy source in the transition to a sustainable energy supply. To meet the future demand for biomass a high-value production and use of biomass will be necessary. Then biomass production must not compete with food production and must not affect biodiversity either. The production of biomass with a high energy return must be stimulated, preferably on soil that is hardly or not at all suitable for food production. In addition to this, it would seem desirable to use biomass first for purposes of as high a value as possible, and only to look at lower quality applications ('cascading usage') after this. Finally the large-scale application must also comply with the principles of corporate social responsibility. This means a lot of attention must be paid to the living conditions (planet), the prosperity (profit) and the social well-being (people) of the local environment.

A rapid global increase of the production and use of biomass may create opportunities, but it also entails risks. Therefore the project group argues in favour of a careful development of the use of biomass for energy, transport and chemistry, so that positive effects on energy supply, development of agriculture and local development and prosperity will be possible. If there is a danger of serious negative effects, action can be taken well in advance. Then there will also be sufficient time to stimulate the necessary efficiency improvement in the agricultural sector. An increase of the efficiency of agricultural systems is a condition for large-scale biomass production for energy, transport and chemistry. In this way the food supply can be safeguarded and vacant land can be used for biomass production.

In order to avoid risks and seize opportunities it will be necessary to set up a testing framework for the sustainable production of biomass. In the elaboration of this testing framework the project group has started from the following principles:

1. The testing framework must be a universal framework that is in line as much as possible with international initiatives

- The testing framework will be generic and broadly applicable. The emphasis is on non-food applications (chemistry, transportation fuels and the generation of energy), since energy subsidies and environmental tax on energy will stimulate the production of biomass for these applications. But the testing framework can also be of importance to assess food production with regard to its sustainability aspects.
- The testing framework is applicable to biomass of all origins, both from the Netherlands and imported. The testing framework is applicable to both the harvested crops and the manufactured products, such as biodiesel and bio-ethanol.
- The testing framework fits in as much as possible with international initiatives, such as existing legislation, international conventions and hallmarks. In addition it also helps to comply with the desire for uniform sustainability criteria for biomass, which was expressed by the European Energy Council in June 2006.
- The testing framework must fit in with developments on a EU level. The Netherlands with some other countries is now ahead of these developments. The Netherlands will have to play an active part in disseminating the sustainability indicators, so that more countries will follow and an international system can be set up.
- The testing framework has been formulated in such a way that it will be valid for all biomass flows and countries. It would not seem desirable to exclude product or country combinations from the outset. However, the testing framework can be a reason to exclude specific biomass flows, because they do not meet the minimum requirements. The testing of this generic framework requires country specific information or information specific for raw materials; for this a dialogue with local parties will be necessary.
- The testing framework will contain sustainability criteria that the government can use to achieve its policy aims. But sectors and market parties can also apply the testing framework themselves on a voluntary basis .

2. The testing framework must be practicable and verifiable.

- The system to be developed must in the long term offer certainty about the desired direction. This means that it will be indicated how the system will be adjusted or extended in the future.
- The testing framework must be manageable. By only asking for necessary information, it avoids an unnecessary administrative burden.
- The testing framework must be applied to the major sustainability problems and opportunities that occur at the moment in the production and trade of biomass, or those anticipated for the future.
- The testing framework is intended for biomass that is applied in the Netherlands or is subsidized in the Netherlands.
- The sustainability criteria within the testing framework must be easy to check and to maintain. The best way to achieve this would seem to be by means of (international) certification of biomass flows. If the producing company does not meet all the basic conditions, it will not be issued a certificate.
- The provider of the bio-energy or biofuel in the Netherlands (for instance the applicant for subsidy or a party that has a biofuel obligation) will have to prove that he meets the (basic) conditions. The sustainability criteria describe minimum requirements. Parties are at liberty to distinguish themselves with higher requirements than this lower limit.

2.2 Methodology

The sustainability of biomass can be determined on the basis of six themes. The first three themes are specific themes, relevant for biomass. The last three relate to the triple P approach (People, Planet, Profit), which is considered the guiding principle for corporate social responsibility in general. These are the following themes:

- Greenhouse gas emissions
- Competition with food and local applications of biomass
- Biodiversity
- Environment
- Prosperity
- Social well-being

For each theme the project group has formulated principles, criteria and indicators. Principles are the general starting points and describe the objective aimed at. The criteria translate this objective into measurable requirements. Subsequently the indicators are the parameters (quantitative or qualitative minimum requirements) by which the testing is done. Section 3.1 gives a further explanation.

When formulating principles, criteria and indicators for the sustainable production of biomass, the project group has primarily made use of existing, international guidelines and standards and hallmarks that have already been developed or are currently being developed. Appendix D gives a survey of these guidelines, standards and hallmarks with references. Since these are continuously under development, the most up-to-date versions are referred to. Apart from this the project group furnishes additional principles, criteria and indicators.

For the time being a number of criteria cannot be translated into testable indicators. In these cases the choice has been made to request reporting. On the basis of the reports a further development of performance indicators can begin. Apart from this a report enhances the transparency, facilitates the local dialogue, and meets the principles of corporate social responsibility. For the reports that are requested, protocols have indeed been worked out, indicating what information has to be supplied.

The sustainability criteria are applicable to the whole chain, from production up to application. An exception to this is the 'greenhouse gas emissions' theme. Here the application is in fact included, since a comparison is made with a reference situation. Further explanation about this can be found in section 3.2 and chapter 4.

When data are collected for each theme, a dialogue with local parties in the producing countries is required. For each theme these may be different groups. In Appendix E a guide can be found showing how this dialogue with the parties involved can take place.

The following approach has been chosen for drawing up the testing framework:

- The proposed criteria for 2007 are minimum requirements that can be implemented in 2007 in the various policy instruments. Where possible, the basic principle is to meet existing obligations in accordance with international law, as well as to local legislation. Where international or local regulations provide too little to go on, the project group has aimed at the formulation of other performance requirements.
- Some criteria are currently not yet testable. For these criteria reporting is required. In the years up to 2011 efforts will have to be concentrated on converting these reports into scientific, well substantiated indicators.
- The period up to 2011 must also be used to mobilize further international support. Moreover, in that period the discussion can be held at a European level about sustainability criteria in possible new guidelines with regard to renewable electricity and transportation fuels.
- Finally it is important to evaluate the working of the proposed criteria in 2010 and on this basis to implement effective improvements in the systematics in 2011.

Although contacts with various parties involved have proved that many respondents attach importance to an indicator aimed at Genetically Modified Organisms (GMOs), no indicator has eventually been included for this. The views with regard to GMOs are divided, also in the project group, and the discussion about this lies beyond the field of activity of the project group. In the future the results of the discussion held around the subject of food may help to clarify the views on biomass production. In the future hallmarks could be used, as is the case with food.

2.3 Small producers

During the development of sustainability indicators it is important to pay specific attention to the group of small producers, the so-called 'smallholders'. The compliance with sustainability criteria and the submission of the evidence of these, demand an investment in time and resources that those small producers may not be able to afford. Often certification systems offer the possibility of group certification, in order to give also the small producers access to the sustainable chain.

An example of this is the development of a certification system for palm oil (RSPO, Roundtable on Sustainable Palm Oil). This certification system is currently paying a lot of attention to the possibility for small producers also to comply with the sustainability criteria. With regard to palm oil small producers account for about one third of the production in Indonesia; in Malaysia this figure lies between 5 and 10 per cent. Malaysia here uses a definition on the basis of land area: a smallholder is a producer with an acreage smaller than 40 hectares. Within the RSPO the idea has been raised of a system in which a 'smallholders manager' will be responsible for a specific region. This manager maintains the contacts with the certifying authority, and therefore has all the documentation at its disposal. The documentation of the manager is the basis for the certificate.

Furthermore a random selection is made of a number of small producers for interviews and inspections. At the moment little is known yet about the form and the exact contents of this inspection, but an interview lends itself better for such an approach than a standard questionnaire. The additional costs for certification of smallholders are estimated at about 20% of the production costs, but it may occasionally also be more. Within the RSPO all parties agree that, without special measures, certification will not be affordable for small producers.

To give also small producers access to the market of sustainable biomass, the buyers can also stipulate as a condition that a certain part of the biomass should originate from small producers. This share can differ for each biomass flow. In addition it is emphasized that accommodating policy will be necessary to improve the position of small producers. Often small producers are unable to earn a living for their families and, for example, fundamental rights and good working conditions are not guaranteed.

The project group recognizes that the testing framework for sustainable production of biomass as formulated may exclude small producers. Therefore it will be necessary to pay specific attention to this. This can be done by simplifying the sustainability requirements where necessary, or by enabling group certification. The project group has a positive attitude towards the approach the RSPO is currently developing. The further elaboration of a generic approach for small producers can take place on the basis of practical experiences. Also the experiences can be used that have been gained with certified niche (food) markets, such as the market for biological coffee. In addition to this it is important to monitor in reportings at the macro level what share of the biomass is obtained from small producers.

2.4 Effects at the company and macro level

The effects of the production of biomass take place at various levels: Effects at the company level involve the immediate effects of a particular plantation or industry facility on the immediate surroundings. An individual company or producer is directly responsible for these effects.

In addition to this effects at the macro level may occur. These are effects outside the immediate sphere of the production of raw materials that can be attributed to it. This primarily concerns indirect shifts in land use that have consequences for the themes greenhouse gas emissions, biodiversity and competition with food. Furthermore the macro level is important for the prosperity theme, since also the economic effects of biomass production can often only be observed at the meso and macro levels. For these themes minimum requirements at the company level provide an insufficient guarantee (for the individual producer) that the biomass production will promote sustainable development also at the macro level. For this monitoring and planning of land use at the regional and national level will be necessary.

An example: biomass for energy can be obtained from a plantation where, before that time, palm oil for food was being produced. At this plantation there are no changes in land use, but to meet the demand for food it may be necessary that a new plantation for food be started elsewhere. Such a change of emphasis of land use should really be included in the sustainability indicators. These are sometimes substantial effects. The greenhouse gas balance can even suddenly change from positive to negative, when peat areas are cultivated for new palm oil plantations. With the displacement of biomass to new plantations deforestation may also take place in nature reserves. It is exactly because of the displacement of biomass production that competition with food production may also take place.

Table 2.4.1 gives an indication for different biomass flows of the amount of land that is needed for a certain yield in terms of energy. Here the project group has looked at the amount of land necessary to replace 25% of the current global demand for transportation fuels.

Table 2.4.1 Indication of land required for the production of biomass, in terms of energy yield (1)

	Yield (gross) Giga joule per hectare per year	**Required agricultural land** - To replace a quarter of the current global demand for transportation fuels (2) - In percentage points of what is available globally (3)
Sugar cane	104	17
Sugar beet	90	20
Palm oil	81	22
Maize	54	33
Wheat	45	40
Barley	20	91
Rape	20	91
Sunflowers	16	111
Soy beans	9	200

(1) from: Biomass for food or fuel: Is there a dilemma? Louise O. Fresco. Amsterdam University. The Duisenberg Lecture, Singapore 19 September, 2006
(2) 45 EJ/year
(3) 2.5 billion ha

In the opinion of the project group the monitoring of macro effects and land use planning must be an essential part of a system to test for the sustainability of biomass production. Without such a system there will exist insufficient insight into the fact if the produced biomass has actually been sustainably produced and there will not be any reason to take action either.

But it would not be logical to have the individual biomass producer monitor the land use, if this exceeds the level of the plantation and its (immediate) surroundings. The individual biomass producer has no influence on these shifts in land use at the macro level and the corresponding effects. The Dutch government is primarily responsible for the development and implementation of a monitoring system testing the changes in land use with respect to sustainability. Cooperation with the (regional) authorities of the producing countries, the biomass producers and NGOs at the local and national level will be needed to collect the necessary data and create a support base for the measures to be taken. A consultation between government, producers and NGOs can weigh and evaluate the monitoring data in the right way.

It may happen that the certificates submitted by the biomass producers meet the basic conditions for companies, but that the changes in land use at the macro level lead to serious deterioration of biodiversity or competition with food production. The Dutch government plays a special part in this, for it lays down the basic conditions for the use of biomass for a sustainable energy supply in the context of the policy aims it has set to the use of biomass for a sustainable energy supply and stimulates the use of biomass as a result of the ambitions and objectives laid down. So it is the task of the Dutch government, if possible on an EU level, to get talking to the government in the production country and together to aim at a responsible planning of the land use. If the local authorities are not prepared to comply with this, the Dutch government can take action by discouraging the use of biomass from these regions.

Both levels (company level and macro level) are essential components in a system to guarantee sustainable biomass production. Therefore the project group proposes two types of reporting: at the company level and at the macro level.

For reporting at the company level the testing framework has been developed as described in section 3.2. In the application of the testing framework no distinction is made between residual flows and cultivation. An exception is made, however, for the category of residual flows with a negligible economic value (< 10%) of the main product (for instance in agricultural or forestry products) and which have no other useful applications. For this purpose only a limited number of criteria is applicable, as mentioned in section 3.3.

The monitoring and planning at the macro level are described in section 3.4.

3. Testing framework for sustainably produced biomass

3.1 Introduction

The testing framework developed is divided into principles, criteria and indicators. This arrangement is also commonly accepted in various other certification systems, for example the FSC (Forest Stewardship Council) hallmark for sustainable forest management. In addition to this, protocols for the requested reportings have been formulated for those aspects for which no indicators are currently available yet.

The following definitions are used here [1]:

- A principle is the general starting point as a basis for the quality requirements. Principles are formulated as objectives. It is important to formulate principles clearly, so as to leave no space for discussion or other interpretations.

- A criterion is a translation of the principle into concrete requirements that have to be complied with. A criterion is much more specific than the general principle, which is usually formulated in an abstract and non-quantifiable way.

- An indicator is a qualitative or quantitative parameter, by which a criterion becomes testable. Indicators must be clear and verifiable. The criteria are minimum requirements which have to be complied with.

- Apart from this norms and standards are needed, because the value of an indicator must be based on a comparison with a reference or standard value. In the definition of the indicators these standards have been incorporated.

- A report is expected if no testable indicators are available. In reporting information is requested, but no minimum requirements are laid down that have to be met.

1 *Hierarchical framework for the formulation or sustainable forest management standards. Lammerts van Bueren, E.M., Blom, E.M. Tropenbos, Leiden, 1997.*

3.2 Testing framework at the company level

3.2.1 Principles of choice

The testing framework at the company level consists of the greenhouse gas balance of the biomass chain and sustainability indicators of different themes. For the testing framework at the company level the following six themes have been the starting point:

- Greenhouse gas emissions
- Competition with food and local applications biomass
- Biodiversity
- Environment
- Prosperity
- Social well-being

The burden of proof for complying with the testing framework at the company level lies with the provider of the bio-energy or biofuel in the Netherlands. This may, for instance, be the applicant for a subsidy or a party who has a biofuel obligation.

Below follows a brief explanation for each theme.

1. Greenhouse gas emissions

A lower emission of greenhouse gases is one of the reasons for stimulating sustainable energy from biomass. But during the production of some biomass flows sizable emissions of greenhouse gases occur, for example of laughing gas (nitrous oxide) during the production and application of fertilizer and of CO_2 during energy consumption for the production of raw materials or during the conversion of forest land to farmland. The quantity of greenhouse gases that is produced in a biomass supply chain, therefore, also carries weight in the assessment of this biomass.

The greenhouse gas balance is primarily of importance when the policy stimulating the use of biomass/biofuels is determined. For one of the main objectives of the obligation for the admixture of biofuels for road transport and the subsidy arrangement for electricity production is the reduction of the CO_2 emissions. That is why it is also important to take the whole chain into account.

With this the greenhouse gas balance has a fundamentally different character from the sustainability criteria. With the other sustainability criteria a sustainable production (cultivation) and trade is paramount. Important here are the sustainability preconditions that must be set out for the production and transport of biomass. Greenhouse gas performance is measured along the whole chain and is therefore dependent on the national reference. That is why the greenhouse gas balance is not an absolute measure for the sustainability of a specific biomass flow, but a relative concept. The greenhouse gas balance is dependent on the chain in which the biomass flow is produced and applied and on the national circumstances.

2. Competition with food and local applications of biomass
This theme is primarily concerned with the competition for land and the displacement of land use for the cultivation of other crops and other applications.
Raw materials for the current biofuels (the so-called first generation fuels) are generally cultivated on good quality farmlands. Raw materials used a lot for biofuels, such as oilseed rape, sugar beet, maize, grain and sugar cane, are also food crops. Additional demand for these raw materials increases the competition for land, which may result in higher land and food prices. On the other hand the extension of the marketing possibilities contributes towards a lower marketing risk for the producer, and with it towards the continuity of the system.

It is expected that in the somewhat longer term especially ligneous crops (ligno-cellulose) will be produced as feedstock for biofuels and electricity. Ligno-cellulose can be produced by trees and grasses, but it may also originate from residues of agriculture, forestry and flows of organic waste materials. The cultivation of ligno-cellulose products puts less pressure on good farmlands.

It is also possible to produce biomass on degraded and marginal lands. Competition with other land use functions is less important for such soils. Regeneration by means of planting (for example reafforestation) may even have positive effects. Still even these soils are used, albeit often extensively, for food production (for instance extensive cattle breeding). Competition with such a use is therefore also a risk here.

Studies indicate that globally agriculture and cattle breeding can be much more efficient. In the 21st century better cattle breeding and farming methods can in principle, in terms of net land use, more than compensate the growing demand for food. Such efficiency improvements will be able to create space on the current farmlands for new biomass production.

Sometimes these efficiency improvements are taking place relatively autonomously. On the other hand it is not a given fact that these lands will fall vacant. In order to realize additional biomass production, goal-oriented investments in the existing agriculture and cattle breeding will be necessary.
Crucial for this is how soon additional biomass production will be effected and to what degree efficiency improvements in agriculture and cattle breeding can compensate the extra demand for land.

