



CBSS EXPERT GROUP  
Sustainable Development – Baltic 21  
9<sup>th</sup> Meeting  
Stockholm, Sweden  
December 5, 2013

## Item 6 Policy recommendations from Bioenergy Promotion 2

Submitted by: Secretariat  
Action requested: for decision

The Bioenergy Promotion 2 project is a Baltic 21 Lighthouse Project and supports sustainable production, commercialization and use of bioenergy in the BSR. The project is the extension of the BSR Bioenergy Promotion project with the aim to capitalize the strategic outputs of the main project into the BSR and national political arenas and into the daily grind of utility companies and local and regional administration.

*Lead partner: Agency for Renewable Resources, Germany.*

*Partners: Baltic Eco Energy Cluster (Poland); Chamber of Agriculture Lower Saxony (Germany); Fachagentur Nachwachsende Rohstoffe e.V. (Germany); Forestry Development Centre Tapio (Finland); Latvian Environmental Investment Fund; Lithuanian Energy Institute; Motiva Oy (Finland); Nordic Energy Research (Norway); Region Zealand (Denmark); Roskilde University (Denmark); Spektrum (Poland) and Swedish Energy Agency.*

During the last two years the project has organized several cross-sectorial and transnational workshops to discuss and implement sustainable bioenergy strategies and facilitate information and knowledge exchange.

The project has also developed actions and instruments on following topics to promote bioenergy:

- Policy development: development of guidelines and recommendations
- Recommendations to CAP, ERDF, EAFRD programming bodies on possibilities of inclusion the incentives for investment into sustainable bioenergy utilization within the new EU operational programmes for 2014-2010
- Regional bioenergy strategies and action plans: development and implementation activities in cooperation with actors in selected demo-regions
- Transfer of experiences to non partner regions: developing recommendations for strategies and actions on mobilizing bioenergy-based development
- Integration of sustainability into corporate strategies of utility companies: cooperation with utility companies operating on regional and on transnational level regarding a possible integration of the Bioenergy Promotion sustainability requirements into their corporate strategies.

The current policy recommendations are presenting a practical approach based on policy paper introduced in the 7<sup>th</sup> EGSD meeting last year and are focusing on the actions to potentially be taken by Baltic 21/CBSS EGSD and the contexts the group members are operating in.

These policy recommendations are now submitted to the CBSS-Baltic 21 for consideration and dissemination in the Baltic Sea Region.

*Experts are expected to **review** the policy recommendations and disseminate them widely in Expert's own organization as well as **give guidance** to the Baltic 21 Unit and the Chair on appropriate next steps.*

## Recommendations on Bioenergy Promotion in the Baltic Sea Region

A policy paper by Partners in the project Bioenergy Promotion 2:

Bjarne Rasmussen, Region Zealand, Denmark

Thomas Budde Christensen, Roskilde University, Denmark

Tyge Kjær, Roskilde University, Denmark

### 0. Introduction

Within the projects Bioenergy Promotion and Bioenergy Promotion 2 there has among others been a focus on how to promote bioenergy solutions in an overall transnational context.

CBSS EGSD is a key player in this respect, and therefore this paper aims at describing a series of opportunities for promoting, developing and implementing bioenergy actions in the Baltic Sea Region, especially those that are relevant to CBSS EGSD.

Several international agendas are interesting in relation to the bioenergy issue, e.g.

- **Green Economy / Green Growth**, which have been developed especially by the United Nations and OECD, and also a multitude of other actors.
- **Resource efficiency** addressing the scarcity of natural resources, a challenge which is driving the EU flagship initiative A resource-efficient Europe.
- **GHG reduction**, counteracting global warming, the major global challenge threatening our survival on the planet Earth.

In all these agendas intelligent bioenergy can play an important role as an integral part of developing solutions. Moreover, bioenergy has the potential to generate multiple benefits related to e.g. environment (air, soil, water, biodiversity), community development, innovation, business development and regional economies.

