BIOMASS FUTURES

Biomass role in achieving the Climate Change & Renewables EU policy targets. Demand and Supply dynamics under the perspective of stakeholders. IEE 08 653 SI2. 529 241

Analysing Bioenergy Implementation in EU Member States: Results from the Biomass Futures Expert Survey

Biomass Futures Policy Briefings

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Content

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Preface

This publication is part of the BIOMASS FUTURES project (Biomass role in achieving the Climate Change & Renewables EU policy targets. Demand and Supply dynamics under the perspective of stakeholders - IEE 08 653 SI2. 529 241, www.biomassfutures.eu) funded by the European Union's Intelligent Energy Programme.

The present policy briefing has been prepared by IEEP as part of the Biomass Futures project. The underlying work has been conducted under Work Package 6 'Support policy makers'. We thank all 18 interviewees that invested their time to be interviewed by us and hence contributed the basis for this report. We also thank Pernille Schiellerup (IEEP) and Calliope Panoutsou (Imperial College) for reviewing the report and Catherine Bowyer for advice on designing the questionnaire (IEEP).

1 Introduction

The EU has set itself ambitious goals to increase the share of renewable energy in its energy mix. By 2020, energy from renewable sources shall make up 20 per cent of gross final energy consumption in the EU according to the Renewable Energy Directive (RED).[1] While a few Member States (MS) are well advanced in meeting their binding national targets, for many others these targets make considerable efforts in stepping up renewable energy indispensible. According to the Directive, Member States were asked to submit National Renewable Energy Action Plans (NREAPs) to the European Commission by the end of June 2010. These plans serve as pathways in which Member States lay out how they envisage meeting their individual targets. According to analyses of the NREAPs, bioenergy will be the main contributor to meeting the EU renewable targets. In particular, biomass will make up 19 per cent of total renewable electricity in the year 2020, 78 per cent of total renewable heating and cooling in 2020 and 89 per cent of total renewable energy in transport. Taken together this would lead to a bioenergy share out of total renewable energy use of over 50 per cent.[2]

The goal of the Biomass Futures project is to analyse the role that sustainable bioenergy can play in contributing to the EU's renewable energy targets. This involves the spatial identification of biomass supply and the estimation of biomass cost-supply curves as well as the macroeconomic modelling of bioenergy demand and supply taking into account market developments in the EU and beyond. Another pillar is the engagement with policy makers throughout the course of the project in order to validate scenarios and results on the one hand and to identify needs and provide them with support on the other hand.

The present report contains a detailed analysis of the outcomes of an expert survey that has been conducted with representatives from mostly Member State public administrations in the context of the policy engagement work of the Biomass Futures project. The main aim of the expert survey is to identify in detail implementation challenges in relation to bioenergy policies, how these are overcome, and which research needs arise from these challenges. In order to clarify these issues, the survey has been mainly addressed at Member State policy makers.

The next section introduces the goals of the expert survey and explains the set up. Section 3 analyses the responses given and is structured into five subsections according to five thematic sets of questions in the questionnaire. Section four concludes by presenting the key issues raised.

2 Methodology and set up of the expert survey

We have conducted 18 interviews in the period 20 January 2011 to 25 February 2011, with three written responses out of the 18 received up to mid-March 2011. We have mainly focussed on Member State representatives. An additional interview with the responsible desk officer for bioenergy in the European Commission (DG ENER) helped to gain the wider EU perspective. In the case of some Member States, we have interviewed representatives of research institutes instead of ministry representatives. This was due

[1] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, OJ L140/16, 05/06/09.

[2] These figures are taken from http://www.ecn.nl/docs/library/report/2010/e10069_summary.pdf. Another valuable report based on the 23 NREAPs available at the time of drafting is Atanasiu (2010), *The role of bioenergy in the National Renewable Energy Action Plans: a first identification of issues and uncertainties*, (http://www.ieep.eu/assets/753/bioenergy_in_NREAPs.pdf), which focuses on analysing the bioenergy information contained in the NREAPs.

to either unavailability of ministerial staff and/or personal contacts to staff in research agencies that are known to be particularly knowledgeable in the field of bioenergy development in their respective Member State. A list of interviewees is provided in appendix 2.[3] As already outlined in a previous Biomass Futures report introducing the expert survey[4], Member States were selected with the aim of achieving representativeness along the following dimensions:

- State of development of Member States' bioenergy industries;
- large versus small absolute bioenergy use;
- old versus new Member States;
- geography.

Appendix 3 provides a chart that conveys information on the first two dimensions. Based on NREAP information (as submitted by October 2010), the chart displays actual 2010 bioenergy use, projected increase by 2020 and thus projected total 2020 bioenergy use.

We have managed to arrange interviews with all Member States we planned to interview according to the previous report (footnote 4) except for Bulgaria.[5] We added Slovakia and Latvia to the list of interviewees. Out of the 18 interviews, three are in fact written responses to the questionnaire as this was the preferred option of response by France, Poland and Italy. The interviews have been conducted by Bettina Kretschmer from IEEP over the phone, with support from Sophie Bennett.[6] The interviews were of a semi-structured nature consisting of a questionnaire with five thematic sets of questions that are reproduced in appendix 1 of this report. This approach allowed the interviewer to emphasise certain questions over others depending on the expertise and responses of the interviewee as displayed in the course of the interview.

The questionnaire (appendix 1) is set up around four main areas of questions which have been identified as of particular interest in addition to a first set of more generic and broad questions. Before proceeding to the analysis of results per set of questions, a few sentences on the rationale underlying each set of questions follow:

First and as an introduction to the issue and to familiarise interviewer and interviewee, we pose a set broad and generic questions about bioenergy.

Second, we investigate the national response to the EU Renewable Energy Directive, eg which policies have been adopted in response to EU legislation. These questions are included to shed light on how prepared a Member State is to implement bioenergy targets and which are major challenges in achieving implementation. This includes the identification of policy instruments or mechanisms that are deemed crucial for successful implementation. It also includes a question on whether Member States strategically plan bioenergy development by identifying demand for and supply of bioenergy sources and aiming to match the two.

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[3] Some interviewees asked to remain anonymous in which case we only include the Member State/Ministry in appendix 2.

[4] The mentioned report is available at: http://www.biomassfutures.eu/work_packages/WP6%20Policy/Biomass_Futures_D6.2_Involvement_and_exchanges_with_policy_makers.pdf

[5] We spoke, however, to a representative from the Bulgarian Ministry for Economy, Energy and Tourism after the analysis was completed to receive her comments and additional remarks, see appendix 4. The reason for this was the need to file a written request to the Minister asking to authorise an appropriate policy officer to act as our contact person.

[6] Intern at IEEP at the time of the expert survey.