Effects
Competition for land and displacement of land use can have various effects. The effects below will in any case occur when the acreage for agricultural production and the efficiency of agriculture and cattle breeding remain constant. But these effects can also occur, if there is an extension of the acreage, or when efficiency is increasing. Dependent on the specific regional situation the following (combination of) effects can occur:

Box 3.2.1: Effects of biomass production on land use

Economic effects:
- Rise of land prices;
- Rise of food prices;
- Effects on (market) prices and availability of other products such as cattle feed, construction material and medicines.

Changes in patterns of land use:
- Relocation or change of food production and cattle breeding;
- Changes in the type of vegetation and the share of vegetation and crops. This can result in a more one-sided or on the contrary a more many-sided land use. In both cases the land use can, apart from this, also become more intensive by other, more efficient production methods;
- Changes in property structures (see under the theme heading 'social well-being');
- Deforestation;
- Loss of protected areas (see under the theme heading 'biodiversity').

These effects exceed the company level. Monitoring of land use is in particular the subject of reporting at the macro level. At the company level this theme can only be tested in a limited way.

3. Biodiversity
Biodiversity is defined as the variability of living organisms in ecological systems. Globally, the protection of biodiversity is one of the cornerstones of sustainable development. In this context the United Nations has formulated the following core objectives:
- The conservation of biological diversity,
- The sustainable use of the components of this biological diversity,
- The fair and equal division of the proceeds of the use of genetic sources.

For bio-energy especially land and freshwater ecosystems are important. It is the protection of endangered species, primaeval and tropical forests that is primarily involved here. The cultivation of biomass can contribute both negatively and positively towards biodiversity.

The effects of biomass production on biodiversity can be both direct and indirect (see box 3.2.2.). The indirect deterioration of biodiversity exceeds the company level; this falls under the testing at the macro level (see section 3.4).

4. Environment
The production of biomass may have great negative impacts on the environment. The use of pesticides and fertilizers can affect the soil and ground water quality negatively. Other possible negative effects are erosion and soil exhaustion. The production of biomass must avoid these effects as much as possible. This involves both the effects within the production unit and outside it.

The environment theme is subdivided into three principles aimed at the aspects of soil, water and air. The principles primarily relate to:
1. Waste management;
2. The use of agro-chemicals (including fertilizers);
3. The prevention of erosion and soil exhaustion;
4. The active improvement of the quality and quantity of surface and ground water;
5. Emissions to air.

The most important direct and indirect environmental effects that can occur, are summarized in box 3.2.3.

5. Prosperity
The starting point for this theme is that the production of biomass makes an active contribution to the local economy. This is an important aspect in the discussion about the sustainability of biomass. A sustainable energy supply must not only create additional prosperity in the importing countries, but also in the producing countries.

6. Social well-being
Just as in the case of prosperity the well-being theme is regarded as an important aspect in the discussion on the sustainability of biomass. The social well-being of the local population and employees must be guaranteed. The well-

Box 3.2.2: Effects of biomass production on biodiversity

Direct effects of biomass production for biodiversity:
- Conversion of intact ecosystems, such as primary forests and wetlands;
- The use of areas with high biodiversity values, inclusive of the fragmentation and disintegration of such areas;
- Large-scale biomass monocultures with low biodiversity values go at the expense of areas with a higher biodiversity or cultural value (deterioration of valuable cultural landscapes).

Indirect effects of biomass production on biodiversity:
- The opening up of relatively inaccessible areas (road construction, other infrastructure), so that migrants can move in and cultivate land;
- The driving away or buying out of original land users, who often go and cultivate larger acreages elsewhere;
- The substitution of food production by biomass production, so that food production has to take place elsewhere. This may also lead to intensification, possibly at the expense of biodiversity and environmental quality;
- The change of the quality and quantity of the water system of ecosystems.

Box 3.2.3: The effects of biomass production on the environment

The direct effects of biomass production on the environment:
- The burning for cultivation or otherwise preparing of land for biomass production leads to CO_2 emissions, soil degradation and health risks;
- The use of forbidden pesticides;
- Excessive use of plant residues (from agriculture or forestry), so that the carbon cycle is broken and the soil will gradually lose organic matter and/or nutrients and will degrade;
- Risks for soil and water by production systems with intensive use of agrochemicals (fertilizers and pesticides).

The indirect effects of biomass production on the environment:
- Cumulative effects, for example, of the use of agrochemicals for biomass cultivation in an environment already under intensive cultivation.

being theme is subdivided into five sub themes:
- The working conditions of employees;
- Human rights;
- Property rights and the rights of use;
- The social circumstances of the local population;
- Integrity.

The choice of principles
On the basis of the above themes the project group has chosen the following starting-points ('principles') for the testing framework. In the following section these are worked out into criteria, indicators and reports.

Principle 1	The greenhouse gas balance of the production chain and application of the biomass must be positive.
Principle 2	Biomass production must not be at the expense of important carbon sinks in the vegetation and in the soil.
Principle 3	The production of biomass for energy must not endanger the food supply and local biomass applications (energy supply, medicines, building materials).
Principle 4	Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity.
Principle 5	In the production and processing of biomass the soil and the soil quality are retained or improved.
Principle 6	In the production and processing of biomass ground and surface water must not be depleted and the water quality must be maintained or improved.
Principle 7	In the production and processing of biomass the air quality must be maintained or improved.
Principle 8	The production of biomass must contribute towards local prosperity.
Principle 9	The production of biomass must contribute towards the social well-being of the employees and the local population.

3.2.2. Criteria, indicators and reportings at the company level

This section gives a survey for each theme of the principles, criteria, indicators and reportings for sustainably produced biomass at the company level.

When data are collected for each theme, a dialogue with local parties involved in the producing countries is required. See Appendix E.

Thema 1: Greenhouse gas emissions

Principle 1: The greenhouse gas balance of the production chain and application of the biomass must be positive	
Criterion 1.1. In the application of biomass a net emission reduction of greenhouse gases must take place along the whole chain. The reduction is calculated in relation to a reference situation with fossil fuels.	**Indicator 1.1.1 (minimum requirement)** The emission reduction of greenhouse gases amounts to at least 50-70%[2] for electricity production and at least 30% for biofuels, calculated with the method described in chapter 4. These are minimum requirements. Here the basic principle must be that policy instruments should promote a higher percentage above the minimum requirement by differentiating strongly on the basis of the emission reduction of greenhouse gases.
Principle 2: Biomass production must not be at the expense of important carbon sinks in the vegetation and in the soil.	
Criterion 2.1: Conservation of above-ground (vegetation) carbon sinks when biomass units are installed.	**Indicator 2.1.1 (minimum requirement)** The installation of new biomass production units (BPUs) must not take place in areas in which the loss of above-ground carbon storage cannot be recovered within a period of ten years of biomass production. The reference date is 1 January 2007, with the exception of those biomass flows, for which a reference date already applies from other certification systems (currently under development).
Criterion 2.2: The conservation of underground (soil) carbon sinks when biomass units are installed.	**Indicator 2.2.1 (minimum requirement)** The installation of new biomass production units must not take place in areas with a great risk of significant carbon losses from the soil, such as certain grasslands, peat areas, mangroves and wet areas. The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development).

Explanation

Criterion 1.1., as opposed to other criteria, is not an absolute measure for the sustainability of a specific biomass flow. The greenhouse gas performance is measured along the whole chain and will, therefore, be dependent on the fuel that is replaced by the biomass.

Indicator 1.1.1. sets as a minimum requirement an emission reduction of greenhouse gases of at least 30% for transportation biofuels and of at least 50-70% for electricity, calculated in relation to the reference situation with fossil fuels. These minimum requirements correspond with what may be reasonably expected of the present biomass flows and technologies (on the basis of recent literature).[3] Currently a calculation model for the greenhouse gas balance is being developed. Evaluation of the percentages mentioned can take place in September 2007, when the calculating instrument will be ready for use.

In transportation biofuels the emission reduction is lower than in electricity production, among other things because of the additional conversion steps that are necessary for the production of these fuels. The project group does not think it is realistic to exclude biomass flows or technologies at this moment. It is of great importance that with the translation into policy instruments an incentive is built in for an accelerated technological change of emphasis to technologies with a better greenhouse gas balance in the course of the coming eight to ten years. This applies especially to transportation biofuels. Policy instruments can, for example, promote a better greenhouse gas balance by strongly differentiating on the basis of performance. In this case better achievements are given more financial support or biofuels are included in the obligation in proportion to their greenhouse gas balance. In this positive stimulation of better achievements, the average performance could be looked at. By this means a mixture to biomass flows can be put to use. The project group thinks it desirable to achieve, in about ten years' time, at least 80 to 90% emission reduction in relation to the current fossil reference. This means that in 2010 it will have to be evaluated to what degree the minimum requirement will have to be tightened upin 2011 to attain the objective of 80 to 90% in ten years' time. This aim can be achieved when innovative biofuels are applied and a much more efficient cultivation for the production of energy.

The project group thinks the performance level of the current biofuels will, in the longer term, be not acceptable anymore.

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2 A calculation model for the greenhouse gas balance is currently being developed. With this the feasibility of the minimum requirements will be evaluated. The percentages will be adjusted upwards, if necessary, and a percentage for electricity production will also be determined.

3 These minimum requirements do not refer to aquatic biomass. The project group has left this future technology out of consideration.

Currently an instrument is being developed, on the basis of the calculation methods (see chapter 4), with which biomass flows can be calculated. In September 2007 the calculating instrument will be ready for use and it will be examined if the minimum requirements mentioned are realistic.

Criteria 2.1 and 2.2: The cultivation of areas with much above-ground (vegetation) or large underground (soil) carbon sinks for the production of biomass leads to the emission of large quantities of greenhouse gases. The reduction of the greenhouse gas emissions will, in many cases, be fully neutralized by this. In peat areas, for example, CO_2 emissions can be ten times as large as the CO_2 yield obtained by replacing fossil fuels by palm oil. That is why these areas are excluded for the installation of new production units for biomass.

The following areas are excluded:
- Areas in which the loss of above-ground carbon storage cannot be recovered in a ten year period of biomass production;
- Areas with a great risk of significant carbon losses from the soil, such as certain grasslands, peat areas, mangroves and wet areas.

The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development).

For peat areas the experience is that, as long as the draining of the area continues, high CO_2 emissions will occur. These emissions are included in the calculation of the greenhouse gas balance, so that this will turn out negative. By which fact peat areas are actually excluded, regardless of the date when a plantation was begun.

The criteria 2.1 and 2.2. are a supplement to criterion 1.1 (positive greenhouse gas balance). Criteria 2.1 and 2.2 exclude areas of which it is known that the loss of carbon in the area can never be compensated by the CO_2 emission reduction when biomass is applied as fuel. These areas are excluded in advance on the basis of criteria 2.1 and 2.2. This makes it unnecessary to calculate the greenhouse gas balance for biomass from these areas. These criteria are in line with the methodology that is currently being developed in the United Kingdom.

Principle 3: The production of biomass for energy must not endanger the food supply and local biomass applications (energy supply, medicines, building materials).	
Criterion 3.1 Insight into the change of land use in the region of the biomass production unit	**Reporting 3.1.1 (only at the request of the Dutch government)** Information on changed land use in the region, inclusive of future developments (if information is available)
Criterion 3.2 Insight into the change of prices of food and land in the area of the biomass production unit	**Reporting 3.2.1(only at the request of the Dutch government)** Information about changes in prices of land and food in the region, inclusive of future developments (if information is available)

Explanation:
The testing at the macro level must give a definite answer to the question, if competition with food or other applications of biomass possibly occurs (also see sections 2.4 and 3.4). This concerns effects on land use that exceed the level of an individual company. Especially large companies often already have information at their disposal which can support the monitoring at the macro level. Information from companies about the local and regional situation can give a more balanced picture for the regional or local level.

The criteria under principle 3 differ from the other criteria in the testing framework at the company level, because here reporting is involved which needs to be supplied only at the request of the Dutch government, provided the data are available.

This theme will be given a closer consideration in Appendix F.1.

Principle 4: Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity.	
Criterion 4.1: No violation of national laws and regulations that are applicable to biomass production and the production area.	**Indicator 4.1.1 (minimum requirement)** Relevant national and local regulations must be complied with, with regard to: • Land ownership and land use rights; • Forest and plantation management and exploitation; • Protected areas; • Wildlife management; • Hunting; • Spatial planning; • National rules arising from the signing of international conventions CBD (Convention on Biological Diversity) and CITES (Convention on International Trade in Endangered Species).
Criterion 4.2: In new or recent developments, no deterioration of biodiversity by biomass production in protected areas.	**Indicator 4.2.1 (minimum requirement)** Biomass production must not take place in recently cultivated areas that have been recognized as 'gazetted protected areas' by the government, or in a 5 km zone around these areas. The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development). If biomass production does take place in the above areas, then only if this is a part of the management to protect the biodiversity values.
Criterion 4.3: In new or recent developments, no deterioration of biodiversity in other areas with high biodiversity value, vulnerability or high agrarian, nature and/or cultural values.	**Indicator 4.3.1 (minimum requirement)** Biomass production must not take place in recently cultivated areas that have been recognized as 'High Conservation Value' (HCV) areas by the parties involved, or in a 5 km zone around these areas. The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development). The following areas are considered HCV areas: • Areas with endangered or protected species or ecosystems, on the basis of the criteria of HCV categories 1, 2 and 3; • Areas with high vulnerability (e.g. slopes and wetlands), on the basis of the criteria of HCV category 4; • Areas with high nature and cultural values, on the basis of the criteria of HCV categories 5 and 6 and criteria for 'high nature value farmlands'. By means of a dialogue with the local parties involved it must be determined where the HCV areas are to be found. If biomass production does take place in the above areas, then only if this is a part of the management to protect the biodiversity values.
Criterion 4.4: In new or recent developments, maintenance or recovery of biodiversity within biomass production units	**Indicator 4.4.1 (minimum requirement)** If biomass production is taking place in recently cultivated areas (after 1 January 2007), room will be given to set-aside areas (at least 10%).
	Reporting 4.4.2 If biomass production is taking place in recently cultivated areas (after 1 January 2007), it has to be indicated: – In which land use zones the biomass production unit can be found; – How fragmentation is discouraged; – If ecological corridors are applied; – If the restoration of degraded areas is involved here.
Criterion 4.5: Strengthening of biodiversity where this is possible, during development and by the management of existing production units.	**Reporting 4.5.1** Good practices will be applied on and around the biomass production unit for the strengthening of biodiversity, to take into account ecological corridors and to prevent disintegration as much as possible.

Explanation

For this theme the requirement is that plantations must not be located in or in the immediate vicinity of 'gazetted protected areas' (areas protected by the government) or areas of 'High Conservation Value'. The reference date for this is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development). Areas that have been cultivated before this point in time, may be used. This prevents these areas (with a low biodiversity

value now) from remaining unused, and enlargement from leading to additional cultivation outside these areas. Furthermore demands are made with respect to the preservation of biodiversity within the production unit.

With the installation of new production units 10% of the overall surface area must remain in its original state to counteract the formation of large monocultures. Companies must also report on the strategy that is applied to enhance biodiversity within the production unit.

In Appendix F.2 a further explanation of the different criteria can be found, inclusive of sources for information.

Principle 5: In the production and processing of biomass, the soil, and soil quality must be retained or even improved.	
Criterion 5.1: No violation of national laws and regulations that are applicable to soil management.	**Indicator 5.1.1 (minimum requirement)** Relevant national and local regulations must be complied with, with respect to: • Waste management; • The use of agrochemicals (fertilizers and pesticides); • The mineral system; • The prevention of soil erosion; • Environmental impact reporting; • Company audits. At least the Stockholm convention (12 most harmful pesticides) must be complied with, also where national legislation is lacking.
Criterion 5.2: In the production and processing of biomass best practices must be applied to retain or improve the soil and soil quality.	**Reporting 5.2.1** The formulation and application of a strategy aimed at sustainable soil management for the: • The prevention and control of erosion; • The conservation of nutrient balance; • The conservation of organic matter in the soil; • The prevention of soil salination.
Criterion 5.3: The use of residual products must not be at variance with other local functions for the conservation of the soil.	**Reporting 5.3.1** The use of agrarian residual products must not be at the expense of other essential functions for the maintenance of the soil and the soil quality (such as organic matter, mulch, straw for housing). The residual products of the biomass production and processing must be used optimally (so, for example, no unnecessary burning or removal).

Principle 6: In the production and processing of biomass ground and surface water must not be depleted and the water quality must be maintained or improved.	
Criterion 6.1: No violation of national laws and regulations that are applicable to water management.	**Indicator 6.1.1 (minimum requirement)** Relevant national and local laws and regulations must be observed, with respect to: • The use of water for irrigation; • The use of ground water; • The use of water for agrarian purposes in catchment areas; • Water purification; • Environmental impact assessments; • Company audits.
Criterion 6.2: In the production and processing of biomass best practices must be applied to restrict the use of water and to retain or improve ground and surface water quality.	**Reporting 6.2.1** The formulation and application of a strategy aimed at sustainable water management with regard to: • Efficient use of water; • Responsible use of agrochemicals.
Criterion 6.3: In the production and processing of biomass no use must be made of water from non-renewable sources.	**Indicator 6.3.1 (minimum requirement)** Irrigation or water for the processing industry must not originate from non-renewable sources.

Principle 7: In the production and processing of biomass the air quality must be maintained or improved.	
Criterion 7.1: No violation of national laws and regulations that are applicable to emissions and air quality.	**Indicator 7.1.1 (minimum requirement)** Relevant national and local regulations must be observed with respect to: • Air emissions; • Waste management; • Environmental impact assessments; • Company audits.
Criterion 7.2: In the production and processing of biomass best practices must be applied to reduce emissions and air pollution.	**Reporting 7.2.1** The formulation and application of a strategy aimed at minimum air emissions, with regard to: • Production and processing; • Waste management.
Criterion 7.3: No burning as part of the installation or management of biomass production units (BPUs).	**Indicator 7.3.1 (minimum requirement)** Burning must not be applied in the installation or the management of biomass production units, unless in specific situations as described in ASEAN guidelines or other regional good practices.