### 1. Roles in a multilevel governance perspective

The Committee of the Regions of the EU defines the multilevel governance principle like this:

Multilevel governance means coordinated action by the European Union, the Member States and local and regional authorities, based on partnership and aimed at drawing up and implementing EU policies. It leads to responsibility

being shared between the different tiers of government concerned and is underpinned by all sources of democratic legitimacy and the representative nature of the different players involved.

Further the Committee recommends reinforcing the partnership practice, both vertically between “local and regional authorities – national government and European Union” and horizontally between “local and regional authorities – civil society”, particularly in the context of social dialogue.

This multilevel governance principle may also be applied to the field of energy systems and technologies – in order to promote bioenergy solutions in the Baltic Sea Region and carry out the gradual transformation of the present local, regional, national and macro–regional energy systems from fossil–based systems towards renewable energy systems.

In addition to these roles, also the interaction between the administrative levels should be in focus, and relevant participatory processes and practices should be developed in order to ensure involvement of stakeholders and efficient implementation of bioenergy and renewable energy solutions.

Thus it is likely that defining clear roles of key players at the various levels, EU, BSR, nation, region, municipality etc. regarding the development and implementation of renewable energy plans and initiatives, including those dealing with biomass and bioenergy solutions, will enable improved dissemination and implementation of sustainable bioenergy solutions.

### **Applying the multilevel governance principle**

According to the multilevel governance principle there should be a clear division of tasks and responsibilities between the different administrative levels in combination with and supported by vertical cooperation and interaction between these levels.

This might imply that:

- Overall goal setting concerning for example renewable energy takes place at EU level; with Directives and funding programmes as some of the key instruments.
- National goals and renewable energy action plans are developed at national level; financial support and R&D are among the key instruments.
- Strategic energy planning – e.g. as part of regional climate strategies – are developed at regional level; besides strategic planning also business development and regional networking and facilitation are key instruments.
- The implementation of energy action plans, including SEAPs, are carried out at local level; a variety a cooperation models and partnerships, local planning as well as awareness raising and stakeholder involvement processes etc. are among the key instruments.

### **Enabling frameworks must be developed and implemented**

The transition process towards renewable energy systems calls for a variety of new enabling frameworks, such as policies, strategies, action plans, programmes and supporting mechanisms.

And in order to create the wanted impacts it is essential to define, develop and implement a relevant mix of instruments, closely linked to the adopted policies, strategies and action plans etc.

These instruments comprise a.o. regulatory/planning instruments, economic/financial instruments, pedagogic/informative instruments, democratic/cooperative instruments.

## **2. The key roles of bioenergy**

Bioenergy will play a pivotal role in the renewable energy system of the future. This is due to the special features of biomass as a resource that can be stored and regenerated, and by using it for electricity generation it can balance fluctuating energy production from especially wind and solar energy plants.

### **Utilisation of bioenergy should be promoted**

Biomass is utilised for energy production in all regions in the Baltic Sea Region. Bioenergy will play an even more important role in the future in many of the regions, due to the fact that bioenergy can serve as a regulatory factor. Bioenergy will become a key element in many regional energy systems because biomass is storable and bioenergy plants – especially based on gaseous biomass – can balance the fluctuating wind-based electricity production. This variable nature is also the case for solar power installations. The challenge of balancing the fluctuating input from wind and solar energy plants may differ from region to region, but it has relevance to all regions in the Baltic Sea Region.

### **Bioenergy systems should be implemented based on sustainable development principles**

In order to ensure a sustainable development in the regions it is important to apply principles and criteria on sustainable bioenergy production and use, covering issues such as biodiversity, energy efficiency, resource efficiency, climate mitigation (CO<sub>2</sub> reduction), social aspects and economic aspects, and based on the EU directive on renewable energy.

### **Efficient use of bioenergy**

Special attention should be paid to utilizing the limited biomass resource in the most efficient manner possible. Thereby various negative environmental impacts are typically reduced. When mobilizing additional biomass resources, which are not merely residues, leftovers and other forms of waste, such as bioenergy crops it is essential to apply sustainable development criteria and create integrated solutions that ensure multiple benefits of the resource utilization.