A **third** set of questions enquires about Member State cooperation. Cooperation can be of particular importance for securing sufficient sustainable bioenergy supply to meet targets but also for sharing best practices. The existence of the RES concerted action groups points to cooperation taking place. Also, cooperation among Member States could be formally undertaken in the form of statistical transfers or joint projects in correspondence to Articles 6 and 7, respectively, of the Renewable Energy Directive. In questions 3.2 and 3.3 the interviewee is asked about the existence of cooperation and whether the MS in question participates. The remaining questions extract information on how far the interviewee is aware of developments going on in other Member States and more specifically whether best practices are shared across the different cooperation mechanisms. This is meant to give an idea about the working of and the effects Member State cooperation actually has.

A **fourth** set of questions about different bioenergy technologies aims at revealing the motivations given by policy makers for choosing one bioenergy technology/pathway over another. It will be interesting to see which those drivers are in order to understand whether or not they are likely to lead to an efficient use of biomass resources and of the corresponding inputs needed such as land, water and energy.

Fifth and finally, a set of questions on 'Moving forward' identifies on the one hand immediate needs in terms of implementation and on the other hand the future importance of bioenergy as a renewable energy source. The insights from this section would inform Biomass Futures work in terms of which stakeholders and topics to target as part of work package 7 (especially Questions 5.3 and 5.4) and in the context of drafting support materials for policy makers under work package 6.

3 Analysis of responses per set of questions

3.1 General perception of bioenergy

We first asked a few broad questions about assessing bioenergy's importance, main benefits and risks associated with bioenergy development and the main actors involved in this development.

The **importance of bioenergy** was generally seen as being high. This does not come as a surprise given the figures retrieved from the NREAPs, according to which bioenergy is anticipated to account for more than half of all renewable energy by the year 2020. All respondents mentioned that bioenergy is and will be of high importance for reaching their national renewable energy target by the year 2020. Three out of 18 respondents (UK, AT, SE) mentioned already at this stage that while bioenergy is crucial for reaching the 2020 target and may remain the most important renewable energy source in absolute terms beyond 2020, its relative importance is likely to decrease as we move on towards 2050 and a more radical decarbonisation of energy supply. It was suggested that bioenergy will be important in reducing dependence on other fossil energy sources thereby increasing energy security and reducing carbon emissions – this is seen as especially important as fossil fuels dwindle and the hydro potential in some countries is exhausted.

In relation to **risks and benefits**, the following table summarises the responses given and also illustrates the frequency of responses. Generally speaking, almost all respondents referred to the widely discussed environmental sustainability risks, such as increased use of land, increased competition for both land and biomass resources etc. Liquid bioenergy was in particular emphasised in the sustainability risk context by three respondents. It was, however, also mentioned that while liquid bioenergy entails greater sustainability risks currently, solid biomass might 'catch up' in a negative sense and pose increased sustainability challenges as its use increases. Environmental issues clearly dominate the responses given for risks of bioenergy. Also, almost a third of respondents highlighted the need for technological improvements such as increasing conversion efficiencies and bringing forward new technologies. Environmental considerations also dominate the benefits that respondents associate with bioenergy. Respondents most prominently mentioned the fact that bioenergy is a renewable energy source mitigating greenhouse gases. Economic benefits are stressed by respondents as well and in a

similar spirit two respondents pointed at bioenergy being a dynamic and innovative sector with scope for technological advancement. Hence technological advancement is seen as both an opportunity for future benefits as well as an essential strategy to mitigate risks. Another economic aspect mentioned by four respondents is greater energy self-sufficiency and lower or less fluctuating energy prices.

Table 1. Risks and benefits mentioned by respondents ranked by frequency

	Benefits	Risks
8-10	Renewable and potentially sustainable energy source, replacing fossil fuel and mitigating greenhouse gas emissions (10) Socio-economic benefits (employment, investment, infrastructure, farming and forestry sectors) / Contribution to the 'bio-based' economy / productive use of land (8)	Sustainability risks (natural habitats, biodiversity, bioenergy lifecycle emissions) from increased demand for (crop)land and other natural resources, including indirect effects (9)
5-7	Storage and transport, flexible use (also in sectors where few/no low-carbon alternatives exist) (6)	Limited resource: Competition for biomass between energy, industrial and food sector (7) Inefficient conversion, unavailability of certain technologies: bioenergy used unsustainably and not competitive with fossil fuels (5)
2-4	Energy self-sufficiency and potentially lower energy prices / reduced exposure to energy price fluctuations (4) Allows for residues to be used rather than wasted (2) Dynamic, innovative sector with scope for technological improvement (2)	Further environmental risks: reduced air, soil, and water quality (4) Deforestation risk and enhanced LULUCF emissions (3) Increasing raw material / food prices (3) Potential tension with waste policy / driving up the price of waste (2) Uncertainty about sustainability of imports (2)
Single response	Environmental benefits (eg improved soil and water conditions) (1) Improving forest conditions (biomass harvesting 'cleans up') (1)	Increased electricity prices (1) Neglecting the need for energy savings and the development of other renewable sources with too much focus on bioenergy (1) Limited public acceptance as a result of sustainability concerns (1)

Note: Numbers in brackets indicate the frequency of given responses.

Concerning **main actors**, the role of public support was stressed with the government (EU / national (and lower-level) governments) being mentioned as the main **demand** driver by setting renewable energy targets. It is understood that bioenergy development would not take place without government support. Other demand drivers mentioned:

- oil price development (or resource prices more generally), which plays a role but would be of little use in the absence of simultaneous government intervention;
- power suppliers (one respondent mentioned that those tend to see bioenergy development as a threat), private and public end-users, industry and other large energy users, but also municipalities as key consumers;
- the R&D sector plays a potentially important role in bringing about now technologies and hence opening up new bioenergy markets.

On the **supply** side, the following sectors were mentioned as main actors:

- agriculture and forestry / wood processing, or in other words the suppliers of raw materials;
- waste management;
- industries that produce residues that are used as raw material and use them for process heat eg pulp and paper industry.

Due to the magnitude of actors involved, one respondent called bioenergy development a 'multi-stakeholder process'. In relation to scale it was mentioned that while the electricity and transport sectors are dominated by large energy companies, the heat sector is more dispersed with many small generators, making it more difficult to regulate as a consequence.

3.2 National policy response

In the next part we asked about the national response to the EU Renewable Energy Directive, eg which policies have been adopted in response to EU legislation and which mechanisms are deemed to be the most important ones for ensuring compliance with RED derived targets. Also, we inquired about the main implementation challenges in relation to bioenergy and how or whether strategic planning addresses bioenergy supply and demand.

On the **policy framework before and after the RED**: Many Member States indicated that some policies had been in place prior to the RED so that the RED rather triggered changes to existing policies. Alternatively, certain elements of the renewable policy framework were in place but others were added (eg renewable obligations, blending obligations for biofuels, feed-in tariff schemes). In Germany, most changes to existing policies were mainly of a formal nature while the most significant substantive changes brought about by the RED were the implementation of the biofuel/bioliquids sustainability scheme.