Explanation

In most countries the protection of the environment has, directly or indirectly, been incorporated into the national laws and regulations. A lot of detrimental effects on the environment are already prevented by the requirement that no infringement must take place of national laws and regulations that are applicable to biomass production and the production area.

But national laws and regulations do not always suffice to prevent environmental damage. To produce biomass in a sustainable way also 'best practices' production methods must be applied. These production methods are dependent on the crop and the location of the biomass production. It is, therefore, impossible to set an indicator as a minimum requirement. Hence reporting is requested for this.

Appendix F.3 gives a further explanation of the different criteria, inclusive of sources for information.

Theme 5: Prosperity

Principle 8: The production of biomass must contribute towards local prosperity.	
Criterion 8.1: Positive contribution of private company activities towards the local economy and activities.	**Reporting 8.1.1** Description of: • The direct economic value that is created; • Policy, practice and the proportion of the budget spent on local supply companies; • The procedures for appointment of local staff and the share of local senior management. On the basis of Economic Performance Indicators EC 1, 6 & 7 of GRI: (Global Reporting Initiative).

Explanation

The translation of this theme into criteria and indicators is uncharted territory, however, and so far it has not been included in any of the existing certification systems. Because of this it is impossible to develop this theme into testable criteria and indicators, so that reporting is requested. For the present the reporting fits in closely with the Economic Performance Indicators of the Global Reporting Initiative (GRI, 2000-2006), especially with the indicators EC 1, 6 and 7. Appendix F.4 will examine this further. Dependent on the experiences with the information supply about the three economic indicators mentioned above, for 2011 an (adapted) report will be required, or performance indicators will be developed.

Theme 6: Social well-being

Principle 9: The production of biomass must contribute towards the social well-being of the employees and the local population.	
Criterion 9.1 No negative effects on the working conditions of employees.	**Indicator 9.1.1 (minimum requirement)** Comply with the Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (compiled by the International Labour Organisation).
Criterion 9.2 No negative effects on human rights	**Indicator 9.2.1 (minimum requirement)** Comply with the Universal Declaration of Human Rights of the United Nations. It concerns here: non-discrimination; freedom of trade union organisation, child labour; forced and compulsory labour; disciplinary practices, safety practices and the rights of indigenous peoples.
Criterion 9.3 The use of land must not lead to the violation of official property and use, and customary law without the free and prior consent of the sufficiently informed local population	**Indicator 9.3.1 (minimum requirement)** Comply with the following requirements: • No land use without the informed consent of original users; • Land use must be carefully described and officially laid down. • Official property and use, and customary law of the indigenous population must be recognized and respected
Criterion 9.4 Positive contribution to the well-being of local population	**Reporting 9.4.1** • Description of programmes and practices to determine and manage the effects of company activities on local population; On the basis of the Social Performance Indicator SO1 of the GRI: (Global Reporting Initiative).
Criterion 9.5 Insight into possible violations of the integrity of the company	**Rapportage 9.5.1** Description of: • Degree of training and risk analysis to prevent corruption; • Actions taken in response to cases of corruption. On the basis of the Social Performance indicators SO2, SO3 and SO4 of the GRI (Global Reporting Initiative).

Explanation

In the elaboration of the principles, indicators and reportings use has been made, wherever possible, of international conventions. Appendix F.5 gives a further explanation of the above criteria and indicators:

- As a starting point for working conditions the "International Labour Organization Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy" has been chosen. Here the following aspects are highlighted: employment, labour relations, security and health, training and education and diversity and equal opportunities.
- The testing if human rights are not being violated takes place on the basis of the United Nations Universal Declaration of Human Rights. It concerns here non-discrimination, freedom of trade union organization and collective bargaining, child labour, forced and compulsory labour, disciplinary practices and training of security staff.
- The customary law of the indigenous population, whether or not officially laid down, must be observed. The use of forest or land is not possible without the informed consent of the original users. For this the project group has kept in line with RSPO and FSC.
- In order to assess the active contribution of biomass production towards the well-being of the local population in the first instance reporting will be requested. The same applies to the insight into the integrity of a company. For the present these reportings fit in closely with the Social Performance Indicators of the Global Reporting Initiative (GRI, 2000-2006), especially with the indicators SO1, SO2 and SO3. Appendix F.5 will examine this further.

In anticipation of a further elaboration of the testing framework for small producers, it would seem realistic not to make the sustainability indicators for well-being obligatory for small enterprises (with, for instance, fewer than five employees).

3.3 Testing framework for residual flows

The framework of sustainability requirements makes no distinction between residual flows and cultivation. But it does make an exception for the category of residual flows representing a negligible economic value (< 10%) of the main product (for instance agricultural or forestry products) and having no other useful applications. To this residual flow category a limited number of criteria and indicators will be applied. A positive greenhouse gas balance, and the prevention of detrimental effects on the soil quality are required. The latter condition applies, because agrarian residual flows must sometimes be brought back to the land to prevent depletion of the soil.

A condition is that the provider or producer can prove clearly that the biomass falls within this residual flow category. Table 3.3.1 gives a summary of the sustainability criteria applying to this residual flow category.

Table 3.3.1: Testing framework for residual flows, with a negligible economic value and no other useful application.

Theme	Requirements	Remarks
Greenhouse gas emissions	Comply with criteria	Methane emissions may be reduced; this can have a positive effect on greenhouse gas balance
Competition with food	No requirements	
Biodiversity	No requirements	
Environment – principle 5 Soil – principle 6 Water – principle 7 Air	 Comply with criteria No requirements No requirements	
Prosperity	No requirements	Effects on prosperity are in principle positive with the use of residual flows that have no other useful application.
Social well-being	No requirements	

3.4 Testing framework at the macro level

Some effects of biomass production are difficult to establish at the individual company level and will only become visible at the regional, national and sometimes even at the supranational level. This applies particularly to the effects that are caused by indirect changes in land use. This is particularly important in the themes greenhouse gas emissions, biodiversity and competition with food and other biomass applications. Furthermore reporting at the macro level is important for the prosperity theme, since also the economic effects of biomass production are on a higher scale level.

When the sustainability of biomass is established it is crucial to include these macro effects. Table 3.4.1 gives a survey of the data that must be available through monitoring at the macro level to map the effects of indirect land use and, if necessary, to take measures. On the basis of this survey the testing at the macro level can take further shape. The testing for prosperity must be worked out further. Important data for this are, for instance, the migration flows in a certain region.

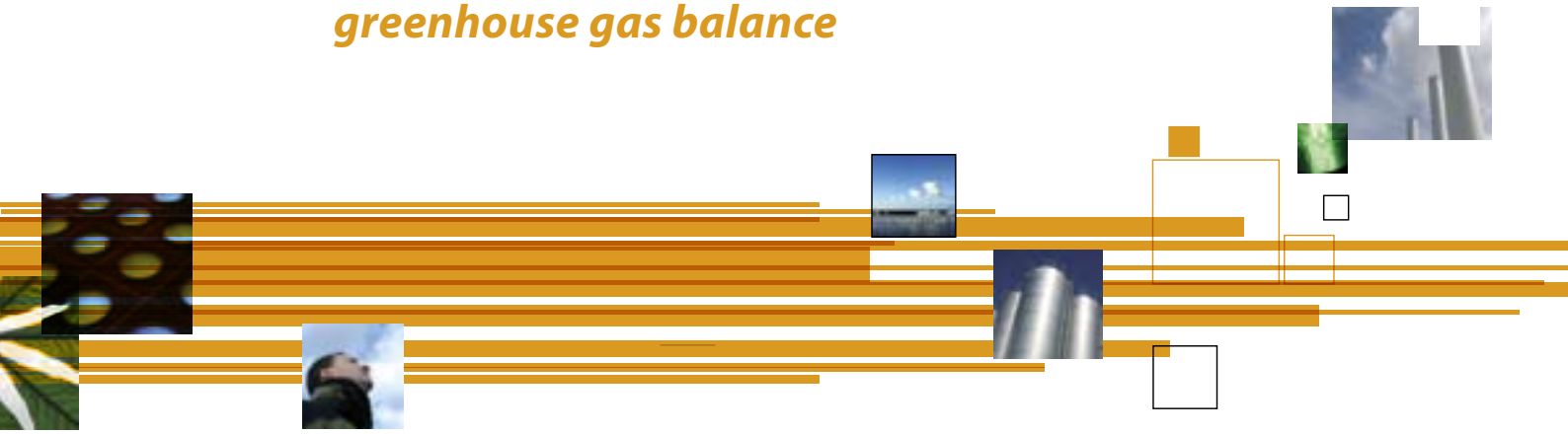
The Dutch government is primarily responsible for the development and implementation of a monitoring system at the macro level. Here the government can cooperate with international authorities.

Table 3.4.1: The necessary monitoring data on (indirect) changes in land use at the macro level

Effect	Data	Information to be reported	Assessment
Land prices	Price information on land at the national and regional level.	Prices for basic year (for the planting of biomass) and after the development. The use of public statistics (national)	Explosive price increases (yet to be defined) that can lead to the evaluation of further planting. Causes for price increases may also have nothing to do with biomass production.
Food prices	Price information about food, with a distinction between autonomous trends (e.g., in the world market) and more local effects deviating from this trend. Price effects caused by biomass production must be considered in relation with (autonomous) exchange rate developments and the prices of raw materials.	Prices of food products for producers (farmers) and for consumers. The use of public statistics (national, FAO).	Price changes within a certain range (yet to be defined) are acceptable, outside this range evaluation will be needed of the extension of the plantings.
Ownership land	Data on property relations of land and land use rights.	For example, land registry data, monitoring of property structures in the relevant area. By national government and independent authority for higher scale levels. (for example province or (federal) state)	Great shifts in relations by biomass production and exclusion of small producers from land ownership can be the basis for evaluation.
Availability of food	The mapping of food security, so the availability of food for the local population versus prices. Changes (especially decrease) of food products from the region. Make a distinction between autonomous trends and effects of the planting of crops for the production of energy.	Import/export and local balance for the major food products for consumers in relevant area. By regional authorities and national government.	Decrease of regional food supply with a certain percentage (to be determined further) can lead to evaluation.

Relocation of food production and cattle breeding.	Land use patterns at the national and possibly supranational level.	Satellite data for the monitoring of (shifts in) land use and vegetation. Data also supplied by independent institutions.	Assessment must take place at different scale levels. Various parties (producer, regional or national authorities and possibly additional independent monitoring) are relevant.
Deforestation and loss of nature reserves in relation to the supply of food, construction material, fertilizers, medicines, et cetera. (also link with the 'biodiversity' theme).	Monitoring of wooded acreage and nature reserves and effects on availability of food, construction material, fertilizers, medicines, etc.	Satellite data for the monitoring of (shifts in) land use and vegetation. By national government and independent authority for higher scale levels and relevant regional organizations.	Assessment of the degree of competition with alternative markets. Make a distinction between autonomous developments and impacts by the cultivation of biomass for the production of energy.
Changes in the type of vegetation and share of vegetation and crops.	Basic map of reference year for biomass production with designation of land use types (for example, making use of biodiversity indices). Make a distinction between biomass production and autonomous trends.	Statistics on land use (generally national and possibly at the level of (federal) state or province). By national government and independent authority for higher scale levels.	Changes can both result in a more one-sided and reversely a more many-sided land use. In both cases the land use can, in addition to this, also become more intensive owing to other, more efficient production methods.

4. Calculation methodology greenhouse gas balance



4.1 Introduction

The testing framework for sustainable biomass at the company level demands that the greenhouse gas balance of the production chain and application of the biomass be positive. (see Principle 1 and Criterion 1.1).
To make demands on the greenhouse gas balance it will be necessary to be able to calculate the greenhouse gas performance unambiguously. Therefore the project group has, in close cooperation with a number of important parties involved, developed a method to calculate the greenhouse gas balance. This chapter gives a general explanation of this methodology. A complete description of the methodology can be found in the publication "The greenhouse gas calculation methodology for biomass-based electricity, heat and fuels", March 2007[4].

The methodology gives a clear definition of the system and makes a choice in the most important calculating steps. It is important to develop, on the basis of this methodology, an instrument to calculate simply, with the aid of standard values, the greenhouse gas balance of biomass production and application. The development of this instrument falls outside the project group's assignment, but has been started off at the beginning of 2007 by the responsible Dutch ministries of EZ (Economic Affairs) and VROM (Department of Spatial Planning, Housing and the Environment). In consultation with market parties standard values for all the processing steps are determined for the various biomass flows. Here international coordination also takes place.

In the first months of 2007 these default values will be determined. Expectations are that around the summer of 2007 a usable calculating instrument will be available. After this the instrument will be tested in a pilot study. The definitive version is expected to be ready for use in October 2007. A user friendly version of this will be made.

4 *The greenhouse gas calculation methodology for biomass-based electricity, heat and fuels. Project group Sustainable Biomass, the Netherlands. March, 2007*

4.2 Description methodology

In the calculation of the greenhouse gas balance a comparison is made with a reference situation in which fossil fuels are used. To make this comparison with a fossil reference possible, it is important to include the whole chain from cultivation to end use. This means that the greenhouse gas emission reduction can only be calculated, once the application of the biomass is known. The greenhouse gas emissions caused by the cultivation and the transport of the biomass can be calculated separately, but they do not say enough about the sustainability of that biomass. Greenhouse gas emissions are strongly dependent on the preliminary treatments that the biomass in the chain has already undergone. With which the sustainability criterion greenhouse gas balance, as opposed to the other criteria, is not an absolute measure for the sustainability of a specific biomass flow. Because the greenhouse gas performance is measured along the whole chain, this makes it dependent on the fuel that is replaced by biomass. In Figure 4.1.1 a diagram is presented of the calculation method.

International coordination

The development of the methodology for the calculation of the greenhouse gas balance will be in line with international methodologies, but on condition that the methodology must be practicable, and must not lead to large cost increases. On the basis of a comparison of international methodologies a number of subjects for discussion have been formulated to be used in a consultation with an international vanguard in the field of biomass and sustainability. During international meetings with the neighbouring countries the United Kingdom, Germany and Belgium, and with participants of the IEA Bioenergy task 38 the various calculation methods have been thoroughly discussed.
On the basis of this international consultation the following agreements have been reached:

a) Change in land use is part of the calculation methods, if it is a question of directly demonstrable alterations in land use (for example a forest cut down to plant energy crops). Indirect changes in land use will not be included

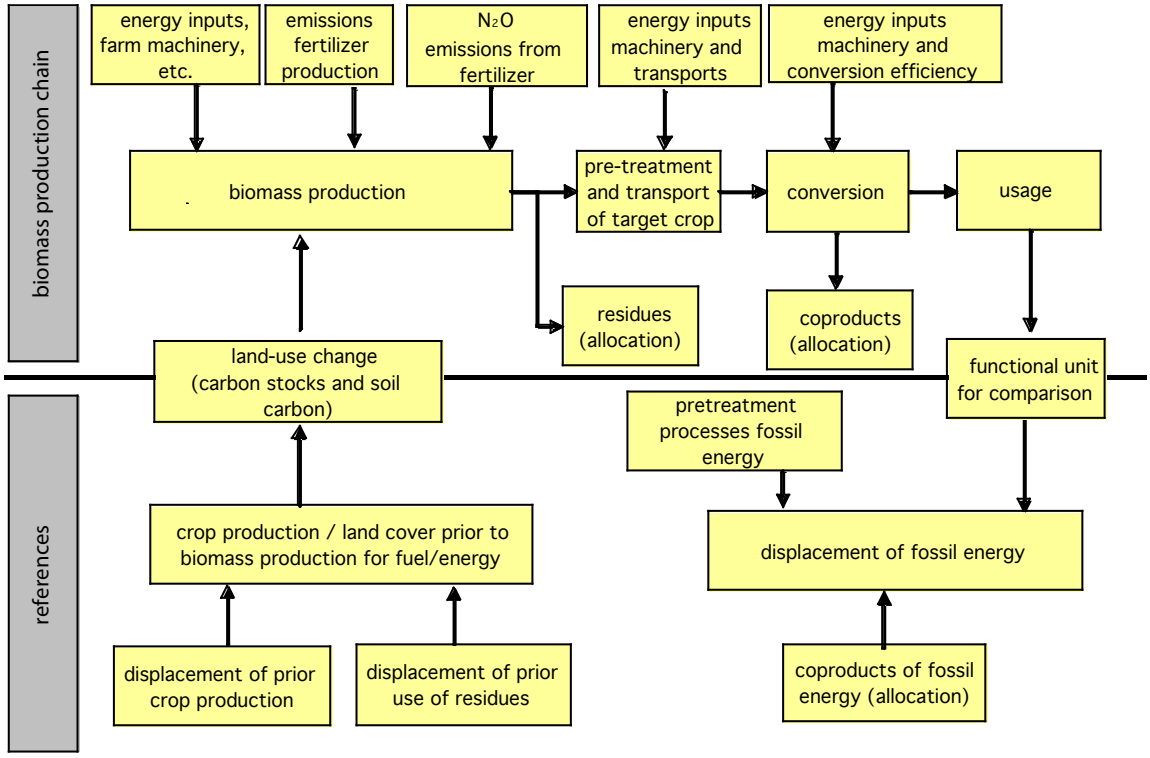


Figure 4.1.1: Comparison of the fossil and the biomass chains in the calculation method for the greenhouse gas balance.

in the calculation. These indirect changes in land use are part of the testing at the macro level.

b) If more products are involved, the prevented greenhouse gas emissions must also be allocated for each product. This allocation will in principle take place on the basis of the so-called 'system extension', in which residual products fall within the system. The practical applicability of this will be evaluated after one year.
c) References for the production and the use for residues will only be included in the calculation methods for electricity. This approach is very complex. For Clean Development Mechanism (CDM) and Joint Implementation (JI) this approach is indeed possible, since concrete projects are involved here.
d) The standard values are determined conservatively. This will encourage the market to bring about process improvements.