### **Bioenergy has multiple benefits**

Among the multiple benefits of bioenergy the following can be mentioned:

- Heat and electricity production
- Transportation fuel
- Flexible energy source
- Reduction of greenhouse gas emissions
- Recycling of nutrients
- Reduction of surface water pollution
- Strengthening of the local economy
- Local job creation

### **Future Energy Systems – a holistic approach ensuring the transition to Renewable Energy Systems**

The global climate change and the limited amount of fossil energy resources available call for a transition to energy systems based on renewable energy. In order to carry out such transition four basic principles are important:

- **System approach:** In order to integrate renewable energy technologies and optimise the investments in the energy systems of the future the energy system should be looked upon as a whole – combining changes with regard to 1) energy resource input, 2) conversion technologies and 3) the end-use of energy.
- **Locally based energy generation:** In order to minimize energy losses the energy production should be balanced locally and regionally.
- **Distributed energy systems, including smart grids.** As the renewable energy sources are distributed by nature the energy systems of the future will have a distributed character, quite different from today's centralized production energy systems. They will include a large amount of decentralized production units. In order to create regulation of production and consumption micro-grids or smart grids will become important elements.
- **Transnational grid connections between the BSR countries** will play a key role in the overall regulation of the energy systems, to avoid energy losses and to ensure energy supply security.

## **3. Exchange of bioenergy resources**

Biomass is in principle a local energy resource, a.o. due to its relatively low energy density and also due to the nature of some types such as manure and slurry, and it can most efficiently be used close to the production site. Yet, different types of biomass are tradeable on a market, regionally, nationally or

internationally– And this may also be necessary in the future in order to shape energy systems based on renewable energy.

To make sure that bioenergy is used as efficiently as possible and in accordance with principles of sustainable development in the whole lifecycle of the bioenergy production chain it may be of importance to establish a certification systems based on the principle of chain of custody.

The EU directive on renewable energy has introduced the lifecycle approach for assessing bioenergy solutions

The sustainability criteria in the renewable energy directive only cover transport biofuels and bioliquids but the directive states that the European Commission should investigate whether such criteria should also cover solid biofuels (such as wood pellets, wood chips and fire wood).

The Commission therefore published a communication report in 2010, the so-called Biomass Sustainability Report COM2010(11), which states that there is currently no binding EU-wide sustainability scheme for solid biofuels, but recommending member states to set up national sustainability schemes based on the same principles and methodology as the ones adopted for transport biofuels and bioliquids.

In the appendix a you find a more detailed description of the market relations and the certification issue.

#### **4. Implementation opportunities**

A number of development and implementation opportunities in the form of cooperation platforms and financial and other promotional instruments are available at the Baltic Sea Region and national level. And they are also relevant to apply to the field of bioenergy solutions. First of all these are:

- EUSBSR action – including flagship projects and Horizontal Actions
- BSR Interreg programmes
- National policies and programmes
- CBSS / Baltic 21 Lighthouse Projects

Besides mobilizing these opportunities it is also important focus on the creation and facilitation of action at the local and regional levels.

#### **Regional climate and energy strategies and local action plans for renewable energy should be elaborated and implemented**

Climate and energy strategies and action plans may form the framework for regional and municipal climate change actions. One example of such planning processes is the SEAP – Sustainable Energy Action Plan – that is a key element in the EU-wide Covenant of Mayors initiative. It is recommended to support this initiative as well as other types of Local Energy Action Plans.

### **Multi-stakeholder involvement should form part of energy planning and action processes**

In order to ensure engagement from the citizens and actors in the region, municipality or community it is recommended to carry out multi-stakeholder participatory processes in combination with various types of awareness raising activities.

### **Facilitation and supporting structures are crucial instruments**

Adequate competences and capacity building are essential to develop and implement local climate and energy plans. These efforts should be promoted and facilitated by supporting structures and activities at national and regional levels. Such activities may comprise training in climate and energy planning, networking and experience exchange among climate and energy coordinators, development of joint projects etc.