Two countries (among them Austria) explicitly mentioned that the RED has changed the dynamics in the bioenergy sector: The RED determines all that is done with all efforts in the renewable policy arena oriented towards meeting the RED target. Also, renewable energy sources and targets are taken more seriously and binding targets facilitate motivating the industry to advance renewable energy markets. In Poland, the development of the use of renewable energy sources has become one of the priorities of Polish energy policy. The European Commission has confirmed this impression in its recent communication on the progress towards the 2020 renewable energy targets[7]: It establishes that there is a key difference in the development of the policy frameworks in MS now as compared to the time when directives 2003/30/EC and 2001/77/EC only stipulated indicative targets for the transport and electricity

[7] Communication COM(2011) 31 final of 31. January 2011 from the Commission to the European Parliament and the Council on Renewable Energy: Progressing towards the 2020 target, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0031:FIN:EN:PDF.

sectors. As stated in the communication, the latter indicative targets for 2010 are unlikely to be met and it is the binding targets of the RED that have brought about enhanced efforts in MS.

Concerning the most **important policy mechanisms,** the respondents mentioned a range of instruments, as it depends very much on the MS which instruments work best within its boundaries as ascertained by the Commission. As a consequence, the Commission's recent progress report has not recommended the harmonisation of support schemes; it emphasised rather strongly, though, that MS should introduce stable and certain support schemes so as to provide security and certainty to investors.

The following instruments grouped by sector were mentioned by the respondents:

Table 2. Renewable energy policy instruments[8]

Electricity	Heat	Transport
Feed-in tariffs; Green certificates system; Renewables obligations; Investment support scheme for (small) installations.	Tariffs for anaerobic digestion as combined heat/ power to boost renewable heat; Installation payments/grants; Renewable heat requirements for (new) buildings; Bonus for using process heat; Making support conditional upon combined heat-power (CHP) deployment.	Biofuel obligations; Tax exemptions; Incentives for promoting 'green cars'.

Additional instruments beyond the upper grouping that were mentioned: Slovakia has introduced feed-in tariffs for the injection of biomethane into the gas grid (support for 15 years), believed to be the first of its kind in the EU (the recently introduced Renewable Heat Incentive in the UK also contains tariff support for biomethane grid injection, see below). The promotion of public private partnerships was mentioned in relation to energy infrastructure.

Development in the heat sector is typically recent and ongoing, with several respondents mentioning the need for enhanced incentives. One respondent mentioned the existence of 'discrimination' in policies between the heat and electricity sectors: while the latter is formally supported, no incentives are granted in the heat sector. As the RED was the first EU harmonised approach to also include the heat sector in binding renewable targets, this sector is a good example for policies still evolving as a response to the RED. An example is the UK Renewable Heat Incentive introduced in March 2011 providing one-off installation support as well as a renewable heat tariff scheme.[9]

The **main challenges in meeting bioenergy targets** in MS are grouped into several categories and are summarised in the table below.

[8] For a detailed assessment of renewable energy policies in Member States, the interest reader is referred to the REPAP2020 project funded under the IEE programme: http://www.repap2020.eu/.

[9] A detailed analysis of the NREAPs by Member State including a compilation of measures adopted by MS is undertaken as part of the REPAP2020 project, see: http://www.repap2020.eu/fileadmin/user_upload/Roadmaps/Assessment_of_NREAPs__REPAP_report_-_interim_status_.pdf. The REPAP2020 project (www.repap2020.eu) is funded under the Intelligent Energy Europe programme.

Table 3. Main challenges in meeting bioenergy targets

Resource related challenges
• *Biomass supply constraints* were listed as a major challenge by most respondents with an exception of Romania (vast untapped potentials) and forest-abundant countries (though one respondent (FI) mentioned a diminishing trend for domestic forestry industry production, reducing residues used in energy sector).
• *Imports* are hence needed especially in the transport sector but also in others, eg for co-firing.
• Different *strategies* to increase domestic supply were mentioned:
  ○ Mobilise the agricultural sector to deliver energy markets;
  ○ Choose biomass sources with higher energy yields/hectare;
  ○ Energy crop development (IE, ES): One respondent (DE) mentioned that farmers are reluctant to commit to growing eg short rotation coppice and hence supply a politically created bioenergy market especially with high and rising prices in traditional agricultural markets;
  ○ Increased use of residues (DE): It was mentioned, however, that the mobilisation of waste/residue resources is costly and their potential to replace agricultural biomass limited;
  ○ Increased use of wood biomass (DE) / fostering forest biomass supply chains (FR).

Sustainability challenges • The balancing of biomass material needs and various *sustainability concerns* is perceived of as a major challenge by the majority of respondents, the focus being on environmental sustainability. • The implementation of the sustainability scheme was mentioned as a challenge (PT, DE, IT). The *lack of recognised voluntary schemes* (at the time of the interviews) was specifically pointed out by three MS as a major challenge for complying with the sustainability scheme (PT, DE, IE). • The fact that the RED/sustainability scheme still contains loopholes (ILUC, highly biodiverse grasslands, definition of waste) creates compliance challenges and uncertainty. • The perceived need for imports to reach targets raises *concerns about the sustainability of imported biomass*. Three (among them DE, PL) MS explicitly mentioned the need for binding criteria for solid and gaseous biomass.[10]
Economic/technical/market challenges • Rising *land prices* driving up feedstock prices and hence bioenergy costs. • Another *economic crisis* discouraging investment would hamper RE development. At the same time economic growth leading to increased energy demand poses a challenge to meeting RED targets. • The *grid integration* of renewables to both electricity and gas (biomethane) grids poses technical and regulatory challenges. • There is a need for *advancing the heat market* in terms of investment volumes and technological development. • Improving *conversion efficiency*: It was mentioned that currently a lot of wood co-firing is done under low conversion efficiency; also, low conversion efficiencies are characteristic of a large

[10] Note that we did not explicitly ask for their position on harmonised sustainability criteria for solid and gaseous biomass. In other words, the two MS mentioned are only those that underlined the need for binding criteria on their own initiative. For a stakeholder questionnaire focussing on this issue that has been conducted as part of the EUBIONET III IEE-project, see: van Dam, J and Junginger, M (2011), Striving to further harmonization of sustainability criteria for bioenergy in Europe: Recommendations from a stakeholder questionnaire, *Energy Policy* 39, pp4051–4066. A large majority of their respondents (81 per cent) spoke in favour of harmonisation.

share of biomass-based heat generation.

- Small biofuel producers are expected to face economic challenges from additional *costs associated with certification*.