Implementation

When the emission reduction of greenhouse gases is calculated, the efficient use of waste heat will also be appraised. In the appraisal a link can be made with the existing greenhouse gas balance index for combined heat and power production.

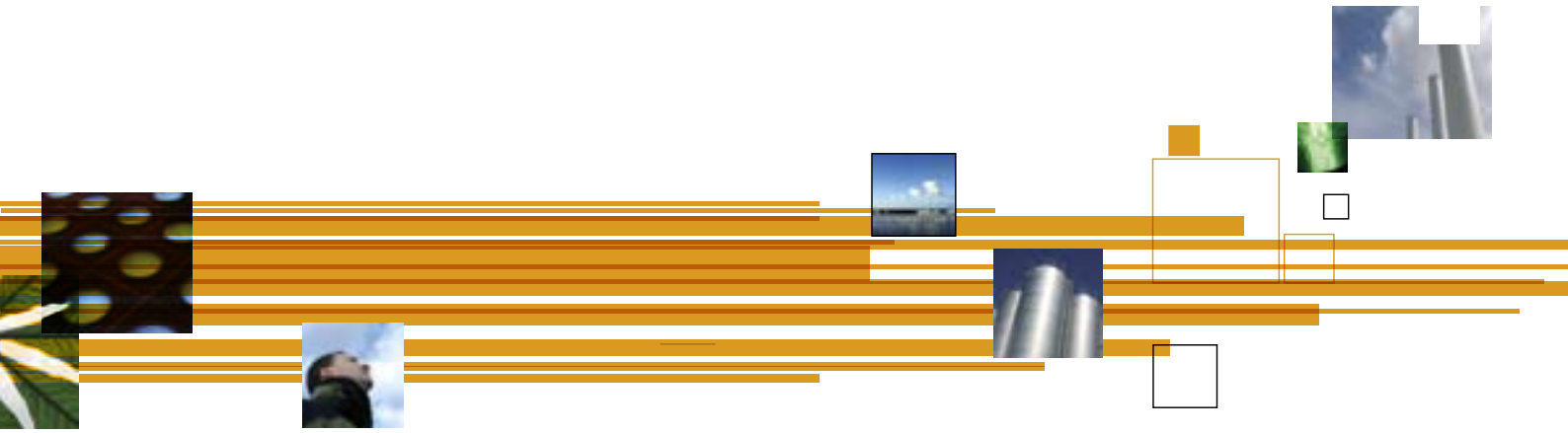
To prevent having to carry out this calculation for each (small) biomass flow, a standard value can be calculated and published in advance for a set of standard chains (raw materials - product combinations). If an owner of biomass thinks he is performing better than the standard value of a whole chain or of a part, he will have to prove this with the aid of the pre-determined methodology. The procedure for disputing generic parameters will, of course, also have to be established unambiguously.

Preferably the indicators and standard values will be determined annually. The standard value must start from the 'lower side' of the uncertainty margin for each standard chain, or else the greenhouse gas performance could be estimated too high. This could lead to oversubsidizing. There is no danger that in this case the standard value would be determined too low, since the owner of biomass himself can prove he is performing better. However, it is important to pay attention here to the relation between the administrative burden of the reporting and the costs of higher standard values, viz. the subsidies that were wrongfully granted. Even in the case of 'only' following the standard values, companies must at all events report on the product and the chain (system limits), to be able to establish within which standard chain the product falls.

In the calculation method the greenhouse gas emission along the biomass chain will be compared with a relevant fossil reference chain. The comparison will take place on the basis of equal end use, for example:

- Compare ethanol with petrol;
- Compare biodiesel with diesel;
- Wood for electricity production with a reference that fits in with the protocol "Monitoring Sustainable Energy" that is used for determining the Dutch objective.

5. Certification



5.1 Introduction

The testing framework must be verifiable and enforceable to be able to implement it in the policy instruments. This can only be the case if biomass flows will also be certified. Companies will then be able to prove by means of certification that they are complying with the testing framework.
This chapter goes into different systems for certification. The advantages and disadvantages of the different systems are discussed, with an eye to implementation and verifiability. After this a provisional comparison is presented of the testing framework with other comparable systems. The last section briefly goes into the conditions for the introduction of a new certification system.

5.2 Three systems for certification

Currently three different systems are the most commonly accepted: the track and trace system, the mass balance system and negotiable certificates.

The track and trace system

Figure 5.1.1. presents a diagram of the track and trace system. The characteristics of this certification system are:

- The biomass is fully traceable to the source.
- During the whole production process the certified biomass is completely separated from non-certified biomass.
- All the companies in the 'sustainable biomass chain' are certified.

The track and trace system is, for instance, applied in Fairtrade products and biological products. This generally concerns niche markets.

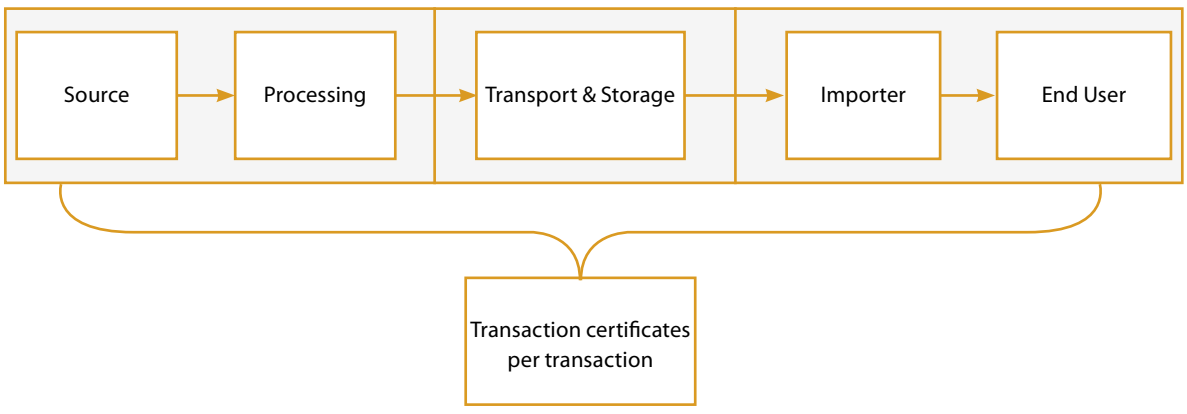


Figure 5.1.1 The track and trace system

The mass balance system

Figure 5.1.2 presents a diagram of the mass balance system. This system has the following characteristics:

- The biomass is partly traceable to the source.
- During the production process the certified biomass may be mixed with non-certified biomass.
- All the companies in the 'sustainable biomass chain' are certified.

The mass balance system is, for instance, applied in FSC in the paper industry.

Negotiable certificates (book and claim)

Figure 5.1.3 presents a diagram of negotiable certificates. The characteristics of this certification system are:

- The biomass is not traceable to the source (see the figure below).
- The end user submits certificates that guarantee the production of a certain quantity of sustainable biomass.
- Only the farmer/forester (primary producer) is certified.

Negotiable certificates are, for instance, applied in Groene Stroom (green power) in the Netherlands.

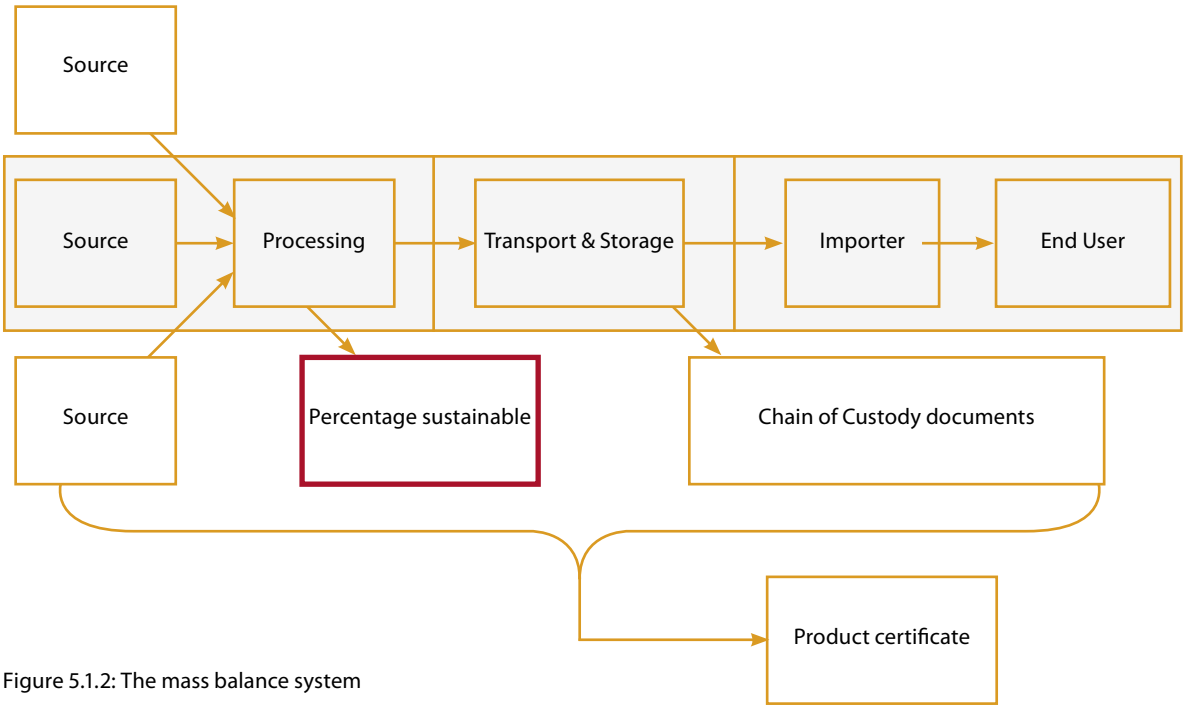


Figure 5.1.2: The mass balance system

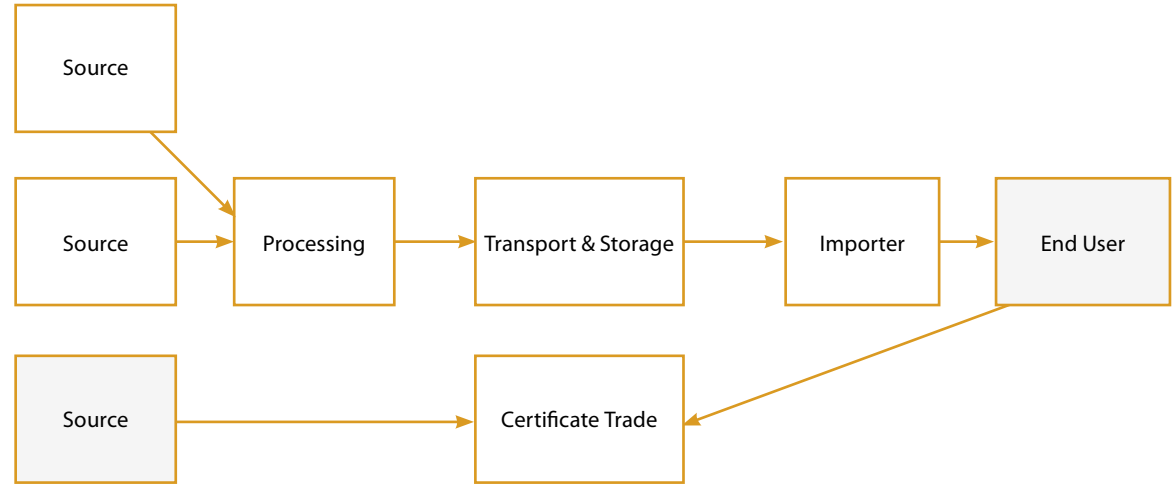


Figure 5.1.3: Diagram negotiable certificates

5.3 Implementation

Will it be possible to implement one of the systems mentioned fully? There is survey below of the specific characteristics and the applicability of the different systems.

The track and trace system

This system is very well applicable to biomass originating from short chains and in small volumes.

The expectation is that, in large volumes, originating from long and complex chains the implementation of a fully traceable certification system will entail a lot of difficulties. The main reasons for this are:

- The obligation to keep certified products physically separated from non-certified products entails operational costs for all the companies actually processing and transporting the product.
- Traders of raw materials will be restricted in their current commercial practice with whom they will be able to do business or not, since a certified batch of biomass can never leave a certified chain, if it is to retain its 'renewable' status.
- The willingness of the primary producers involved to adjust their business operations will be smaller, as the chain is longer.

The mass balance system

This system is very well applicable to biomass originating from short chains and for both small and large volumes.

But the implementation of a partly traceable certification system will entail difficulties with biomass originating from long and complex chains:

- More than in current daily practice a firm will be restricted in selling a shipment, since once a certified lot of biomass has left the tracing system, such a lot can never be sold as certified biomass.
- Since a certified lot need not be processed and transported physically separated, the additional costs will remain limited to a few additional administrative activities and the certification itself.

Negotiable certificates

This system is applicable for both small and large quantities of biomass, originating from small well-organized orderly chains and also from the long and very complex chains.

The main reasons that can be given are:

- The parties involved will be restricted to the end users and primary producers. Firms are in no way directly involved in the certification.
- The willingness of primary producers to meet the wishes and demands of the end user will be great, since they will be compensated with financial remuneration. In the other systems, where there are a lot of links, it is highly doubtful if the supplement price paid for a certified lot of biomass will actually find its way to its primary producer.

5.4 Verifiability

Each certification system has different moments when a company (or a product) is assessed by an independent certifying agency. With the number of checks the chance of misuse will decrease. Apart from this, each certification system entails a specific risk with regard to the verification of the actual delivery of the certified biomass. This risk can not, or only with a great many difficulties, be removed (for instance, by setting up one international register for all certificates issued). In the table below the verifiability for the different certification systems is explained.

Table 5.3.1: The verifiability of different certification systems

Certification system	Verification	Risk with respect to verification of actual delivery
Track and trace	A lot of verification moments (chance of misuse is small) viz: • Verification if supplier has been certified by each customer in the chain; • Periodical (physical and administrative) verification of the producers by an independent party; • Verification of each transaction between two parties in the chain by an independent party.	Farmer/forester supplies more certified product than he could actually have produced.
Mass balance	Idem as in Track and Trace	Idem as in Track and Trace
Negotiable certificates (Book and Claim)	Small number of verification moments (chance of misuse is relatively large), viz: • Periodical (physical and administrative) verification of the producers by an independent party; • It is of the essence to set up a good registration and redemption system. In case of conversion steps after production, certification must also take place.	Double issue of certificates by producers and double claims when certificates are used.

5.5 Choice of certification

The choice for one of the three described systems is strongly dependent on the aim of certification, in which a number of strategic dilemmas play a part. Below can be found, for each aim, which type of certification system will meet this best.

Aim a: The use of sustainable biomass
In order not to actually exclude sustainably produced biomass, the best choice would be the track and trace system. This system makes it possible to assess the quantity of biomass used. This can also be done with the mass balance system. But here only the percentage of sustainably produced biomass is ensured, since renewable certified biomass is mixed with non-sustainable biomass.

Aim b: The production of sustainable biomass
To make the production of biomass more sustainable, the system of negotiable certificates will suffice. The advantage of this system is that the producer of sustainable products is immediately rewarded for his efforts. A reservation must be made here, however. A condition to prevent the double sale of certificates must be an international system for the registration and redemption of certificates issued.

The certification system to be chosen is dependent on the route followed in the further implementation of bio-energy. With commodities, large bulk quantities, the so-called book and claim system of negotiable certificates may be preferable:
- Can be introduced rapidly and easily (the Dutch system for Groene Stroom (green power) was introduced within one year's time);
- Primary producers (farmers/foresters) will profit directly from their participation in the programme;
- Firms will not be hampered in their daily activities;
- End users and industrial insurance boards will always have the possibility of additionally introducing a mass balance or track and trace system.

In smaller niche markets, such as Fair Trade flows, track and trace must be recommended because of the traceability of the biomass.

With the setting up of a certification system the experience can be used that has been gained elsewhere, such as the Forest Stewardship Council (FSC) or the Marine Stewardship Council (MSC).

5.6 Declaration of equivalence of the testing framework with other certification systems

When drawing up the testing framework developed here, the project group has sought to keep in line as much as possible with various international certification systems already existing or currently under development. The result of this is that the testing framework developed here for sustainably produced biomass shows similarities with some other standards. For production companies this will entail a further complication. If a company has already had itself certified for another standard (for instance a standard specifically aimed at its type of cultivation), that procedure would have to be gone through again for the certification for the testing framework. That would mean double costs for the company concerned. Certainly if the overlap between the testing framework and a comparable standard is very large, the question arises if a new certification would be necessary.

To examine to what extent such an overlap already occurs at the moment, a comparison has been made[5]. The standards used most that have an overlap with the testing framework developed here for sustainably produced biomass have been compared with this testing framework. This concerns the following standards:
- SAN/RA: Sustainable Agriculture Network / Rainforest Alliance;
- RSPO: Roundtable on Sustainable Palm Oil (currently being developed, criteria have been defined);
- RTRS: Round Table on Responsible Soy (currently being developed, criteria have been defined);
- EurepGAP: Integrated Farm Assurance for Combinable Crops;
- FSC: Forest Stewardship Council;
- IFOAM: International Federation of Organic Agriculture Movements;
- SA 8000: Social Accountability International.

Appendix G gives a survey of the results of this benchmark. These are the main conclusions:

From the comparison it follows that some standards (for instance SAN/RA, RSPO. RTRS Basel and FSC) show more overlap with the testing framework than others. Most similarities between the criteria of the testing framework with comparable standards exist in the field of
- Biodiversity;
- Environment:
- Social well-being (with the exception of integrity).