## **5. Recommendations for action**

Based on the above description the following opportunities for action to be carried out at macro-regional, national, regional and local levels are recommended:

### **1. Promotion of the Green Growth Agenda.**

Bioenergy is especially well suited for contributing to the creation of a Green Economy / Green Growth, either as an integral part of broader sustainable business development activities, or forming specialized bioenergy business development platforms, clusters and other initiatives.

Action Opportunities – Examples:

- Bioenergy business development programmes / Innovation clusters
- Agriculture/forestry as energy supplier
- Industrial symbiosis – reuse of surplus biomass from one production in another production
- Bioenergy-based innovation aiming at developing new products and services as well as business models along the whole value chain
- Integrated business–community solution – utilization of biomass from industry, forestry and agriculture for local energy supply of both companies and the neighbouring community

### **2. Driver of Local Development.**

Bioenergy has a wide spectrum of opportunities for driving the local development, with regard to both quality of life and economic vitality. Yet, there is a need for innovative and efficient frameworks and instruments in order to unleash this potential.



One key aspect is regional and local (bio)energy strategies and action plans, which can be provided by public authorities in a co-creative process involving key stakeholders.

Another key aspect is related to strengthening entrepreneurship and market development; this focus might go hand in hand with the elaboration of energy plans.

Here the principle of multilevel governance can be unfolded and pave the way for actions that create vertical cooperation as well as horizontal dynamics.

Action Opportunities – Examples:

- (Bio)energy Planning frameworks that efficiently promotes the use of biomass for energy production – provided by the state level
- Facilitation mechanisms – examples: the national level can provide assistance from a task force, or a regional government can support municipalities in developing plans and carrying out implementation actions
- Bioenergy Partnerships – e.g. triple helix or quadruple helix
- Community-based bioenergy initiatives – raising awareness and creating engagement and support among the citizens, and strengthening the local and regional economy
- Pilot and Demonstration projects – on both new or improved bioenergy technologies and more system-oriented solution such as distributed energy systems, smart energy approaches (integrating district heating, power and gas supply)

### 3. Renewable Energy System

In order to develop sustainable = renewable energy systems it is important to carry out careful analyses on possible future energy system designs.

Thereby the whole energy system – composed of three subsystems: resources, conversion, end-use – must be taken into consideration, to ensure the most energy and cost efficient solutions.

This system approach is also a precondition for optimal use of the available biomass resources for energy production.

By reducing the energy need in the end-use, and creating more efficient conversion processes, the need for biomass, which is a limited resource, will be reduced.

Action Opportunities – Examples:

- Creating concrete visions of possible energy futures – for the Baltic Sea Region, a nation, a region, a municipality, thereby addressing the connections to the surrounding geographic areas and energy systems –

both the backcasting approach and modeling and simulation of the energy systems should be used

- Baltic Bioenergy “showroom” – a transnational approach combining knowledge, technologies and other types of solutions across borders
- Testing and demonstration of balancing wind-based electricity production by the means of flexible bioenergy plants
- Testing and demonstration of other combinations of renewable energy technologies
- Testing and demonstration of full scale (smaller) distributed energy systems
- Promotion of integrated solutions, e.g. coupled industrial production, linking industrial surplus energy/resources and the community, bioenergy as part of post-fossil agriculture, multiple use of biomass for energy and other purposes

#### 4. **Baltic Sustainable Bioenergy Certification System**

Biomass is in principle a local or regional resource, which – from an energetic point of view – most efficiently is used close to the production site. Yet, some types of biomass and certain amounts of biomass might be needed in other regions, also in the future. Therefore it makes sense to create some kind of regulation that promotes a macro-regional bioenergy market.

In order to create energy solutions based on sustainable bioenergy the total carbon cycle – or in economic terms: the full value chain – must be addressed. This lifecycle approach, which is in accordance with the EU directive on renewable energy, comprises the biomass production phase as well as all post-forestry/-agriculture phases, i.e. conversion, transmission and end-use.

An initiative in the Baltic Sea Region can get Inspiration from the Sustainable Biomass Partnership (formerly Initiative Wood Pellets Buyers), especially the principles and methods that have been applied.

Thus a certification system should on the one hand as a minimum follow the EU directive on renewable energy, and on the other hand be based on the chain of custody principle.