Policy challenges

- Continued *financial support* for renewable energy will be a challenge in times of tight public budgets.
- At the same time, *stable policy support* is deemed crucial to provide for investment certainty.
- One respondent stated that the projections on bioenergy deployment as mapped out in the NREAPs are based on *weak statistics* and there is a lack of scientific studies backing the outlined pathways so that bioenergy development remains a 'black box' and will pose great challenges to politicians to reach the *a priori* formulated pathways.
- Weak *public acceptance* (mainly driven by sustainability concerns, 'food versus fuel' debate but also 'NIMBY', ie 'not-in-my-backyard' attitudes and prejudices about the competitiveness of renewable versus fossil energy sources). This potentially endangers the interest of investors and suppliers.
- Top-down imposition of targets was mentioned by one respondent (IE) as setting difficult constraints for MS, stating in relation to biofuels that MS may choose not to deliver and pay consequent fines instead.

On the question of **strategic planning in Member States** to address demand and supply needs, responses can be roughly divided into three camps:

- A group of three respondents says there is no strategic planning stating that bioenergy development is left to the market within the existing policy support framework (among them DE and FI; this does not come as a surprise as both have well developed markets already).
- Another group of eight respondents confirms that there is strategic planning which involves different departments/ministries. This is believed to make policy formulation and planning complicated but it is also believed to be necessary given the nature of bioenergy involving various sectors (IE, PT, HU, SK, LT, LV, IT, FR, PL). Lithuania mentioned that the Renewable Energy Law to be adopted will shift some competencies to the municipality level. Next to the renewable energy action plans and multiannual investment programmes, France employs regional 'climate-air-energy' schemes as a regional planning tool.
- A third group of three respondents mentioned the NREAPs in the context of strategic planning, but stated that these contain the broad direction of renewable energy development but no detailed planning (RO, ES, AT).

Half of respondents indicated that their national public administration engage in bioenergy planning processes. It can safely be assumed, though, that 'planning' is understood differently in the different national contexts and that the MS in the second category above display a considerable range of activities in this respect. Also, the National Renewable Energy Action Plans could be seen as a process that makes a considerable degree of planning mandatory for each Member State.

3.3 Member State cooperation

With the third set of questions we investigated Member State cooperation. Given the fact that a majority of respondents have listed supply shortages as a challenge, cooperation between Member States could be of relevance for securing sufficient sustainable bioenergy supply to meet targets but also for sharing best practices. The existence of the RES concerted action groups points at cooperation taking place. Also, cooperation among Member States could be formally undertaken in the form of statistical

transfers or joint projects in correspondence to Articles 6 and 7, respectively, of the Renewable Energy Directive.

We first asked in **how far the interviewee is aware of strategic planning going on in other Member States** in order to get an idea about how informed representatives from one MS might be about developments in other MS. The majority of MS interviewed were not aware of strategic planning going on in other MS. An exception is regular discussion between Ireland, Northern Ireland, and the UK, however, there is no coherent market for material between the UK, IE, and the rest of Europe. AT mentioned that some information is gained from discussions on sustainability criteria and the Finnish representative claimed to be informed about policy instruments in other MS from European Commission reports. Some mentioned that they have a certain level of knowledge about developments in other Member States but this is not gained from formal government cooperation. These responses hint at limited cooperation actually taking place.

On **cooperation between Member States**, there are different forms of 'soft' cooperation within the EU and internationally, particularly in relation to sustainability criteria but not exclusively. Intra-European biomass trade could be seen as a form of cooperation between Member States. Of interest here was, however, rather the use of the formal cooperation mechanisms of the RED. No Member State reported on already concluded agreements in relation to the cooperation mechanisms of the RED (joint projects and statistical transfers). Also, the EC is not aware of the use of cooperative mechanisms in relation to bioenergy; in fact, only two MS plan to use them at all in relation to other forms of renewable energy according to the recent Communication (COM (2011) 31). Studies have demonstrated the cost-saving potential associated with the use of the cooperation mechanisms and hence more widespread use of them would be welcomed.

It should be noted, though, that the cooperation mechanisms present a new policy tool whose potential and operation first need to be properly understood by Member States. Responses suggested that Member States take first steps in order to investigate potential opportunities, either by initial contacts between Member States or by initiating studies: Both Lithuania and Latvia mentioned that they have been approached to potentially offer surplus renewable energy. Latvia mentioned in this context that the fulfilment of its own target currently takes priority. The UK mentioned that they are currently investigating the potential for joint projects under the RED (and also in the context of reducing emissions via *Joint Implementation* under the Kyoto Protocol) for all renewables without any concrete projects being currently underway. Also Lithuania currently prepares a study on the potential use of cooperation mechanisms and bioenergy is seen as an important field. It was mentioned that the Spanish NREAP contains some measures related to the sourcing biomass, but no cooperation currently takes place.

Four respondents stated that they were not aware of cooperation. A majority of respondents did mention soft cooperation mechanisms including the following in addition to some formal cooperation in the Nordic countries (some might have been discontinued in the meantime):

- The MS concerted action group in relation to the RED;
- The Renewable Fuels Regulators Club (REFUREC), providing a platform for discussing cross-border issues associated with the biofuels market in the EU and beyond;
- Cooperation via the European Biomass Association (AEBIOM) and the European Renewable Energy Council (EREC);
- Various Intelligent Energy Europe (IEE) projects on bioenergy/biomass markets to eg identify obstacles to cross-border trade in central and Eastern European countries;
- European Industrial Bioenergy Initiative (EIBI) comprised of industry, Member State and European Commission representatives;
- Cooperation between Nordic and Baltic countries in the context of the 'Nordic market for energy' including cooperation on the industrial and municipality level;

- Cooperation among Baltic countries;
- Cooperation between SE and NO to produce a single Green Certificate Scheme;
- Cooperation between AT, DE, Scandinavia, and NL on biomethane development;
- Cooperation between several Member States on sustainability criteria for solid and gaseous biomass;
- Informal/loose cooperation between ministry officials or technical experts from the respective energy (research) agencies;
- International cooperation on the standardisation and sustainability of biofuels and bioenergy (eg CEN, GBEP, ISO);
- Cross-border cooperation within the bioenergy industry (the example of a Hungarian ethanol plant to be partly supplied by Romanian corn was mentioned).

One potential form of cooperation is the **dissemination of best practices** across Member States. In terms of what representatives see as being best practices developed in other Member States, it was mentioned explicitly by one respondent that countries with vast biomass resources set good examples (eg Scandinavia, AT, DE); the same respondent stressed that every country's conditions are different so that there is limited applicability/transferability of best practices. In addition, the following specific aspects were mentioned, partly reinforcing the view that countries that are biomass-rich and/or have well developed bioenergy policies and markets set best practice examples:

- Austria and Sweden have good supply mechanisms in place that operate in a sustainable way, especially with regard to forestry schemes; they also show strong technology development;
- Finnish scientists have a strong role in promoting technologies for forestry resources;
- Germany was mentioned as being generally ahead in renewable energy development;
- the UK and Germany were mentioned as being ahead on sustainability criteria and procedures;
- Sweden is strong in efficient energy recovery from biowaste, bio-refinery (deriving various products including energy sources from forest biomass), district heating, wood pellets, etc;
- Netherlands was mentioned for having efficient co-firing technology in place;
- Italy sets good examples for the use of agricultural residues for bioenergy production.