For the following of the working group's principles there exists little or no similarity with the standards compared here;
- Greenhouse gas emissions;
- Competition with food, local power supply, medicines and building materials;
- Prosperity

5 *Carried out by B. Dehue, Ecofys (December 2006).*

Table 5.4.1: Summary of the pros and cons of the three certification systems

	Traceability biomass	Implementation	Verifiability
Track and trace	+	-	+
Mass Balance	+/-	+/-	+
Book and Claim	-	+	+/-

Who must now cut the knot if certification of company activities by a comparable system can be declared equivalent to the testing framework developed here? Or about which parts must still be reported additionally? This is not the task of the certifying authority, for it has other interests. Neither can the company itself decide about this. Therefore the project group proposes to charge with this the committee or project group yet to be set up coordinating the process of introducing the testing framework (see section 6.2).

One of the tasks of this committee will be to judge if the declaration of equivalence of the testing framework with a comparable system is valid. This means, for instance, that an RSPO certificate is declared equivalent to the testing framework: this certificate is accepted and herewith (a part) of the testing framework developed here is complied with. The 'greenhouse gas balance' criterion has not been included in any of the other systems. For this, additional information will at all events have to be supplied.

This approach fits in with the approach for transportation biofuels in the United Kingdom. In the Netherlands experience has already been gained with this approach in the Beoordelingsrichtlijn Hout (Assessment Guideline Wood).

As long as different standards are developed the government will have to facilitate such an equivalence examination. Cooperation with, among others, the United Kingdom is obvious here.

Declaring comparable certification systems equivalent has two important advantages:
1. There are standards that already have a large support base with various interest groups.
2. The certification costs and the administrative pressure are considerably lower for the companies in question.

5.7 Implementation verification and certification

Verification and certification

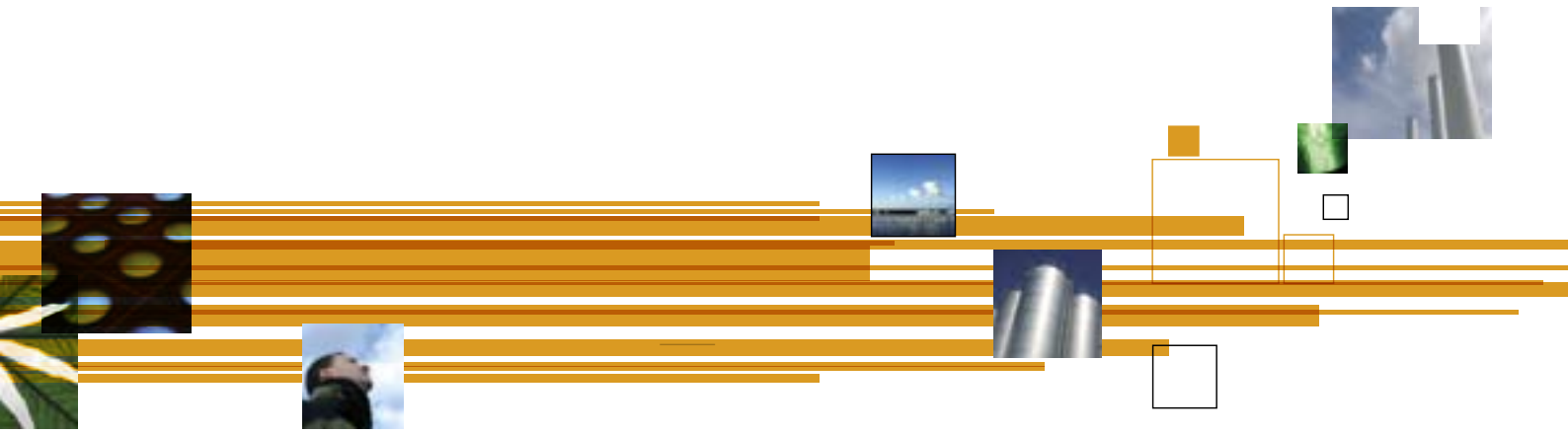
If biomass flows comply with the set sustainability criteria wil be checked by independent auditors, who compile a checklist on the basis of the criteria. The sustainability of the biomass will only be verified, if a declaration has been issued by this independent auditor.

In an existing certification system the auditor can be accredited by the certifying authority. This means that the auditor will test on the basis of prescribed criteria and that he complies with certain quality requirements. In this case a formal certificate can be issued.

Introduction certification

Various international organizations have drawn up guidelines for the introduction of a certification system, such as the WTO (World Trade Organisation), the ISO (International Organization for Standardization) and the ISEAL (International Social and Environmental Accreditation and Labelling Alliance). In a Code of Good Practice these organizations have set a number of conditions for the introduction of a certification system. This code contains procedures for the certification. Conditions have also been included for the international coordination with similar certificates and the participation of parties involved. In summary the following conditions are of importance:
- Publication of the programme to set up a certification system (with aim and procedures);
- Possibilities for parties involved to react. Here at least one 60 day period will apply;
- Duplication with other (existing) certificates must be avoided;
- Consultations with the parties involved, also in the production countries.

6. Conclusions and recommendations



6.1 Conclusions

Expectations are that in the twenty years to come the use of biomass for sustainable energy production will increase enormously. This will create opportunities for all kinds of parties. But large-scale biomass production can also have negative effects on nature and environment, or on the social circumstances of the local population. For the sustainable production of biomass it will be necessary to develop a testing framework. Provided it is sustainably produced, the use of biomass also offers opportunities for the producing countries. This concerns, among other things, soil recovery, rural development and higher efficiency in agriculture.

In this report the project group 'Sustainable production of biomass' has formulated a testing framework for sustainable biomass.

Application and feasibility

The testing framework does not distinguish between biomass of Dutch, EU or non-EU origin. The testing framework will apply to the production and processing of biomass in energy, fuels and chemistry. The emphasis is on transportation fuels and electricity production. When drawing up the testing framework, the project group has, wherever possible, kept in line with international initiatives, conventions and hallmarks. For this it has been taken into account that the testing framework must be practicable and verifiable.

Some effects of biomass production are difficult to establish at the individual company level and will only become visible at the regional, national and sometimes even at the supranational level. This concerns primarily indirect shifts in land use. To guarantee sustainable biomass production, reporting will, therefore, be necessary at two levels: the company level and the macro level.

Testing framework at the company level

The testing framework at the company level consists of the greenhouse gas balance of the biomass chain and the sustainability indicators for different themes. Six themes determine the sustainability of biomass. The first three themes are specific themes, relevant for biomass. The last three relate to the triple P approach (People, Planet, Profit), which is considered the guiding principle for corporate social responsibility in general. These are the following themes: greenhouse gas emissions, competition with food and local applications of biomass, biodiversity, environment, prosperity and social well-being.

The testing framework developed is divided into principles, criteria and indicators. Box 6.1.1 presents the nine principles that have been derived from the different themes. The indicators are the qualitative or quantitative minimum requirements which the biomass will at least have to comply with. It has turned out that for the present a number of criteria cannot yet be worked out into testable indicators. In these cases the choice has been made to request a report. For this protocols have been formulated.

It is important to evaluate the minimum requirements periodically and too tighten them up, if necessary. This will increase the sustainability of biomass in the future. The project group recommends evaluating the minimum requirements in 2010, so that adjustments, if any, can be adopted in 2011. In the years to come it will also be necessary to work further on formulating testable indicators where these are still lacking. For this the reportings will serve as a basis. These indicators can be included in the testing framework in 2011.

Box 6.1.1: The testing framework at the company level

Principle 1	The greenhouse gas balance of the production chain and application of the biomass must be positive.
Principle 2	Biomass production must not be at the expense of important carbon sinks in the vegetation and in the soil.
Principle 3	The production of biomass for energy must not endanger the food supply and local biomass applications (energy supply, medicines, building materials).
Principle 4	Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity.
Principle 5	In the production and processing of biomass, the soil, and the soil quality must be maintained or even improved.
Principle 6	In the production and processing of biomass ground and surface water must not be depleted and the water quality must be maintained or improved.
Principle 7	In the production and processing of biomass the air quality must be maintained or improved.
Principle 8	The production of biomass must contribute towards local prosperity.
Principle 9	The production of biomass must contribute towards the social well-being of the employees and the local population.

For the calculation of the greenhouse gas balance a calculation methodology has been set up that is in line with international practice. In this methodology greenhouse gas emissions that are connected with indirect shifts in land use will not be included. The calculation methodology will be worked out further in the next period into an operational calculating instrument.

The greenhouse gas balance, as opposed to the sustainability criteria, is not an absolute measure for the sustainability of a specific biomass flow. The greenhouse gas performance is measured along the whole chain and compared with conventional fossil fuels. With this the greenhouse gas balance is dependent on the national reference.

When data are collected for each principle, a dialogue is required with parties involved in the producing countries. This final report also presents a guide describing how this dialogue can take place.

Testing framework at the macro level
Especially effects that are caused by indirect changes in land use will only become visible at the regional or national level. Indirect effects of land use are particularly important with the themes greenhouse gas emissions, biodiversity and competition with food and local applications of biomass. These indirect effects will not be included in the testing framework at the company level. However, for determining the sustainability of biomass it is crucial to include these macro effects.

Therefore a monitoring system at the macro level will be necessary, on the basis of which a responsible planning of land use can be aimed at.

The primary responsibility for the development and implementation of such a monitoring system with regard to changes in land use lies with the Dutch government. But without the cooperation with the (regional) authorities of the producing countries, the biomass producers and NGOs at the local and national level it will not be possible to collect the necessary data and to obtain a support base for measures to be taken. A tripartite consultation among government, local parties and NGOs will make it possible to weigh and assess the monitoring data in the right way.

In case of possible negative effects at the macro level it will be the task of the Dutch government, if possible on an EU level, to enter into consultation with the authorities in the production country and together to aim at a responsible planning of land use. If the local authorities are not prepared to comply with this, the Dutch government is faced with a political dilemma whether or not to discourage the use of biomass from these regions on an EU level.

Testing framework for residual flows
The testing framework does not make a distinction at the company level between residual flows and cultivation. There is an exception for the category of residual flows representing a negligible economic value (< 10%) of the main product, (for instance, agricultural or forestry products) and having no other useful applications. To this residual flow category only a limited number of principles, apply, viz. a positive greenhouse gas balance and no detrimental effects on the soil quality.

Small producers
The project group recognizes that the testing framework for sustainable production of biomass as it has been formulated may exclude small producers. Therefore it will be necessary to pay specific attention to this. This can be done by simplifying the sustainability requirements, where necessary, or by enabling group certification.

Certification
Three certification system are currently commonly accepted: the track and trace system, the mass balance system and the negotiable certificates (book and claim) system. The certification system to be chosen is dependent on the route that is followed during the further implementation of bio-energy. With commodities, (large bulk quantities) the so-called book and claim certification system would be preferable:

- Can be introduced rapidly and easily (the system for Groene Stroom (Dutch green power) was introduced within one year's time);
- Primary producers (farmers/foresters) will profit directly from their participation in the programme;
- Firms will not be hampered in their daily activities;

- End users/industrial insurance boards will always have the possibility of additionally introducing a mass balance or track and trace system.

In smaller niche markets, such as, for instance, Fair Trade flows, track and trace must be recommended because of the traceability of the biomass. With the setting up of a certification system the experience can be used that has been gained elsewhere, such as the Forest Stewardship Council (FSC) or the Marine Stewardship Council (MSC).

With some existing systems the testing framework shows such an overlap that they may be declared equivalent. The 'greenhouse gas balance' criterion is not included in other certification systems. Additional information will at all events be necessary for this.

Support base

When drawing up the testing framework for sustainable biomass, the project group has made use of a broad consultation process. The project group has been put together with great care to represent the most important parties involved: the private sector, social organizations, financial institutions and governments. Use has been made of six working groups in which a large number of parties involved have participated. In addition to this a survey was held and a number of consultative meetings were organized. When formulating the testing framework, the project group has taken into consideration, as much as possible, the different points of view that have been put forward during these stakeholder meetings. Owing to lack of time, parties in producing countries have not been involved in this process.

International alignment

When developing the testing framework, the project group has cooperated closely with the United Kingdom. The result is that the testing frameworks developed in the Netherlands and the United Kingdom show a great similarity. [6]

6.2 Recommendations

On the basis of the above conclusions the project group has arrived at the following recommendations:

Implementation in policy

1. The use of sustainable biomass is essential for the production of renewable energy in the Netherlands. The project group recommends incorporating the testing framework developed at the company level as soon as possible into relevant policy instruments, for example in electricity production and in the obligation for biofuels. The application of the testing framework contributes towards transparency about the production and processing of biomass, and for this reason can guarantee the sustainability of biomass. This may lead to a broader social support base for bio-energy.
   The project group realizes that the implementation in policy instruments will demand the necessary throughput time, and that the legislation and regulations within the Netherlands and the EU, as well as commercial obligations at the global level (WTO), are important factors here. It will also take some time to make this policy enforceable and verifiable (e.g. think of certification).
2. In connection with investments and commercial contracts it is important that market parties should, as soon as possible, gain an insight into the time involved in the implementation of the testing framework in the policy. Existing subsidy contracts must not be renegotiated.
3. The Dutch government must, as soon as possible, give shape to the testing framework at the macro level. A monitoring programme must be set up to follow the effects at the macro level. This primarily concerns changes in land use. Indirect shifts of land use may have effects on biodiversity, the greenhouse gas balance and competition with food. In the testing framework at the company level it will not be possible to include this aspect. When setting up this monitoring programme, the Dutch government would be well advised to cooperate closely with the governments of the producing countries, biomass producers and NGOs. If this monitoring programme shows negative effects, the Dutch government is called upon to attach consequences to this and to undertake action to aim at sustainable production of biomass also at the macro level. The possibilities to steer at the macro level must be examined.

   In consultation with parties involved the macro effects of large-scale production of biomass on biodiversity and food production emerged as an important point of concern. The project group has not occupied itself with the policy instruments that are most suitable to guarantee the sustainability of biomass. However, various parties have suggested directions to prevent these problems. Without a further exploration of these directions by the project group, the following have been mentioned:
   - Cooperation among the Netherlands and some producing countries through partnerships or covenants to guarantee a careful biomass production;
   - In the short term only use biomass from Europe, to gain time for a structural solution in the longer term for the sustainable production of biomass in the South. In this way high volume objectives in the Netherlands and the EU will not put the sustainable production of biomass in the South under unnecessary pressure;
   - Positive stimulation of cascading usage, so that only the use of low-quality components of biomass for energy will be aimed at.
   - Positive stimulation of biomass production on fallow soils (soils that are not suitable for food production and without high biodiversity value).

Certification

4. It is important that the Dutch government should support and if necessary stimulate the development of a certification system for biomass. When this system is given shape it will be necessary to take international developments into account. An internationally

6 *Sustainability reporting within the RTFO: Framework report. Ecofys, 2007. Commissioned by the UK Government.*

harmonised system would be preferable.
5. The testing framework shows overlap with other certification systems. In order to prevent duplication of certification, a careful assessment process will be needed to declare systems possibly equivalent. It is desirable that the government should develop a policy to facilitate such an equivalence examination.

Development of the testing framework

6. The project group recommends continuing the coordination of the testing framework developed in the Netherlands with those other European countries in the direction of a uniform testing framework on an EU level. For biomass flows are an international market. The application of sustainability criteria must be brought to the attention of the European Commission, so that also the EU will incorporate sustainability criteria into its policy. Here the Dutch approach may serve as an example.
7. The testing framework has come into being through a broad consultation process. Given the time frame a dialogue with stakeholders (both government and social organizations) in the producing countries has not taken place yet. However, the impact of biomass production in these countries (both risks and opportunities) do render this dialogue necessary. The small producers deserve specific attention here. The dialogue with stakeholders in producing countries would have to start as soon as possible.
8. The testing framework developed here must be tested in practice and be further refined. The project group considers the following planning realistic for this:
   - In the period March 2007 – July 2007 the testing framework must be tested for practicability by at least eight companies with different feedstock flows.
   - In de period September 2007 till September 2010 at least five long-term pilot studies must be carried out. The aim of this is to achieve a refinement of the testing framework developed, (where possible) to be able to convert the reportings into indicators and at the same time to achieve coordination on an EU level about the contents of the testing framework. A coherent research programme deserves recommendation.
   - At the end of 2010 an evaluation of the testing framework must take place, on the basis of which improvements in the systematics can be put into effect in 2011.
9. To ensure the continuation of the above activities, it would seem desirable to set up a tripartite project group (government, private sector and NGOs) as a sequel to the project group "Sustainable production of biomass". It is important that in this project group the various departments should cooperate. The task of this project group would be:
   - To supervise the testing of the testing framework;
   - To plan the long-term pilot studies and monitor them carefully;
   - To start the underpinning research off and to monitor its results;
   - To make recommendations to the government on international coordination, the translation of the testing framework into policy, and (if necessary) to stimulate a certification system.

Greenhouse gas balance

10. For the calculation of the greenhouse gas balance a methodology has been developed. For the translation of the testing framework into policy instruments the project group recommends the use of this methodology. On the basis of the calculation methodology an instrument is currently being developed that makes it easy to calculate biomass flows and technologies with the aid of standard values. The project group thinks it necessary that this instrument be ready for practical application in September 2007.
11. The minimum requirements for the greenhouse gas balance of biomass flows must be increased step by step, so that an accelerated development of the technology will be stimulated. With this the application of transportation biofuels with a higher emission reduction of greenhouse gases (the second generation of biofuels) can become the standard within a period of eight to ten years. The project group thinks the performance level of the current transportation biofuels unacceptable in the long term. For this the government can tighten up its policy by means of measures stimulating a better performance. Here the average performance of the used biomass flows could be looked at, so that a mixture of biomass flows would be used.
12. The project group thinks it is realistic now to start from 30% emission reduction for transportation biofuels, and of 50-70% for electricity production[7]. These figures must be evaluated in September 2007 with the aid of the calculating instrument (also see recommendation 10). The project group thinks it desirable to achieve, in about ten years' time, at least 80 to 90% emission reduction in relation to the current fossil reference. This means that in 2010 it will have to be evaluated to what degree the minimum requirements will have to be tightened upin 2011 to attain the objective of 80 to 90% in ten years' time This aim can be achieved when innovative biofuels are applied and a much more efficient cultivation for the production of energy.