Preferably the development process should seek to integrate already existing control mechanisms and certification systems in the Baltic Sea Region, and make sure that the best available knowledge is taken into account.

Action Opportunities – Examples:

- Assessment of the benefits of a joint Baltic Sustainable Bioenergy Certification System
- Comparing already existing mechanisms and certification systems, and identifying pros and cons

- Drafting and testing a certification system that covers the whole bioenergy production chain and efficiently promotes sustainable bioenergy solutions in the Baltic Sea Region – e.g. in cooperation with the Sustainable Biomass Partnership

**References:**

The Committee of the Regions: White paper on multilevel governance (2009)  
EU directive 2009/28/EC on the promotion of the use of energy from renewable sources (2009)

## Appendix

### Biofuels trade and markets

#### Liquid fuels

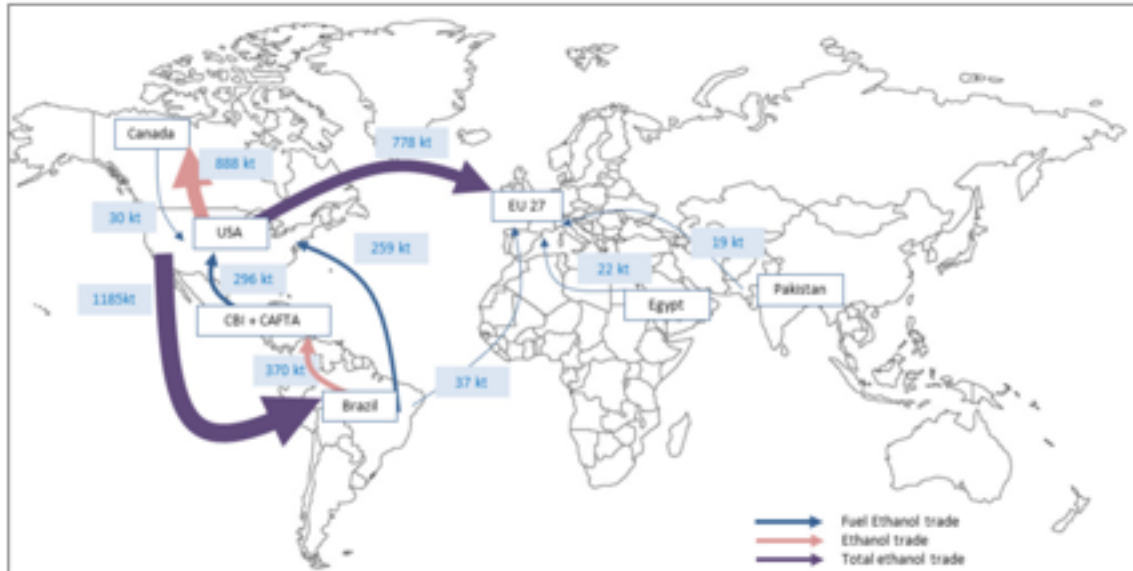
The world market for biofuels has grown significantly over the last decades. The two largest biofuel products in terms of volume in EU are biodiesel and bioethanol, accounting for 70% and 28% of total EU consumption in 2011 respectively. The world biodiesel market is dominated by the EU while the bioethanol market is dominated by the US. The EU consumption has been driven largely by the policy targets decided on EU level and the related public support schemes for biofuels consumed in the transport sector. .

Argentinian biodiesel is the main supplier to EU closely followed by Indonesia.