The other aspect retrieved here was whether and **how best practices are actually communicated**. There does not seem to be a lot of formal dissemination activity. It is partly at the initiative of Member State officials to inform themselves. It was also mentioned that more action in this respect can be found in relation to renewable electricity. The concerted action groups and REFUREC and EU projects such as the Biograce project as well as the RED comitology committee were mentioned as forums for information exchanges; one respondent (SE) mentioned explicitly the latter as a very useful forum for exchanging experiences and would wish for more frequent meetings of this kind. Another respondent (DE) mentioned ongoing dialogue with other Member States on the implementation of the sustainability scheme. Discussions among several MS on a quality management tool related to biomass heat plants were mentioned by another respondent (AT). It was also said (HU) that there is dissemination via eg AEBIOM and EREC but enhanced efforts in relation to dissemination and enhanced technology transfer would be beneficial. It would also be useful to develop a more EU integrated approach and define spatially explicit indicators on the best resource – bioenergy production system matches.

When respondents considered **which Member State is most prepared** in terms of bioenergy development, there was an emphasis on Nordic countries, with their abundance of forestry resources and large forest industries as a major source of biomass. Respondents often also cited their bioenergy technological development as among the most advanced. Sweden in particular was cited the most frequently by respondents on this question. France, the highest user in absolute terms, was singled out

for its well developed use of rural, small scale applications. Finland, with the highest bioenergy use per capita, was mentioned for successfully establishing bioenergy sources of low cost such as efficient industry and large scale CHP. Respondents suggested that Germany is successful in making best use of its biomass potential.

On technological capability, it was suggested that Scandinavian countries and Austria are well placed in terms of infrastructure (widespread small scale district heating and small scale CHP), while the Netherlands and Denmark were praised for making good use of waste resources. Denmark was said to lead in technology in this area. Austria was furthermore praised for giving bioenergy a 'prestigious' image ie making it desirable to have a 'modern, computerised biomass boiler at home'. Overall, however, there was agreement that this question depended on the MS and its main resources: given that some are more reliant on forestry/agricultural biomass, with others already advanced in exploiting residues.

All in all, it appears that those Member States that are mentioned as best prepared are also associated with particular best practices worth sharing across Member States. The forms of cooperation mentioned indicate that there is quite a bit of soft cooperation (most notably on sustainability related issues) while more formal cooperation is largely lacking. If individual respondents are well informed about developments in other Member States, this was partly due to the proactiveness of particular policy officers. A few respondents mentioned that more fora for cooperation and exchange among Member States would be beneficial.

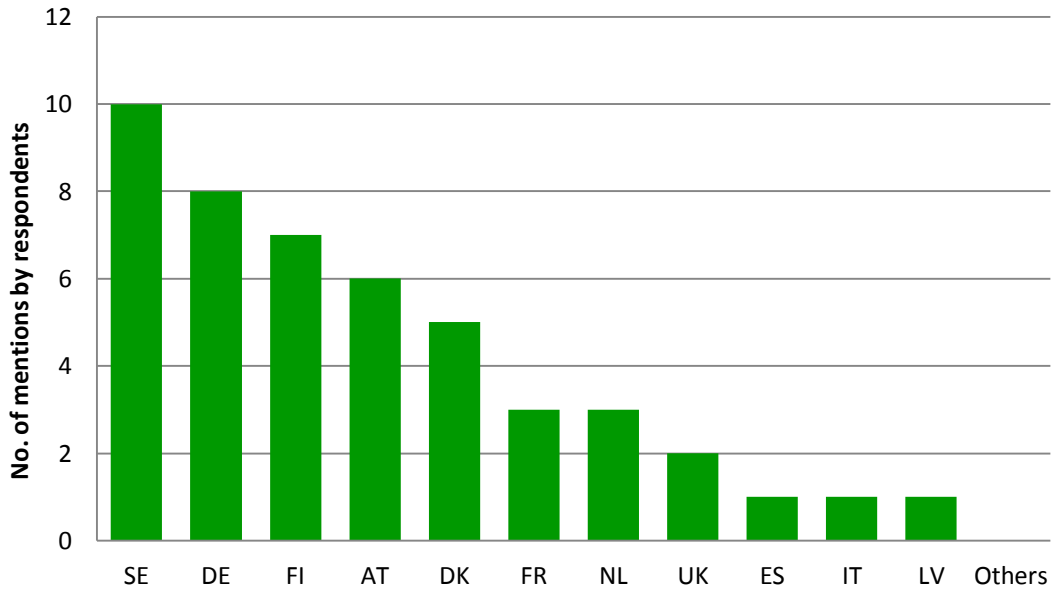


Figure 1. Frequencies of responses to the question 'Which Member State do you consider to be best prepared?' Note that multiple answers were possible; for the response 'Scandinavia' a point was attributed to Finland, Sweden and Denmark each.

3.4 Technology choice

A fourth set of questions about different bioenergy technologies aimed at revealing the motivations given by policy makers for choosing one bioenergy technology/pathway over the other. In striving to meet bioenergy targets in a sustainable way, it will be interesting to see whether the main drivers are purely economic in nature or whether also environmental aspects play a prominent role so as to ensure an efficient use of biomass and hence land and water resources.

A first question asked about the **most important bioenergy types in the sectors heating, electricity and transport** in the Member States interviewed to set the scene for the subsequent question on technology choice. When it comes to a purely quantitative assessment, the question on the most important sources will best be answered from consulting renewable energy statistics, where available. The answers given here indicate the following **important feedstocks and some of their drivers**:

- The importance of feedstock is clearly determined by the *resource endowments* and existing industries of the different countries, with the forest-rich countries relying mainly on domestic woody biomass for both electricity and heat generation. Another example is Ireland with an important food production sector (eg milk hydration industry) and a consequently high potential for biogas from anaerobic digestion.
- Solid and woody biomass dominates electricity (co-firing) and heat generation. One reason for the dominance of solid biomass mentioned was the *ability to transport* it in the form of pellets.
- Biogas is mentioned by eight respondents for use in electricity and heat generation including biomethane injection into the gas grid in some countries. Germany mentioned to also use biomethane to fuel transport.
- First generation agricultural crops dominate the transport sector.

Several countries mentioned **the absence (or poor development) of a district heating system as the main barrier for heat uptake from CHP**. In the Irish case, reasons mentioned for the underdevelopment and the low future potential of district heating and renewable heating appliances are the absence of a closely-bound village structures found in other parts of Europe and a relatively large proportion of newly built housing as a result of the recent boom meaning there will be limited future demand for new housing with modern heating infrastructure and retrofit is expensive. HU mentioned that while the heat uptake from biogas used in CHP plants is limited as these are mostly located on remote farms, electricity generation from solid biomass concentrates in CHP plants as the government does not support co-firing for electricity generation only.