7 *A calculation model for the greenhouse gas balance is currently being developed. With this the feasibility of the above minimum requirements will be evaluated. The percentages will, if necessary, be adjusted upwards and a percentage for electricity production will also be determined.*

Appendix A Project assignment and approach

A.1. Objective

The objective of the project group "Sustainable Import of Biomass" is:

- The formulation of testable criteria for sustainably produced biomass;
- Providing the national government with a set of testable criteria that can be applied in legislation around electricity production and biofuels;
- Starting a mental process to arrive eventually at the desired certification. Developing a certificate is a long-term undertaking and will, therefore, continue also after the termination of this project assignment;

Derived objectives are:

- The planning of a structure in which know-how is shared, consultation takes place and recommendations are formulated to make possible the transition to sustainably produced biomass;
- The creation of a support base among authorities, market parties and NGOs for process, testing criteria, certification methods and applications in policy. A broad support base will be necessary, since the government itself can only influence a limited part of the playing field. If parties should fail to come to an agreement, the national government will nonetheless incorporate sustainability criteria into the relevant legislation (electricity production, biofuels for road transport).

The assignment for the project group concerns the period 1 January – 1 March 2007 and comprises the following elements:

1. Organize a stable structure of consultation and cooperation with the stakeholders concerned, if this is not sufficiently covered by existing initiatives;
2. Ensure that testable and broadly supported criteria will be agreed upon for the production and trade of sustainable biomass. Get stakeholders sufficiently involved in this and pay sufficient attention to the international context;
3. Design a universal framework, which can subsequently be applied to the various biomass flows.
4. Design workable protocols for the reportings;
5. Develop a calculation method to determine the greenhouse gas balance; broadly speaking this methodology must provide the system definition and the various calculation steps.
6. Offer the national government an operable set of sustainability criteria that are suitable for application in legislation. What must be primarily thought of here are electricity production and the biofuels for road transport;
7. Set up a handle for a dialogue with local and regional stakeholders;
8. Start the shaping of thoughts about certification;
9. Select at least three pilot projects in which from 1 July 2006 the criteria can be applied and tested
10. Ensure that the authorities in this process operate as a unit and nationwide;
11. Report in July 2006 and February 2007 on the results that have been attained in the project and formulate recommendations for the way in which the stakeholders can continue the structure of consultation and cooperation.

Here the following definitions are used. The project will be aimed at:

- Biomass flows
- Non-food applications, this means energy, transport and chemistry. The project group recognizes that ideally for non-food applications the same sustainability requirements would have to apply.
- The whole chain from production up to application. The project is, therefore, aimed at the production and the transport of biomass flows. An exception to this is the 'greenhouse gas emissions' theme. Here the application is included, since a comparison is made with a reference situation. In the environment theme processing of the biomass, if any, will be included.
- People, planet and profit aspects.

The project will not be aimed at:

- The availability of sustainably produced biomass

A.2. Approach

The project group has been put together with care to be a well-balanced representation of private companies, social organizations, financial institutions and the government. The project group has been kept small deliberately, to enable it to function effectively as a working group. The members of the project group have participated in a private capacity, but have undertaken to communicate with their colleagues during the process. As an independent chairperson, Jacqueline Cramer, professor of sustainable entrepreneurship at Utrecht University, has directed the process and seen to the overall coordination as regards contents.

The project has been carried out in two phases. The project group has begun by formulating the basic principles for the elaboration of sustainability criteria and indicators. Next the sustainability criteria and indicators have been formulated. In the subsequent stages a further elaboration of criteria and indicators has taken place; if performance indicators were not yet available, protocols have been drawn up for the reportings that were requested. For this six working groups have been set up:

- Working group Stakeholder Dialogue
- Working group Methodology greenhouse gas balance
- Working group Competition with food, local energy supply, medicines and building materials
- Working group Biodiversity and the Environment
- Working group Properity and Social Well-being
- Working group Certification

The project group and the working groups have been supported, where necessary, by experts with respect to content.

During the process stakeholders have been consulted on a number of occasions. The results of these contacts

with stakeholders have been included in this report as completely as possible.

- In the first phase two meetings were organized with parties who indicated they felt involved in the process, but who did not form part of the project group. One meeting was organized notably for private companies, the other meeting for NGOs. At both meetings the starting points of the sustainability criteria were subject of discussion.
- In the first phase a web survey among approx. 250 stakeholders was posted, in which these stakeholders were asked extensively to give their opinion on the system for sustainability criteria and the levels of quality the criteria must guarantee.
- The first phase was concluded with a working conference on 15 June 2006. Prior to this conference the sustainability criteria were sent to the participants and during the conference the criteria were discussed in six thematic workshops.
- In the second phase a large number of presentations were held at conferences and meetings
- The second phase was concluded with four consultative meetings. These were aimed at the government, NGOs, the energy sector and industry from the cattle feed, foodstuffs and oils and fats production sectors.
- During the whole process contact was maintained with a great number of stakeholders who showed an interest in the process.
- During the whole process extensive attention was paid to international coordination. The Netherlands together with some other EU countries is at the forefront in the development of sustainability criteria for the production of biomass. Intensive contacts have been maintained with the project team in the United Kingdom. In October 2006 and January 2007 workshops have taken place in which the Netherlands, the United Kingdom, Germany and Belgium were present.
- There has been one conversation with the European Commission to gain some insight into the thoughts of the Commission with respect to the 'sustainability of biomass' subject. The Dutch government has asked the European Commission to take up an active position with regard to the development of sustainability indicators. The Netherlands has offered to place the knowledge gained with this project at the disposal of other parties.

Appendix B Participants consultations

The list below gives a survey of organizations that participated in one or more than one consultative meetings.

ABN AMRO
ADM Europoort
Argos Groep B.V.
ASN Bank
Algemene Vereniging Inlands Hout
Bio-ethanol Rotterdam bv
Biopetrol Group
Biovalue
Biox
Brabantse Milieufederatie
Bond van Nederlandse Margarine Fabrikanten
Bothends
BTG Biomass Technology Group B.V.
Carboncapital Solutions
Cargill
Cefetra Groep
Cehave Landbouwbelang
CEO
CertiQ
CE-Transform
COGEN Project (project group Biomass & WKK)
Copernicus Instituut, Utrecht University
Cordaid
COS Noord Holland
DHV Mobiliteit en Verkeer (DHV Transportation and Infrastructure)
dutCH4
Ecofys
Elektrabel
Eneco Energie
EON-Benelux
Essent
EuropaBio
Exxon Mobile/Esso the Netherlands B.V.
Federatie Nederlandse Levensmiddelen Industrie
Gelderse Milieufederatie
GiPP Energy
Global Forest Coalition
Greenpeace
Grontmij Nederland B.V.
ICCO
IOI
IUCN
Iveco
K.O.G. Edible Oils B.V.
Kema Nederland B.V.
Kuwait Petroleum
KV Papier en kartonfabrieken
LLTB/LTO Duurzame energie (LLTB/LTO Sustainable Energy)
Loders Croklaan
Lyondell
Milieu Federatie Limburg
Milieu Federatie Zuid Holland
Milieu Federatie Drenthe
Milieudefensie (Dutch Environmental Defence Association)
Milieufederatie Noord-Holland
Ministerie van Buitenlandse Zaken (Dutch Ministry of Foreign Affairs)
Ministerie van Economische Zaken (Dutch Ministry of Economic Affairs)
Ministerie van Financiën (Dutch Finance Department)
Ministerie van LNV (Ministry of Agriculture, Nature (Management) and Fisheries
Ministerie van Verkeer en Waterstaat (Dutch Ministry of Transport, Public Works and Water Management)
Ministerie van VROM (Dutch Department of Housing, Spatial Planning and the Environment)
Nederlandse Akkerbouw Vakbond
Nedalco
Nevedi
Netherlands Development Finances Company (FMO)
Nuon
Nutreco
OxfamNovib
Platform Bio energie (Platform Bio energy)
Platform Groene Grondstoffen (Platform Green Raw Materials)
Platform Hout (Platform Wood)
Productschap Margarine, Vetten en Oliën (Commodity Board for Margarine, Fats and Oils)
Rabo Groen Bank B.V.
Rabobank
Rendac Son/Sonac/Ecoson
Sabic Europe
Shell Nederland
Smilde
Stichting Milieukeur
Solarix
Sonac
Sovion N.V.
Stichting Natuur en Milieu (Foundation Nature and the Environment)
Ten Kate Vetten
Triodos Bank
TU Delft
Unilever
Utrecht University
Vereniging Afvalbedrijven
VNPI
Wageningen UR
Wereld Natuur Fonds (World Wide Fund For Nature)
Wetlands International

Appendix C Members working groups

Working Group Stakeholder Dialogue
Jacqueline Cramer, Sustainable Entrepreneurship B.V., chair
Ella Lammers, SenterNovem, secretary
Omer van Renthergem, Dutch Ministry of Foreign Affairs
Sander van Bennekom, OxfamNovib
Paul Wolvekamp, BothEnds
Jelle Hettinga, Nuon
Bert Fokkema, Shell

Working Group Methodology Greenhouse Gas Balance
Kees Kwant, SenterNovem, chair
John Neeft, SenterNovem, secretary
Elke van Thuijl, SenterNovem, secretary
Eric Swartberg, Cargill
Yves Ryckmans, Laborelec (Electrabel)
Bart Rosendaal, Rosendaal Energy
Veronika Dornburg, Utrecht University
Hans Jager, Stichting Natuur en Milieu (Foundation Nature and the Environment)
Rob Remmers, Essent
Ronald Zwart, Productschap MVO (Commodity Board for Margarine, Fats and Oils)
Steven Wonink, Ministerie van VROM (Department of Housing, Spatial Planning and the Environment)
Daan Dijk, Rabobank
Mark Woldberg, Nedalco
Geert Bergsma, CE

Working Group Competition with Food
Jacqueline Cramer, Sustainable Entrepreneurship B.V., chair
Ella Lammers, SenterNovem, secretary
John Veerkamp, Dutch Ministry of Foreign Affairs
Mohamed Sharif, Ministerie LNV (Ministry of Agriculture, Nature (Management) and Fisheries
Bert Groeneveld, Biox
Peter Zuurbier, Wageningen University
Andre Faaij, Utrecht University
Willem-Jan Laan, Unilever
Pieter Jansen, Both Ends

Working Group Biodiversity and the Environment
Jacqueline Cramer, Sustainable Entrepreneurship B.V., chair
Steven Wonink, ministerie VROM (Department of Housing, Spatial Planning and the Environment), secretary
Carl Konigel, IUCN
Danielle de Nie, IUCN
Steven de Bie, Shell
Barbera van der Hoek, WWF
Rob Busink, ministerie LNV (Ministry of Agriculture, Nature (Management) and Fisheries
Caroline van Leenders, Dutch Ministry of Foreign Affairs
Jan Joost Kessler, AIDEnvironment
Sven Sielhorst, AIDEnvironment

Working Group Prosperity and Social Well-being
Jacqueline Cramer, Sustainable Entrepreneurship B.V., chair
Mariska de Bruijne, Ministerie van EZ (Ministry of Economic Affairs), secretary
Ewald Breunesse, Shell
Jan-Kees Vis, Unilever
Sander van Bennekom, Oxfamnovib
Marieke Meeuwsen, LEI
Mark Prosé, Control Union

Working Group Certification
Jacqueline Cramer, Sustainable Entrepreneurship B.V., chair
Mariska de Bruijne, Ministerie van EZ (Ministry of Economic Affairs), secretary
Kees Kwant, Senter Novem
Helma Kip, Essent
Ineke Vlot, Milieukeur
Nico Leek, Probos
Edwin Koster, Solidaridad
Ronald Zwart, Productschap MVO (Commodity Board for Margarine, Fats and Oils)
Johan Maris, Control Union
Mark Prosé, Control Union

Appendix D References to conventions and hallmarks

GRI: Global Reporting Initiative:
www.globalreporting.org

ILO: International Labour Organisation:
www.ilo.org

RSPO: Roundtable Sustainable Palm Oil:
www.sustainable-palmoil.org

RTRS: Roundtable on Responsible Soy:
www.responsiblesoy.org

EUREPGAP: Euro-Retailer Produce Working Group (EUREP)
Good Agricultural Practices (GAP):
www.eurepgap.org

FSC: Forest Stewardship Council:
www.fsc.org

SAN: Sustainable Agricultural Network:
www.rainforest-alliance.org/programs/agriculture/san

Appendix E Dialogue with local parties involved; A Guide

E.1 Aim of this guide

The Dutch government has expressed its intention to incorporate sustainability criteria for biomass into relevant policy instruments. For this purpose a testing framework for sustainable biomass production has been developed (see chapter 3 of this report). A requirement here is that a dialogue is held with local and regional stakeholders in the producing countries. This guide is intended to offer companies a handle to give shape to this stakeholder dialogue. First of all the aim of a stakeholder dialogue is explained briefly and subsequently the procedure to be followed. Finally it is described how and on what the reporting must take place.

This guide will be aimed at companies wishing to apply sustainable biomass for electricity production, biofuels or chemistry and having to report on its sustainability. In figure E.1 it is indicated where in this process the stakeholder dialogue takes place.

The obligation to report on the sustainability of biomass lies with the company that has to comply with sustainability criteria and indicators in the context of the relevant policy instruments in the Netherlands. Often a company will not itself be the producer of biomass, but will buy biomass from a provider or producer. What we see here is a supply chain responsibility: the obligation to meet sustainability is passed on to suppliers and eventually to the producers in the countries of origin. The company in the Netherlands, the purchaser, will ask the producer of biomass to report on the sustainability of the biomass. This can be laid down in the contract. A requirement here is a dialogue with stakeholders. This is given shape by submitting the draft report on sustainability to the local and regional stakeholders. The reactions of stakeholders are incorporated into the final report, which is subsequently supplied to the purchaser. The purchaser uses these reports on the sustainability of the different lots of contracted biomass to prove that the sustainably requirements are complied with.

The quality of the reports is guaranteed by the certifier. With the certification the reliability of the information provided is tested, both with respect to content and procedure. The stakeholder dialogue is part of this. With the certification it will be tested if a stakeholder dialogue has taken place, and if reactions have been adequately incorporated in the reporting. As part of the certification process audits may be carried out in which information is checked on site.

In a dialogue with stakeholders a distinction can be made between various levels:

- The micro level: How do stakeholders assess the results of the sustainability test at the local/regional level. Do

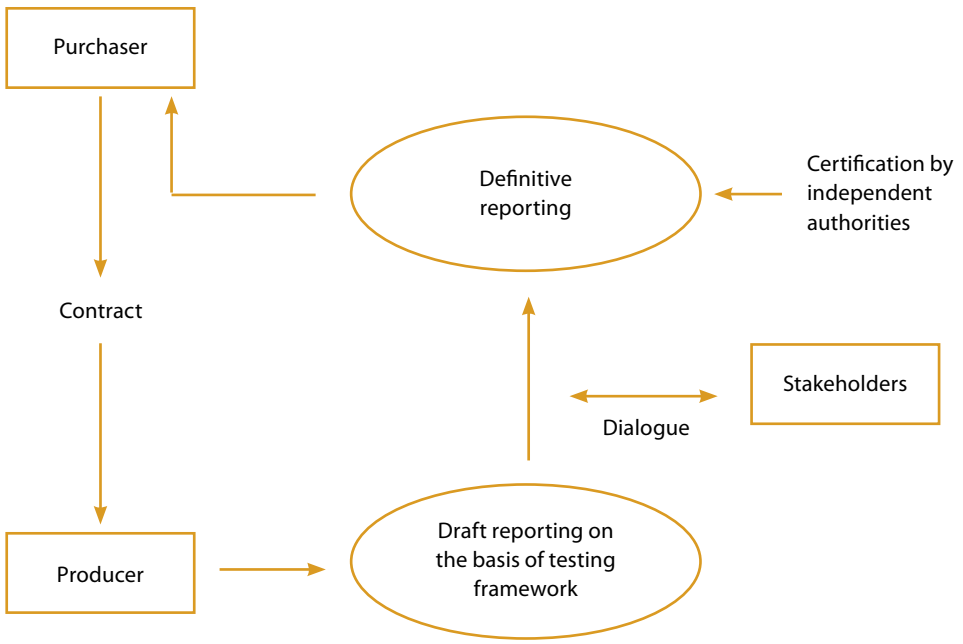


Figure E.1: The stakeholder dialogue in relation to the reporting on the testing framework

they agree with the information supplied and what additional information can they supply?
- The macro level: How do national stakeholders (e.g. federal government, national NGOs) assess the macroeconomic effects of (large-scale) production of biomass in their region/country?

This guide examines the dialogue at the micro level, since this falls within the scope of an individual company producing biomass.

For small producers/suppliers a stakeholder dialogue as described in this guide will not be not practicable. Separate guidelines will be necessary for these smallholders, in which adjustments and/or simplifications will be needed both for the practical requirements and the procedural execution.

E.2 Why a stakeholder dialogue?
The aim of a dialogue with stakeholders is to increase the reliability of the reporting on the sustainability of biomass, and to find a support base for this reporting with the local and regional stakeholders. For this an open and transparent reporting structure will be necessary. A stakeholder dialogue can also be useful for obtaining additional knowledge and information, so that the reporting can be complied with.

In addition to this for the local and regional stakeholders a dialogue will also be of importance. They can put forward their points of concern, and thus exert an influence to reduce negative effects (for example on nature or the environment) and to increase possible positive contributions (for instance with regard to employment).