**Figure 1:** Global biodiesel trade in 2011 (net flow in ktonnes) (assuming energy content = 37.8 GJ/tonnes) (Source IEA 2013)



**Figure 2:** Global fuel ethanol trade in 2011 (net flow in ktonnes) (Assuming energy content = 27 GJ/tonnes)(Source IEA 2013)



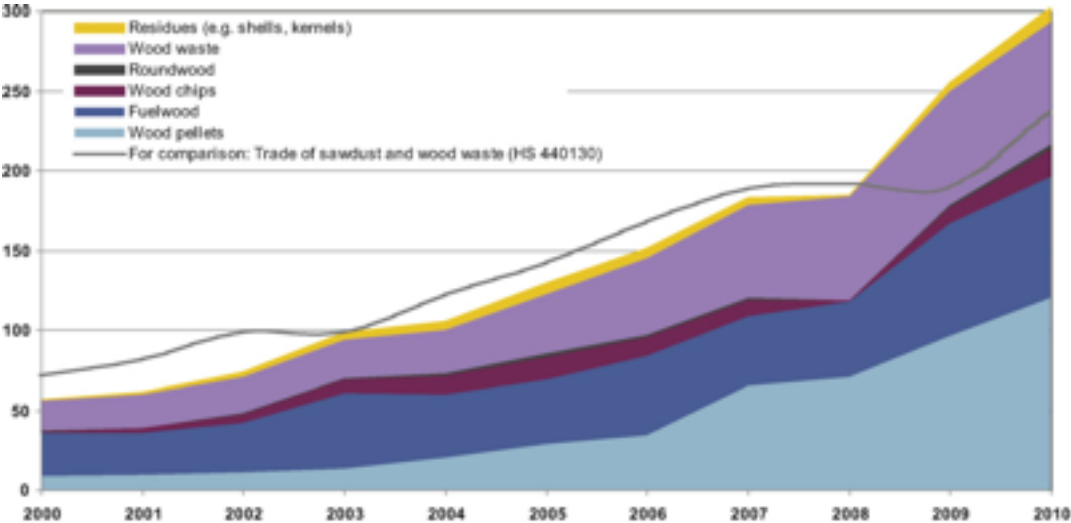
### Solid fuels

The international solid biofuel trade has grown significantly over the last 15 years. Solid biofuel trade grew from 56 in 2000 to 300 PJ 2010 (Lamers et al 2012). The biggest growth can be ascribed to international trade with wood pellets. Pellet trade grew from 8.5 in 2000 to 120 PJ 2010 (Lamers et al 2012).

The figure below illustrates global solid biofuel trade from 2000 to 2011. The figure illustrates a dramatic increase in global wood pellet trade.

Many European member states plan to increase consumption of solid biofuels in electricity and heating sectors in order to comply with policy targets for 2020. This tendency was clearly identified in a survey over renewable energy action plans submitted to the European commission in 2010 (EHC and EEA 2010).

**Figure 3:** Global energy policy related net solid biofuel trade in PJ (Lamers 2012)



The next figure illustrates global wood pellet trade flows in 2011. The majority of wood pellet import to EU (EU27) originates from the US and Canada closely followed Eastern Europe and Russia.

Figure 4: Global wood pellets trade flows in 2011 (ktonnes) (IEA 2013)



An internal market for solid biomass has emerged in the EU. The main products are round wood, wood chips , waste wood and wood pellets.

The three figures below illustrate intra-EU trade of fuelwood, wood chips and wood pellets. An emerging Baltic Sea market for fuel wood and wood chips can

be identified whereas the trade flows for wood pellets seems to be more international.

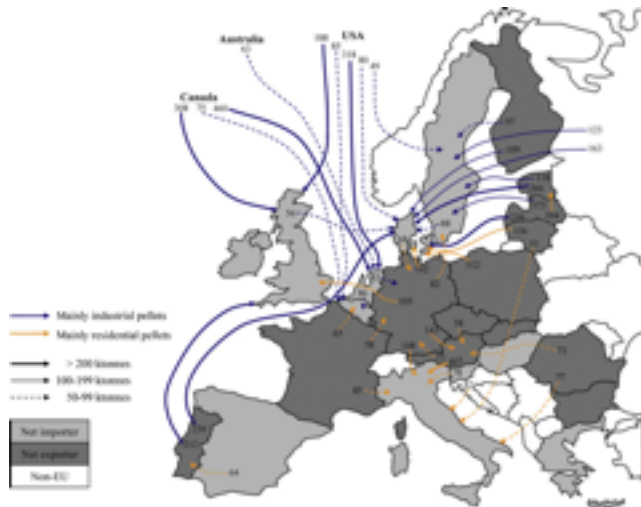
**Figure 5:** EU fuelwood trade streams (>50 ktonnes) in 2010 (Lamers et al 2012)