In terms of **factors driving technology choice**, responses can be summarised along the following lines:

- A group of four respondents (RO, UK, DE, AT) emphasises *letting the market decide* (within the regulatory framework).
- In a similar spirit, nine respondents (among them ES, SE, FI, SK, LV, LT, IT, PL) pointed at *cost efficiency and hence market-based economic consideration* together with the relative abundance of resources as the most important drivers. Two respondents stated that co-firing is a priority because of its cost efficiency, a key factor in times of tight budgets as pointed out explicitly by one of them. On the other hand and mentioned above, HU does not support co-firing.
- Four respondents (PT, HU, LT, FR) explicitly mentioned *environmental impacts* and sustainability concerns as a primary influencing factor in making technology choices including: carbon savings; energy efficiency; transport distances (HU does not provide support when production is based on biomass that is sourced >50km away from the plant to reduce transport logistics and associated GHG emissions); discouraging the use of trees for energy production within the forest biomass industry (PT).
- Other drivers for technology choice mentioned are: resource prices; political priorities/incentives.

The impression given is that environmental concerns come second to market forces in the majority of Member States interviewed, with only four respondents (PT, HU, LT, FR) explicitly referring to environmental impacts as a factor influencing technology choices. This impression links to Table 1 on perceived risks and benefits above: While environmental considerations figure strongly in the responses given in terms of the main risks and benefits, economic benefits also rank strongly on the benefits side

of the table. This gives rise to the dilemma that the most economic ie cost-effective solutions do not necessarily coincide with the most environmentally friendly feedstocks, as long as potential negative externalities for eg soil, water and air quality or biodiversity are not taking into account.

3.5 Moving forward

Fifth and finally, a set of questions on how to take bioenergy development forward has identified on the one hand immediate needs in terms of implementation and on the other hand the future importance of bioenergy as a renewable energy source. We first asked respondents **how to overcome the risks of bioenergy** previously identified in the first set of questions. While their answers by definition depended on the types of risks identified before, a clear ranking nevertheless emerged with the following risk mitigation measures mentioned most frequently (multiple responses were made):

- Ten respondents (among them IE, PT, UK, DE, HU, IT, FR, PL) mentioned the further development and/or enforcement of sustainability standards by making the RED's sustainability scheme work and to have traceability systems in place that ensure sustainable supply chains. Two respondents (the UK being among them) highlighted explicitly the need to address indirect land use change. One respondent (HU) suggested the introduction of education programs and market-based incentive systems for farmers so as to stimulate the use of no-tillage systems and of awareness programs for private companies and the public to make the case for and hence create a market for sustainable biomass.
- Five respondents (among them ES, DE, SK, LV) underlined the need for stable and predictable support in order to address supply constraints and to foster bioenergy market development. Another element mentioned is forest biomass supply chain organisation (FR).
- Four respondents (RO, UK, AT, LV) pointed at strategic planning as another way to address supply constraints and to avoid tight competition for biomass resources between sectors. In this context the need for 'biomass instead of bioenergy planning' was mentioned (RO) as well as the need for keeping the long term, 2050 bioenergy profile or vision in mind and orient planning towards that (UK, AT).
- Two respondents (FI, IE) recommended looking for best practices in other countries; in this context it was specifically mentioned that this would help to align policy support via feed-in tariffs with the true costs of technologies (IE).

Further responses:

- Sustainable mobilisation of the available forestry potential across Europe, overcoming infrastructure, ownership, and knowledge constraints (SE).
- Progress on waste recycling (remaining a large untapped potential in Europe) by re-visiting the Waste Directives with a focus on energy efficiency (SE).
- Using suitable crops for marginal lands or those polluted by industries (IT).
- Supporting only highly efficient electricity/heat production in CHP in order to reduce resource needs (SK).
- Enhanced technology testing in national (climatic) conditions to bring forward advanced technologies (LV).

On **advanced biofuels**, the majority of respondents did not think they would act as a silver bullet to overcome risks associated with conventional biofuels, at least not in the short term when they will not make up a significant share of transport fuels. It was highlighted that it could be relatively late before we start getting returns from second-generation biofuels. There may be some commercial realisation towards the second half of the decade, but first-generation biofuels will still be needed. One respondent

suggested that due to the continued need for first-generation fuels and the associated stress on land, the RED targets might have to be revised. It was suggested that second-generation biofuels are generally more expensive than hoped. One respondent had a more positive attitude towards first-generation biofuels stressing that they yield high-value by-products (protein) while acknowledging that their environmental performance depends on the scale of their production.

There still seems to be a lot of uncertainty surrounding the performance and viability of advanced biofuels: respondents mentioned that the efficiency in terms of energy yields/hectare is uncertain yet a crucial determinant of their performance (this includes uncertainty about the amount of process energy needed); there is uncertainty about whether enough waste would be available for second-generation biofuels to make a significant contribution towards the renewable energy targets; uncertainty about ultimate environmental impacts is mentioned as a reason for hesitancy eg impacts on the marine environment from algae-based fuels. Another aspect curbing enthusiasm is the question on fuel-engine compatibility. Moreover, while it was not questioned that the use of waste for biofuel production would be unambiguously beneficial, wood-based advanced fuels would still have land use effects, whose extents are not well understood.

Having mentioned the various types of scepticism, the majority of respondents embraced the use of a wider range of raw materials for biofuel production and expressed their hope for second-generation fuels to deliver.

One way of ensuring the 2020 renewable energy targets are met could be via enhanced or revised support for particular actors in the bioenergy market. Table 4 below identifies the **actors that need additional incentives or motivation and processes that need improvement**, according to the responses made that were subsequently grouped into the areas of supply, demand and R&D**.**

Table 4. Improvement needs for policies and incentive structures

Supply
• Make the whole supply chain aware of the challenge of delivering bioenergy targets; • Both the agricultural sector as well as the forestry sector needs to be motivated to deliver biomass to the energy sector, especially when there is strong demand from competing sectors; • Farmers in particular need incentives to plant higher yielding crops, to maintain high-quality land and to adopt sustainable practices (eg no tillage); • Make sure farmers and more generally suppliers comply with sustainability criteria; • Set up regional 'bioenergy logistic centres' that act as intermediaries between biomass buyers and sellers and can centrally invest in process equipment (eg for drying of biomass): long-term supply contracts would smooth out price fluctuations and bottlenecks that occur when farmers prefer to supply traditional food and feed markets in times of high world market prices for agricultural commodities.
Demand
• Incentivise the end-user; • Investors: they should trust in policy support but policy support in turn must be designed in such a way that it generates trust (stability and predictability of policy support framework); • The heat sector and in particular end users need additional stimuli: eg introduction of more efficient stoves in households; • Transport and district heating sector.
Research & Development
• There is still room for significant technological improvements so enhanced R&D efforts are needed;

- Economic operators need to be motivated to finance some R&D;
- Depending on the type of R&D investment, it would open up new markets and hence stimulate demand but also increase supply by eg increasing yields and bringing forward advanced technologies and/or increase conversion efficiencies.