E.3 Procedure for a stakeholder dialogue
Since a stakeholder dialogue is an obligatory part of the reporting on the sustainability of biomass, in principle reporting on the stakeholder dialogue must take place with each batch/contract of biomass. When a lot is bought from the same producer(s) as last time (or in case of long-term contracts), one stakeholder dialogue a year will suffice.

A good stakeholder dialogue is based on an iterative process. Here three phases can be distinguished:
- preparation
- consultation
- processing

With each cycle there will arise a better understanding for the local themes and better relations with the local stakeholders. It stands to reason that in case of long-term contracts this iterative process can be taken into account much better.

Phase 1: Preparation
1. Selection stakeholders.
   In the preparatory phase it is important to make a good selection of the local stakeholders in the producing country who are going to play a part in the dialogue. As a first step a survey is made of the different categories of stakeholders who are important enough to be involved in the dialogue; these are for instance the people living in the neighbourhood, employees, local NGOs. After this it can be examined for each category which of the stakeholders are representative, so that a selection can be made. In this way a list of candidates is compiled of the representative stakeholders that will be actively approached to take part in the consultation process. It is important that this list should be compiled in consultation with stakeholders, thus avoiding a blind spot, if necessary.

   In the eventual prioritising of stakeholders with whom the dialogue can best be held, the following points need to be paid attention to:
   - which stakeholders are the really interested parties, in other words which stakeholders, if any, will experience negative effects or have a positive interest in the biomass production/trade. It is important to substantiate properly which stakeholders have an interest.
   - which stakeholders are well informed? These stakeholders can give support, when the necessary data for the reporting are collected.

   Apart from this it is important also to involve in the dialogue relevant stakeholders, indicating themselves that they would like to be heard. Incidentally, the list of stakeholders that are involved in the dialogue may differ for each sustainability theme.

2. Develop a strategy for the stakeholder dialogue.
   For each stakeholder it can be documented in what way he will take part in the dialogue. For this there are various possibilities. Think, for instance, of bilateral meetings or thematic workshops.

The result of the preparatory phase is a survey of stakeholders and some insight into the possible negative and/or positive effects that they will experience from the biomass production or trade.

Phase 2: Consultation
In the second phase the implementation of the developed strategy will take place. In a consultation at least two meetings are essential:
- A meeting in which a survey of reactions, opinions and remarks is the central point;
- A final meeting in which it is clearly indicated how the reactions listed will be dealt with, and why.

It is important that a consultation process should be accessible for the stakeholders involved. If necessary, consultation can also take place digitally to approach a larger group of stakeholders. However, it is recommended always to link this to a physical meeting.

Some other points of attention are:
- See to it that stakeholders are well informed. This means careful translations of the documents in question into the local language;
- The meeting must be announced well in advance, and the status of the consultation must be made known to the stakeholders.

- Locally a lot of different and conflicting points of view may exist. Therefore a clear feedback is important.

The result of this phase is a survey of the response of the different stakeholders, and clarity about if and how this response has been incorporated, and why.

Phase 3: Processing
In the last phase the results of the stakeholder dialogue are incorporated into the final reporting on the sustainability of the biomass. During the processing of the results it is important to maintain a close contact with stakeholders, certainly in the case of long-term contracts. When local opposition or conflicting insights have to be dealt with, a more intensive dialogue will be necessary.

In the survey below some do's and don'ts in the consultation process have been summarized.

E.4 Protocol for reporting on the stakeholder dialogue
In the reporting on the stakeholder dialogue the following elements must come up for discussion:
- reporting on the dialogue: who has been spoken to, why, what has been discussed and in what form;
- reporting on in what way the reactions listed have been processed. It is important here to mention contradictory or critical viewpoints and to indicate how these have been dealt with;
- reporting on possible follow-up activities.

This reporting is part of the reporting on the sustainability of biomass.

Do's and don'ts in a stakeholder dialogue

Do
- recognize that perceptions of stakeholders are important and that they need to be reacted to;
- listening is just as important as talking;
- the stakeholder dialogue must be accessible for all stakeholders;
- develop a process for the dialogue for which a support base exists with the stakeholders;
- make time for personal contact during the dialogue;
- recognize and appreciate that stakeholders take time for the dialogue in spite of the pressure of work;
- be active yourself in the follow-up of the dialogue;
- record the results of the dialogue, certainly in the case of long-term contracts;
- do not raise false expectations during the dialogue.

Don't
- do not enter into a dialogue without the intention of listening;
- try not to develop answers before the dialogue has taken place;
- do not base a stakeholder dialogue on existing contacts instead of on a systematic approach, in which all important stakeholders are involved;
- do not assume that silence means approval;
- do not assume that intermediary parties will act as messenger of the company;
- do not assume that one strategy will work for all stakeholders;
- do not assume that the stakeholders will follow the same time schedule as your company;
- do not rely on technology instead of personal contacts;
- preferably do not use external consultants for the management of the stakeholder dialogue;
- do not involve only 'friendly' stakeholders in the dialogue.

Appendix F Further information and explanation testing framework

F.1 Competition with food and local applications biomass
The theme "competition with food and local applications of biomass" primarily has to do with competition for land and displacement of land use for other cultivations and applications. These effects on land use exceed the level of an individual company. Therefore, at the macro level, the testing framework must in particular give a decisive answer to the question if competition with food or other applications of biomass may occur (also see sections 2.4 and 3.4). Companies (particularly the big companies), however, often have at their disposal information which can support the monitoring at the macro level. The companies are also responsible for generating sufficient information, so that monitoring of this theme at the national and global level will become possible. For this theme reporting is requested that needs only to be supplied at the request of the Dutch government, and only if data are available.

Below there follows a further consideration on the parameters that are important to make it possible to map out changes in land use.

Important information and parameters for land use
Changes in land use can be considered at various scale levels with respect to:
- the level of the plantation/the production company
- the macro level (this concerns in the first instance the regional, provincial or (federal) state and national level, but if necessary also the supranational/continental and global level)

Here it is possible that at the national level no negative effects will occur as a result of shifts in land use, but that they will occur at the local level.

The following data are notably important to map changes in land use:
- A clear description of the kind of biomass that is used, and the possible alternative use in other markets (for instance as food, construction material, fertilizer, cattle feed or medicines). Here a distinction can be made between residual flows, food crops and non-food crops.
- Information on the application of raw materials for the various objectives and shifts among them over time (this is notably important for commodities with more than one applications, such as vegetable oils).
- Satellite data for the monitoring of (shifts in) land use and vegetation.
- Statistics on land use (generally national and possibly at the level of (federal) state or province.
- Statistic data with respect to (average) yields of crops over time (for instance on the basis of national and FAO statistics).
- Field data, notably for verifying the diversity (or its decrease) in land use.
- Price information on land and food.
- Data on property relations of land and land use rights.

Assessment
It is not clear in advance if the extent to which effects occur will be acceptable or not. Some examples of this by way of illustration:
1. Increase of food and land prices is disadvantageous for consumers, but in many cases positive for farmers. Higher incomes may lead to investments in agricultural production resulting in a higher production. More intensive agriculture (and cattle breeding) production can also entail lower relative environmental costs. The degree to which and the rate at which prices change will, therefore, have to play a part in the assessment of the effects. Its interpretation will in its turn again depend on regional circumstances (such as spending power), domestic regulation and the price developments within the commodity markets.
2. The introduction of biomass crops (for example grasses or trees) and the simultaneous intensification of agriculture and/or cattle breeding will have various effects. Intensification may result in the decrease of biodiversity; but also in a more diverse pattern of land use by the planting of trees, which will, reversely, lead to higher biodiversity.
3. The (partial) replacement of food production by biomass crops may be seen as undesirable at the level of a province. At the national level conventional agriculture may, however, move to areas where this is more efficient and possibly also ecologically better (for instance owing to more suitable soils). Regionally undesirable effects, therefore, need not be a problem at the national level.

For this theme, therefore, there turns out to be no well-tried system available to map out effects and subsequently to assess them for sustainability. That is why it has not proved possible yet to work out this theme into testable criteria and indicators. Moreover for the monitoring of changes in land use information will be needed at different scale levels. An individual biomass producer will not be able to monitor shifts in land use, when those shifts exceed the level of the plantation and its (immediate) surroundings.
Most aspects of this theme must be monitored at higher scale levels (macro level). These aspects are described in section 3.4. In addition to this it is important to ask companies for an obligatory reporting, in which the availability at local and regional levels of biomass for food, energy supply, building materials or medicines, and the relation, if any, with this cultivation for the production of energy is described (see section 3.2.2). These data serve as verification of information from national databases, and to make it possible to assess if locally/regionally undesirable effects occur that cannot be spotted with the aid of macro data.

F.2 Biodiversity
Biodiversity is defined as the variability of living organisms in ecological systems. For this theme 5 criteria have been formulated, each of which have been worked out into testable indicators (minimum requirements) or reportings. Below further information is supplied for each criterion.

Criterion 4.1:
In most countries the protection of biodiversity, has been incorporated, directly or indirectly, into the national laws and regulations. If these regulations are adhered to, many detrimental effects for biodiversity will already be prevented. That is why there must not be any violation of national laws and regulations that are applicable to biomass production and the production area. If violations have taken place, they must have been settled legally.

It must be shown that (i) the national regulations (mentioned in criterion 4.1) are known, (ii) that they are complied with, and that (iii) changes in legislation and enforcement are kept up to date and applied. Further it must be shown that no lawsuits are applicable to the production unit as a result of violations of these laws and regulations.

Criterion 4.2:
Areas protected by the government ('gazetted protected areas') are excluded from the production of biomass to prevent 'recognized areas with a high biodiversity value' from being lost. Also a 5 km zone around the protected areas has been excluded from the production of biomass. This buffer zone is necessary to discourage influences from outside the area. This concerns, among other things, disturbance by entering, use of agrochemicals, noise and invasion by exotic species from outside the production area.

There are two exceptions to this rule, so that the production of biomass may actually take place in areas protected by the government.
1) If the cultivation (of natural vegetation) of the production unit has taken place before 1 January 2007 (or the reference date applying from other certification systems (currently under development)). This exception is made to prevent these cultivated areas from remaining unused while they no longer have any great biodiversity value.
2) If biomass production is part of the management to protect the biodiversity values. By this, areas are meant that owe their great 'historical' biodiversity value to human intervention, such as reedlands and heathlands.

There exist good definitions, documented registers and maps of areas protected by the government, so that verification is possible. The following sources must be consulted to determine where these areas can be found:
- UNESCO World heritage sites (http://whc.unesco.org/en/list/)
- IUCN List of Protected Area's categories I, II, III and IV (http://www.wwf.de/fileadmin/fm-wwf/pdf-alt/waelder/WWF-position_Protected_Areas_03.pdf), according to the list available from 2003 (http://www.unep-wcmc.org/wdpa/unlist/2003_UN_LIST.pdf) or more updated surveys or national data;
- RAMSAR areas (wetlands falling under the Convention on Wetlands; http://www.ramsar.org/), according to the available list (http://www.ramsar.org/index_list.htm) or more updated surveys or national data.

In the future new and better sources may become available. These data will then make it possible to replace the above publications (partially).

Criterion 4.3:
Areas with a high nature conservation value ('High Conservation Value' (HCV)) designated by stakeholders are excluded from the production of biomass to prevent areas with a high biodiversity value from being lost. Also a 5 km zone around the protected areas has been excluded from the production of biomass. This buffer zone is necessary to discourage influences from outside the area. This concerns, among other things, disturbance by entering, use of agrochemicals, noise and invasion by exotic species from outside the production area.

There are two exceptions to this rule, so that the production of biomass may indeed take place in HCV areas.
1) If the cultivation (of natural vegetation) of the production unit has taken place before 1 January 2007 (or the reference date applying from other certification systems (currently under development)). This exception is made to prevent these cultivated areas from remaining unused, while they do not have great biodiversity value any longer.
2) If biomass production is part of the management to protect the biodiversity values. By this, areas are meant that owe their great 'historical' biodiversity value to human intervention, such as reedlands and heathlands.

In many cases the location of these areas is unknown, except if they have already been designated by stakeholders. Therefore local stakeholders consultation must take place to establish if the production unit can be found in an HCV area. If in this context local stakeholder consultation has already taken place, this will have to be proved.

High Conservation Values (HCV) areas comply with the following definitions:

HCV1. Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).
For example, the presence of several globally threatened bird species within a Kenyan montane forest.
HCV2. Globally, regionally or nationally significant large landscape-level areas where viable populations of most, if not all, naturally occurring species exist in natural patterns of distribution and abundance.
For example, a large tract of Mesoamerican flooded grasslands and gallery forests with healthy populations of Hyacinth Macaw, Jaguar, Maned Wolf, and Giant Otter, as well as most smaller species.
HCV3. Areas that are in or contain rare, threatened or endangered ecosystems.
For example, patches of a regionally rare type of freshwater swamp in an Australian coastal district.
HCV4. Areas that provide basic ecosystem services in critical situations (e.g. watershed protection, erosion control).
For example, forest on steep slopes with avalanche risk above a town in the European Alps.

HCV5. Areas fundamental to meeting basic needs or local communities (e.g. subsistence, health).
For example, key hunting or foraging areas for communities living at subsistence level in a Cambodian lowland forest mosaic.
HCV6. Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).
For example, sacred burial grounds within a forest management area in Canada.

For updated surveys of HCV areas for each country refer to http://hcvnetwork.org/practical-support.

HCV areas generally also correspond with the following area categories.

- Conservation International - Biodiversity Hotspots (http://www.biodiversityhotspots.org/xp/Hotspots/)
- Birdlife international - Important Bird Areas (http://www.birdlife.org/action/science/sites/index.html)
- WWF G200 Ecoregions, and within it the vulnerable and critical/endangered regions. (http://www.panda.org/about_wwf/where_we_work/ecoregions/ecoregion_list/index.cfm)
- High nature value farmland. (http://reports.eea.europa.eu/report_2004_1/en/EEA_UNEP_Agriculture_web.pdf)

Criterion 4.4:
Large-scale monocultures must be prevented as much as possible, in view of the low biodiversity level of this type of production. A minimum of biodiversity must, therefore, be protected within the biomass production unit. If the biomass production unit has recently been cultivated (of natural vegetation), the original vegetation must be maintained on 10% of the acreage of the production-unit. In addition to this it must be reported in what kind of land use zone the biomass production unit can be found, and if there is any restoration of degraded areas.

Criterion 4.5:
Biodiversity is also a part of the production unit itself. Small adaptations in the management method can greatly improve biodiversity at the production unit. No exact guidelines can be given for this, since it is very much dependent on the location where the production is taking place. At the production unit good practices will, therefore, have to be applied for the strengthening of biodiversity. Examples of these are among other things, ecological corridors and the prevention of fragmentation. Reporting will have to take place on the 'practices' applied.

F.3 Environment
The environment theme is subdivided into three principles aimed at the aspects of soil, water and air. Each principle has been elaborated into a number of criteria and indicators or reportings. Below, there follows, where necessary, further information for each criterion.

Criterion 5.1, 6.1 and 7.1:
In most countries the protection of the environment has, directly or indirectly, been incorporated into the national laws and regulations. If these regulations are adhered to, many detrimental effects for the environment will already be prevented. That is why there must not be any violation of national laws and regulations that are applicable to biomass production and the production area.
If violations have taken place, they must have been be settled legally.
It must be shown that (i) the national regulations are known, (ii) that they are complied with, and that (iii) changes in legislation and enforcement are kept up-to-date and applied. Further it must be shown that no lawsuits are applicable to the production unit as a result of violations of these laws and regulations.

Criterion 5.1:
In addition the Stockholm convention (12 most harmful pesticides) must at least be complied with, also where national legislation is lacking.
These are the following materials:
1. PCBs, 2. Dioxins, 3. Furans, 4. Aldrin, 5. Dieldrin, 6. DDT, 7. Endrin, 8. Chlordane, 9. Hexa Chlorobenzene (HCB), 10. Mirex, 11. Toxaphene, 12. Heptachlor. (For more information see: http://www.unido.org/doc/29428#pcb.)

Criterion 5.2:
The production and processing of biomass must not be at the expense of the soil and the soil quality. We are talking here about erosion, nutrient balance, soil pollution and salination. Where possible this must be improved.
The standards for erosion and soil quality are location-bound. Therefore there is no guideline that has to be complied with. However, a management / business plan with a strategy aimed at sustainable soil management must be developed and applied. A report on this must be produced covering the following aspects:

Annual documentation of practices used with regard to:

- the prevention and control of erosion
- maintenance of nutrient balance
- conservation of soil organic matter (SOM),
- the prevention of soil salination.

Annual reporting on measurements with regard to:

- soil loss in tons soil/hectare/year;
- N, P and K nutrient balance,
- SOM and pH in the top layer of the soil

Criterion 5.3:
The ecological carbon and nutrients cycle must be maintained for the conservation of the soil and the soil quality. Therefore the use of residual products, produced in the production and processing of biomass, must not conflict with other local functions necessary for the conservation of the soil and the soil quality (organic matter, mulch, straw for housing, etc.).
In addition it is argued that the residual products of the biomass production and processing must be optimally used to prevent unnecessary losses (for instance no unnecessary burning or removal).
The standards for the use of residual products are location-bound. Therefore there is no guideline that has to be complied with. However, it must be reported for what functions the residual products are used.

Criterion 6.2:
The production and processing of biomass must not be at the expense of ground and surface water quality. We are talking here about the use of water for irrigation purposes and water pollution due to the use of chemicals. Where possible this must be improved.
The standards for water quantity and quality are location-bound. Therefore, there is no guideline that has to be complied with. However, a management / business plan with a strategy aimed at sustainable water management must be developed and applied. A report on this must be produced covering the following aspects:

Annual documentation of practices used with regard to:
- efficient use of water,
- responsible use of agrochemicals.

Annual reporting on measurements with regard to:
- use of irrigation water (in litre/hectare/year)
- origin of irrigation water,
- BOD (Biological Oxygen Demand) level of surface water on and near land used for biomass production and processing.