**Figure 6:** Bioenergy related wood chip trade patterns in 2010 (Lamers et al 2012)



**Figure 7:** Main wood pellet trade streams (>50 ktonnes) in Europe in 2010 (Lamers et al 2012)



## Biofuel certification schemes

Sustainability criteria's for solid biomass has gained increased focus over the last years in policy as well as in businesses. The growing concern is that the increased consumption of biofuel in transport, electricity and heating will cause environmental harm if the biomass is not generated in sustainable managed forest or agricultural systems and if the fossil fuel input to the generation, transport and processing of the biofuel outbalance the net positive greenhouse gas emission benefit if the whole lifecycle of the biofuels is considered.

There exist a variety of different certification schemes for biofuels. These certification schemes can roughly be divided into four main categories:

1. Forest certification schemes: Such schemes usually include principles for forest sustainable management but rarely include sustainability principles regarding the transport and processing of forest products and therefore do not cover lifecycle greenhouse emissions requirements for the whole chain. The most commonly used forest certification schemes are FSC and PEFC
2. Agricultural certification schemes: commonly applied to for example organic food products. These systems rarely includes lifecycle greenhouse gas emission requirements
3. General biofuel certification systems: Most of these have been developed following the implementation of the EU Renewable Energy Directive (2009/28/EC) and include sustainability requirements related to the energy production



4. Wood pellet certification systems: These systems have been setup by utilities in order to standardize wood pellets facilitate international trade with standardized wood pellets. One of the largest organizations, the so-called International Wood Buyers Initiative has also developed a sustainability certification scheme for wood pellets and formed the organization called Sustainable Biomass Partnership

In Europe, a key driver behind the development of biofuel sustainability criteria's has been the adoption of the EU Renewable Energy Directive. The directive aims at increasing the use of renewable energy sources across EU member states with 20% in 2020. The directive also includes a target on 10% renewable energy sources in transport energy consumption. The targets for the share of renewable energy sources are divided between member states and each member state is given an individual mandatory reduction target. The 10% renewable energy target in the transport sector is the same for all EU member states.

The Renewable Energy Directive also includes binding sustainability criteria's for biofuels used in transport and bioliquids used in electricity and heating in order to count towards the mandatory renewable energy targets and to benefit from financial support.

Minimum lifecycle GHG (greenhouse gas) savings of 35% (2017: 50%; 60% for new installations)

- Raw material not to be obtained from land with high biodiversity value
- No conversion of land with high carbon stock (forested areas, wetland, peatland)
- Agricultural raw material cultivated in the EC to comply with Cross Compliance rules
- Complementary reporting requirements (soil, water, air quality, social criteria)

The sustainability criteria in the Renewable Energy Directive only cover transport biofuels and bioliquids but the directive states that the European Commission should investigate whether such criteria should also cover solid biofuels (such as wood pellets, wood chips and fire wood). The Commission therefore published a communication report in 2010, the so-called Biomass Sustainability Report COM2010(11), which states that there is currently no binding EU-wide sustainability scheme for solid biofuels, but recommending member states to

set up national sustainability schemes based on the same principles and methodology as the ones adopted for transport biofuels and bioliquids.

Three European countries have so far adopted legally binding sustainability criteria for solid biofuel following the recommendations from the European Commission. These are: the UK, Belgium and the Netherlands. The sustainability criteria include legally binding minimum lifecycle greenhouse gas emission reduction targets.

### References:

ECN and European Environmental Agency, 2010, Renewable Energy Projections as Published in the National Renewable Energy Action Plans of the European Member States, published October 2010

Lamers et al, 2012: Development in international solid biofuel trade – an analysis of volumes, policies and market forces, Renewable and Sustainable Energy Reviews 16 (2012) 3176–3199

EEA 2013, Impacts of sustainability certification on bioenergy markets and trade, Strategic Inter-Task Study: Monitoring Sustainability Certification of Bioenergy, published February 2013 by the International Energy Agency