In relation to the heat sector it was stressed by one respondent that it is much more challenging to incentivise numerous end-users in the heat sector than it is to incentivise a limited number of large generators in the electricity market. Another respondent was rather positive towards business development saying that business motivation is not a problem but that it is rather problematic that the market is subsidy driven and in times of tight budgets they this can become a bottleneck for development.

In terms of **research needs** there was a consensus that in the short term, more market and commercialisation research is needed on the most efficient uses of biomass, while at the same time strategic energy planning research is needed to understand the role of bioenergy as a sustainable energy source now and in the long term so as to avoid introducing infrastructure and technologies that will become obsolete in the future (danger of technology 'lock-ins'). Underlying objectives of enhanced research were to reduce costs, increase supplies, increase conversion efficiency, and advance new technologies. Some respondents disagreed that any further research is necessary in the short term on the basis that all the technologies that can possibly play a commercial role in 2020 have been developed already.

In terms of more specific research needs, it was suggested that more research is needed on:

- energy efficiency at a system level;
- active sustainable forestry (increasing forestry biomass supply without compromising on biodiversity preservation);
- regionalised biomass potential studies;
- making efficient use of biowaste;
- indirect land use change and biodiversity impacts of bioenergy use;
- second-generation technologies / enzyme research / bio-refinery technologies.

It was also highlighted that enhanced sharing of findings between Member States would be beneficial. Research on how to increase public acceptance and educate young people about the environmental issues surrounding climate change and energy savings would serve the future bioenergy development.

In relation to advanced technologies, it was stressed that commercialisation research including pilot projects and demonstration plants is needed. It was suggested that resources for this could come from the NER300 programme.[11] On second-generation biofuels in particular it was mentioned that while considerable investment in development projects has been taken place, many projects have failed to deliver, and a need for further research is perceived.

Most respondents point at a high **long-term importance of bioenergy**. In countries with abundant biomass resources and/or little alternatives, bioenergy is believed to remain the key renewable energy source in the long term (which is commonly understood as the year 2050). Five respondents (among them PT, SE, HU, SK) indicated that while bioenergy will remain important or will even be the most

[11] *NER300* is a funding programme managed by the European Commission, Member States and the European Investment Bank (EIB) that originates from a provision of the EU Emissions Trading Scheme Directive 'to set aside 300 million allowances (rights to emit one tonne of carbon dioxide) in the New Entrants' Reserve of the European Emissions Trading Scheme for subsidising installations of innovative renewable energy technology and carbon capture and storage (CCS)'. See: http://www.ner300.com/.

important renewable energy source in absolute terms in 2050, its relative importance is likely to peak in 2020. Six respondents (among them DE, LT, LV, FR, PL) mentioned the future importance will depend on the relative technological developments of bioenergy and other renewable sources, stressing that the efficiency of bioenergy use has to improve.

Various sectors were highlighted for which bioenergy will be of particular importance such as heat generation and those sectors that lack low-carbon alternatives eg aviation, heavy freight and high process heat. Bioenergy was also mentioned as playing a potentially important future role in the electricity sector as a baseload provider balancing the generation from intermittent renewable sources such as wind and solar. It was finally stated that biomass use will not only be important in the energy sector but also as bio-fibres / bio-materials in other sectors leading up to a 'bio-based economy'.

4 Key issues raised

According to analyses of the National Renewable Energy Action Plans, bioenergy will be the most important renewable energy source to meet the targets of the EU Renewable Energy Directive. This was confirmed by respondents of this expert survey. Respondents furthermore attributed bioenergy a strong long-term importance, especially as bioenergy can serve energy needs in sectors that lack alternative low-carbon energy sources.

When asked about the main risks and benefits of bioenergy, the respondents' emphasis was on the environmental issues surrounding bioenergy, entailing both risks and benefits. This points at opportunities to stress the environmental dimension beyond climate change mitigation further in future bioenergy policies. The economic benefits of bioenergy were also ranked highly by respondents.

The widespread concern about environmental sustainability is not significantly reflected in the way technology choices are currently made. Only four respondents explicitly mentioned environmental impacts (including greenhouse gas mitigation potential) as a primary influencing factor in technology choices, while economic and cost considerations including the abundance of resources dominate. The fact that economic considerations play a strong role for Member States helping them to achieve their renewable energy targets in a cost-effective way is hardly a surprise. The fact that the environmental costs that respondents are very well aware off are unlikely to be monetised and reflected in cost-benefit analyses underlying bioenergy development decisions means, however, that there is no reason to expect the most cost-effective bioenergy solutions to coincide with the most environmentally benign ones. This is a point that further research as well as policy making needs to be aware of and efforts on how to bring the environmental performance of bioenergy solutions to the forefront should be enhanced.

Getting bioenergy right from a sustainability point of view is also perceived of as a major policy challenge. The implementation and enforcement of the RED's sustainability criteria were frequently mentioned in the context of policy responses to the renewable Energy Directive and challenges of bioenergy development. All these points hint at a potentially great challenge ahead: While wider sustainability issues that are currently not (comprehensively) tackled in the RED sustainability scheme or where policy is still under development such as indirect land use change, biodiversity, soil and water issues are cited as major issues of concern, Member States already seem to struggle with the implementation of the *existing* binding sustainability criteria. The tackling of further sustainability issues, while deemed necessary by several respondents, will present additional compliance challenges; early guidance and strong Member State cooperation could ease them and help effective implementation.

Cooperation across Member States could be a useful tool in order to share best practices on making more efficient use of a wider range of biomass resources including waste resources with more beneficial environmental impacts and dealing with the policy challenges of transposing binding sustainability criteria. While cooperation does take place in various loose forms and soft frameworks, some

respondents have indicated that enhanced cooperation in the form of Member State representative meetings and the sharing of best practices would be beneficial. A problem could be that while there is a range of different fora, it might be difficult for policy officers to determine where participation would be most beneficial. The mentioning of the comitology committee as a useful forum for exchange and the associated wish of one respondent for more of such kinds of meetings could be interpreted as a call for more 'officially' convened meetings by, for instance, the European Commission. Combining comitology meetings with more informal discussions on particularly challenging policy issues could be an efficient way of maximising discussions and best practices sharing among the Member State officials that are responsible for and hence well-informed about bioenergy development in their national administration.

Finally and as a guide to policy makers and funders, a few issues are mentioned that according to respondents need to be researched further for successfully and sustainably fostering bioenergy development in the future[12]:

- regionalised biomass potential studies (here the results of the Biomass Futures project on regionalised supply potentials will fill an important gap[13]);
- indirect land use change and biodiversity impacts of bioenergy use (the Biomass Futures project undertakes important work on developing sustainability standards further encompassing all forms of bioenergy[14]);
- active sustainable forestry (increasing forestry biomass supply without compromising biodiversity);
- making efficient use of biowaste;
- commercialisation research such as pilot projects and demonstration plants for bringing forward advanced bioenergy solutions;
- strategic long-term energy planning and energy efficiency at a system level.