Criterion 6.3:
The production and processing of biomass must not be at the expense of water from non-renewable sources. Non-renewable water sources are, for instance, aquifers. Reporting must take place on the origin of irrigation water or water for the processing industry.

Criterion 7.2:
The production and processing of biomass must not be at the expense of the air quality. The standards for air quality are location-bound. Therefore, there is no guideline that has to be complied with. However, a management / business plan with a strategy to reduce emissions and air pollution must be developed and applied. A report on this must be produced covering the following aspects:

Annual documentation of practices used with regard to:
- waste management
- emission reduction.

Annual reporting on measurements with regard to:
- air emissions.

Criterion 7.3:
Burning when installing or managing biomass production units (BPUs) is prohibited, since it can seriously affect air quality and may lead to large CO_2 emissions.
Burning may only take place, if this is demonstrably the most effective and least damaging way to minimize the risk of damage caused by diseases and pests, as described in ASEAN guidelines or other regional good practices. In these cases it must be proved that the burning is controlled. The application of burning must be reported.

F.4 Prosperity
The basic principle applying to the prosperity theme is that the production of biomass should make an active contribution to the local economy. The theme has been elaborated in one criterion while the request is made to report according to some of the Economic Performance Indicators of the Global Reporting Initiatives (GRI:). In all GRI distinguishes nine indicators (see table F.1). Notably the indicators EC1, EC6 and EC 7 are relevant in the context of obligatory reporting about the economic effects on the local economy (see explanation below). The other indicators are either not applicable, or less relevant or will be dealt with under the well-being theme. These indicators are, therefore, not a part of the reporting.

Table F.1:Economic Performance Indicators of the Global Reporting Initiative. EC1, EC6 and EC7 are part of the reporting for the prosperity theme.

Aspect: Economic performance	
EC 1	**Direct economic values that have been generated and distributed, among which income, operational costs, staff remunerations, donations and other social investments, retained profits and payments to financiers and authorities.**
EC 2	Financial implications and other risks and possibilities for the activities of the organization as a result of climate change.
EC 3	Covering the liabilities in connection with the established payment plan of the organization.
EC 4	Significant financial support from a government.
Aspect: Market presence	
EC 5	Spread in the relationship between the standard starting salary and the local minimum wage in important company locations.
EC 6	**Policy, methods and part of expenditure with respect to locally based suppliers at significant locations of operation.**
EC 7	**Procedures for local staff recruitment and share of the top executives originating from the local community at significant locations of operation.**
Aspect: Indirect economic effects	
EC 8	The development and consequences of investments in infrastructure and services that are primarily offered for the general benefit by means of obligations of a commercial nature, either in kind or pro bono.
EC 9	Insight into and description of significant indirect economic consequences, among which their size.

In the tables below a further explanation is given of the economic performance indicators of the GRI that are part of the reporting: EC1, EC6 and EC7.

Table F.2: Explanation Economy Performance Indicator EC1, EC6 and EC7.

EC1 Direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investments, retained earnings, and payments to capital providers and governments	
Component	**Comment**
Direct economic value generated	
a) Revenues	Net sales plus revenues from financial investments and sales of assets
Economic value distributed	
b) Operating costs	Payments to suppliers, non-strategic investments, royalties, and facilitation payments
c) Employee wages and benefits	Total monetary outflows for employees (current payments, not future commitments)
d) Payments to providers of capital	All financial payments made to the providers of the organization's capital.
e) Payments to government (by country – see note below)	Gross taxes
f) Community investments	Voluntary contributions and investment of funds in the broader community (includes donations)
Economic value retained (calculated as Economic value generated less Economic value distributed)	Investments, equity release, etc.

EC6 Policy, practices, and proportion of spending on locally-based suppliers at significant locations of operation.	
1	Report the organization's geographic definition of 'local'.
2	For the following calculations, note that percentages should be based on invoices or commitments made during the reporting period (i.e., accruals accounting).
3	Report whether the organization has a policy or common practices for preferring locally based suppliers either organization-wide or for specific locations.
4	If so, state the percentage of the procurement budget used for significant locations of operation that is spent on suppliers local to that operation (e.g., % of goods and supplies purchased locally). Local purchases can be made either from a budget managed at the location of operation or at the organization's headquarters.
5	Indicate the factors that influence supplier selection (e.g., costs, environmental and social performance) in addition to their geographic
Definition Locally-based suppliers Providers of materials, products, and services that are based in the same geographic market as the reporting organization (i.e., no trans-national payments to the supplier are made). The geographic definition of 'local' may vary because, in some circumstances, cities, regions within a country, and even small countries could be reasonably viewed as 'local'.	

EC7 Procedures for local hiring and proportion of senior management hired from the local community at locations of significant operation	
1	Report whether the organization has a global policy or common practices for granting preference to local residents when hiring in significant locations of operation.
2	If so, report the proportion of senior management in significant locations of operation from the local community. Use data on full-time employees to calculate this percentage.
3	Report the definition of 'senior management' used.
Definition: Local Local refers to individuals either born in or who have the legal right to reside indefinitely (e.g., naturalized citizens or permanent visa holders) in the same geographic market as the operation. Reporting organizations can choose their own definition of 'local' because, in some cases, cities, regions, and even small countries could be reasonably viewed as local. However, the definition should be clearly disclosed.	

F.5 Social well-being

The basic principle of the well-being theme is that the well-being of the local population and employees must be guaranteed. This theme has been elaborated in 5 criteria, for which indicators or reports have been formulated. Below a further explanation is given.

Criterion 9.1:

Guiding principle for this criterion is the "International Labour Organization Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy", for more information see www.ilo.org. This document is an integration of the major ILO conventions and recommendations in the field of working conditions.

Criterion 9.2

Testing if no violation of human rights is taking place happens on the basis of the Universal Declaration of Human Rights. This is the framework for human rights of the United Nations, for more information see www.udhr.org.

Criterion 9.3

This criterion guarantees that the rights of the indigenous population will be respected. For this the project group has kept in line with FSC and RSPO: FSC 2 and 3; RSPO 2.3. For more information on RSPO, see www.sustainable-palm oil.org, and on FSC, see www.fsc.org.

Reporting 9.4.1 and reporting 9.5.1

To be able to assess the effects on the social circumstances

Table F.3: Social Performance Indicators of the Global Reporting Initiative

Reporting		Social Performance Indicators GRI
9.4.1	SO1	Nature, scope, and effectiveness of any programs and practices that assess and manage the impacts of operations on communities, including entering, operating, and exiting.
9.5.1	SO2	Percentage and total number of business units analyzed for risks related to corruption.
9.5.1	SO3	Percentage of employees trained in organization's anti-corruption policies and procedures.
9.5.1	SO4	Actions taken in response to incidents of corruption.

of the local population reporting will apply initially. The same holds good for the criterion Insight into the integrity of a company. For both reportings the Social Performance Indicators of the Global Reporting Initiative (GRI) are followed. See table F.3 .

Below the Social Performance Indicators will be explained further.

SO1 Nature, scope, and effectiveness of any programs and practices that assess and manage the impacts of operations on communities, including entering, operating, and exiting.

1 Report whether there are programs in place for assessing the impacts of operations on local communities:
   - Prior to entering the community;
   - While operating in the community; and
   - While making decisions to exit the community.
2 Report whether programs or policies define:
   - How data is collected for such programs, including by whom; and
   - How to select community members (individual or group) from whom information will be gathered.
3 Report the number and percentage of operations to which the programs apply.
4 Report whether the organization's programs for managing community impact have been effective in mitigating negative impact and maximizing positive impacts, including the scale of persons affected.
5 Report examples of how feedback and analysis of data on community impacts have informed steps toward further community engagement on the part of the reporting organization.

Definitions

Impacts of operations: This refers primarily to social impacts, such as:

- Community health and safety regarding infrastructure, hazardous materials, emissions and discharges, and health and disease;
- Involuntary resettlement, physical and economic displacement and livelihood restoration; and
- Local culture, gender, indigenous peoples, and cultural heritage.

This definition excludes impacts covered by other Indicators, such as EN10 (water sources/habitats affected by water use), EN12 (areas with high biodiversity value), and LA8 (serious diseases). It also excludes voluntary contributions (in-kind and cash) to communities.

SO2 Percentage and total number of business units analysed for risks related to corruption.

1. Identify business units analysed for organizational risks related to corruption during the reporting period. This refers to either a formal risk assessment focused on corruption or the inclusion of corruption as a risk factor in overall risk assessments.
2 Report the total number and percentage of business units analysed for risks related to corruption

SO3 Percentage of employees trained in organization's anti-corruption policies and procedures.

1. Identify the total number of employees, distinguishing between management and non-management employees, using the data from LA1.
2 Report separately the percentage of total number of management and non-management employees who have received anti-corruption training during the reporting period.

SO4 Actions taken in response to incidents of corruption.

1 Report actions taken in response to incidents of corruption, including:
   - The total number of incidents in which employees were dismissed or disciplined for corruption; and
   - The total number of incidents when contracts with business partners were not renewed due to violations related to corruption.
2 Report any concluded legal cases regarding corrupt practices brought against the reporting organization or its employees during the reporting period and the outcomes of such cases.

Appendix G Benchmark: Comparison certification systems

To find out to what extent the testing framework shows overlap with existing certification systems, a benchmark analysis has been performed[8]. The standards used most that have an overlap with the testing framework developed here for sustainably produced biomass have been compared with this testing framework.
This concerns the following standards:

- SAN/RA: Sustainable Agriculture Network / Rainforest Alliance
- RSPO: Roundtable on Sustainable Palm Oil (currently being developed, criteria have been defined)
- RTRS: Round Table on Responsible Soy (currently being developed, criteria have been defined)
- EurepGAP: Integrated Farm Assurance for Combinable Crops
- FSC: Forest Stewardship Council
- IFOAM: International Federation of Organic Agriculture Movements
- SA 8000: Social Accountability International

The most important results have been included in table 6.5.1. below. In the results a distinction has been made according to three scores:

- Y: (coloured green) means that the criterion involved for sustainable biomass production is fully covered in the standard involved.
- P: (coloured yellow) means that the criterion involved is partially covered in the standard involved. This may be due to various causes such as:
  - Of the various indicators a part is covered and another part is not.
  - The subject addressed by the indicator for biomass does return in the standard involved, but in a less strict form. Thus in the testing framework a 5 km buffer zone is prescribed while SAN applies a 1 km buffer zone.
  - The subject addressed by the indicator for biomass returns in the standard concerned, but is not obligatory. With this the standard concerned does not constitute a guarantee that the indicator is complied with.
- N: (coloured red) means that the criterion involved as a whole is not addressed at all or that the formulation in the standard involved is insufficient to speak of a partial (P) score.

In the first instance the benchmark analysis has been performed at the indicator level and after this aggregated to criterion level. When comparing indicators it has been considered if a specific formulation was sufficiently covered to qualify for a P or Y score. Table G.1 gives a first indication of the extent to which existing standards cover the different criteria of the testing framework for sustainably produced biomass.

8 *Carried out by B. Dehue, Ecofys (December 2006).*

Table G.1 Results benchmark (Ecofys, December 2006)

CRAMER CRITERIA	SAN/RA:	RSPO	RTRS Basel	EUREPGAP	FSC:	SA 8000	IFOAM
1 Greenhouse gas balance							
1a Net emission reduction compared with fossil reference, inclusive of application, is at least 30%. Here a strong differentiation of policy instruments is assumed, in which for instance a better performance would lead to more financial support.	N	N	N	N	N	N	N
2. Competition with food, local power supply, medicines and building materials							
2a Insight into the availability of biomass for food, local energy supply, building materials or medicines.	N	N	N	N	N	N	N
3.1 Biodiversity The installation of biomass production units will not be at the expense of protected or vulnerable biodiversity							
3a No deterioration due to biomass production of biodiversity in protected areas.	Y	Y	Y	N	Y	N	Y
3b No deterioration of biodiversity by biomass production in other areas with high biodiversity value or vulnerability.	Y	Y	Y	N	Y	N	N
3c No installation of biomass production units in regions where biodiversity has recently been decreased due to conversion.	N	Y	Y	N	Y	N	P
3.2 Biodiversity: The management of biomass production units will contribute towards the conservation or strengthening of biodiversity							
3.2a Concrete contribution towards the maintenance or recovery of biodiversity at or around biomass production units in natural	P	N	P	P	Y	N	P
4. Prosperity							
4A Insight into possible negative effects on the regional and national economy.	P	P	P	N	P	N	N
5 Social well-being No negative effects on the well-being of the employees and local population, ta ing into account:							
5a or ing conditions of employees	Y	P	Y	P	P	Y	P
5b Human Rights	Y	P	P	N	P	Y	P
5c Property rights and rights of use	P	Y	Y	N	Y	N	P
5d Insight into the social circumstances of local population	Y	Y	Y	N	Y	P	N
5e Integrity	N	N	N	N	N	N	N
.1 Environment: In the production and processing of biomass, the soil, and the soil uality must be retained or even improved.							
6.1 a In the production and processing of biomass best practices must be applied to retain or improve the soil and soil quality.	Y	Y	Y	P	P	N	Y
6.1 b In the production of biomass crop residues are used for multiple purposes	P	P	N	N	N	N	P
6.2 Environment: In the production and processing of biomass ground and surface water must not be depleted and the water quality must be maintained or improved.							
6.2 a In the production and processing of biomass best practices must be applied to restrict the use of water and to retain or improve ground and surface water quality.	Y	Y	Y	P	P	N	P
6.2.b In the production and processing of biomass no use must be made of water from non-renewable sources.	Y	Y	Y	P	N	N	Y
7. Legislation: Biomass production will take place in accordance with relevant national laws and regulations and international treaties.							
7a No violation of national laws and regulations that are applicable to biomass production and the production area.	Y	Y	Y	Y	Y	Y	N
7b No infringement of relevant international treaties	Y	Y	P	N	Y	Y	P

From the above benchmark it may be concluded that some standards (for instance SAN/RA, RSPO. RTRS Basel and FSC) show more overlap with the testing framework than others. Most similarities between the criteria of the testing framework with comparable standards exist in the field of

- Biodiversity
- Environment
- Social well-being (except integrity)

For the following principles of the working group there exists little or no agreement with the benchmarked standards

- Greenhouse gas emissions
- Competition with food, local power supply, medicines and building materials
- Prosperit















Advice of the project group "Sustainable production of biomass"
Commissioned by the Energy Transition's Interdepartmental Programme Management (IPM)

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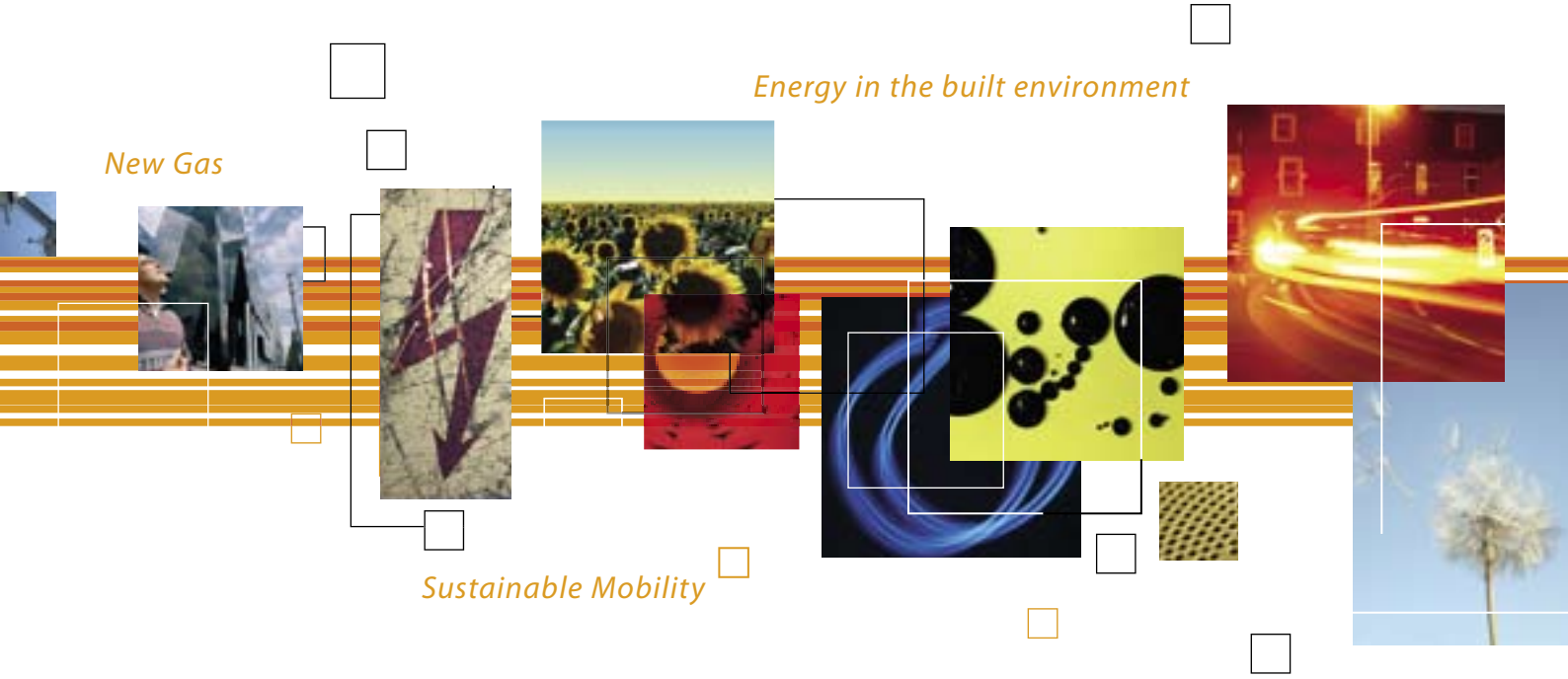
New Gas
Energy in the built environment
Sustainable Mobility