The last point on long-term planning is crucial: The Renewable Energy Directive proves to be an important driver for bioenergy development in particular and renewable energy in general and has changed the dynamics in renewable energy policy in Member States significantly, according to the Commission reports and some of the responses made here. This is a very promising development, also in light of even more ambitious renewable energy targets needed in the coming decades. An early indication of these longer term objectives for renewable energy will make it easier for Member States to now embark on sustainable bioenergy pathways.

[12] This report was sent out to all respondents before finalisation. Comments received were generally positive and there was general agreement on the conclusions reached. A list of research needs that partly add to the above mentioned ones and partly specify them is included in appendix 4.

[13] http://www.biomassfutures.eu/work_packages/WP3%20Supply/D3.3%20Atlas_of_technical_and_economic_biomass_potential_March%202011%20FINAL.pdf

[14] Work package 4 of the Biomass Futures project, forthcoming results downloadable at http://www.biomassfutures.eu/work_packages/work_packages.html.

Appendix 1 – Questionnaire for Expert Survey

0. Introduction

0.1. Name:

0.2. Contact Details:

0.3. Position/ area of focus:

0.4. Background:

1. General

1.1. Overall, how do you assess bioenergy's importance in meeting Europe's RE targets?

1.2. What are the key benefits and risks associated with bioenergy?

1.3. Who do you consider to be the main actors in shaping the nature of the supply and demand for bioenergy?

2. National response to EU Renewable Energy Directive

2.1. Have national policies (in your MS) been drafted promptly in response to RED?

2.2. Or were policies in place before already? If so, please specify them.

2.3. Which policy instruments or mechanisms do you foresee as being the most important for achieving implementation (i.e. specific provisions implemented in your MS etc)?

2.4. What do you foresee will be the main challenges in meeting the RED targets?

2.5. Is there strategic planning ongoing in your MS to address demand and supply needs? If so, who is responsible and what form does it take?

3. Cooperation across MS

3.1. Do you know about strategic planning ongoing in other MS?

3.2. Is there (organised) cooperation between MS on bioenergy supply and demand issues?

3.3. If so, does your country participate? And if not, why not?

3.4. Are there MS that you consider are developing best/good practice examples that others might follow? How are these communicated?

3.5. Which MS do you consider to be most prepared?

4. Different bioenergy technologies

4.1. Which types of bioenergy are likely to be of highest importance in delivering bioenergy needs for the sectors H&C, electricity and transport (in your country)?

4.2. How is the choice between different types of bioenergy in the energy market made (in your country)?

4.2.1. Based on cost/efficiency considerations (carbon savings, long term viability, production costs, abatement costs, others)?

4.2.2. Different political incentives?

5. Moving forward

5.1. How can identified risks best be overcome using policy tools (referring back to the risks mentioned as part of the 'General' questions)?

5.2. Will advanced biofuels be a silver bullet to overcome risks associated with conventional biofuels?

5.3. Which actors in the bioenergy market do policy makers need to motivate/need additional political incentives to deliver goals?

5.4. Do you perceive particular research needs to help

5.4.1. the effective implementation of short term (up to 2020) policies at EU and national level;

5.4.2. bringing forward advanced bioenergy solutions (also post-2020)?

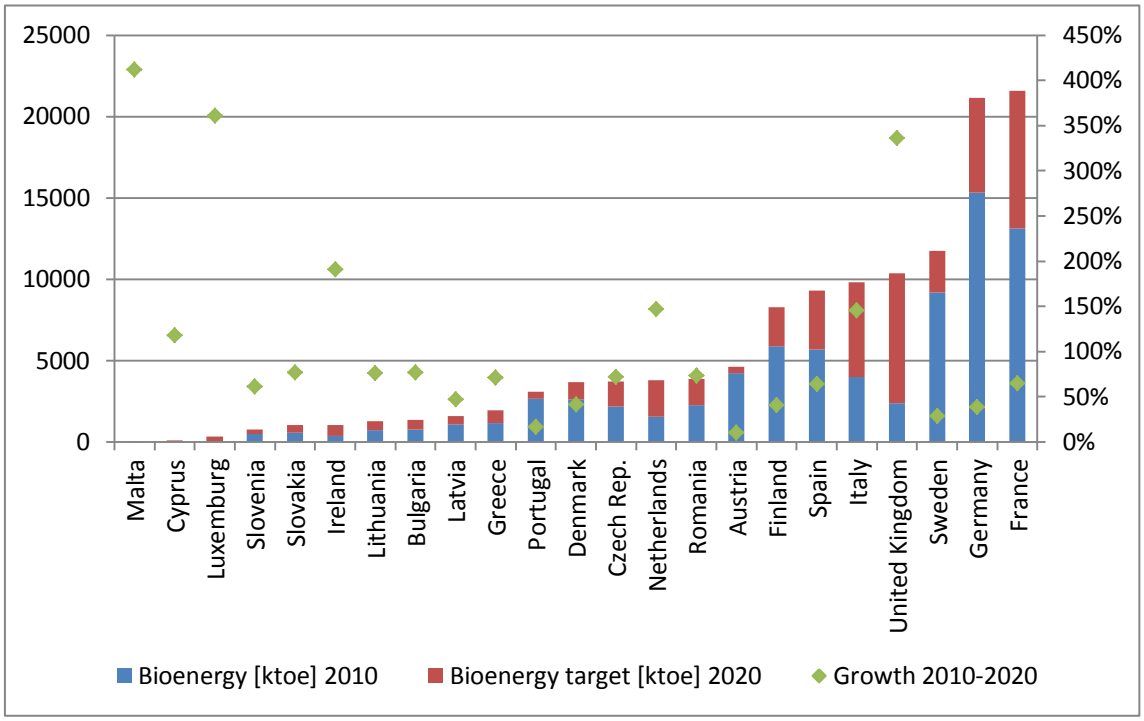
5.5. Will bioenergy remain a key technology into the long term ie up to 2050 or is this an intermediary technology to buy us time as we move towards other low carbon solutions?

BIOMASS FUTURES

Appendix 2 – List of interviewees

	MS	Interviewee	Position	Interview date
1	Austria (AT)	Bernd Vogl	Deputy head of division Environmental Economics and Energy, Energy expert at Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management	09.02.2011
2	European Commission (EC)	Fanny-Pomme Langue	Policy Officer for Bioenergy, Directorate General for Energy	02.02.2011
3	Finland (FI)		Representative of the Finnish Government	11.02.2011
4	France (FR)	Pascal Blanquet (and colleagues)	Policy officer for Forestry, Agriculture and Biofuels in the Department for Climate Change Mitigation, French Ministry for Sustainable Development	Written response 04.03.2011
5	Germany (DE)	Jessica Löhndorf	Fellow, Ecologic Institut gGbmH	08.02.2011
	Germany (DE)		Two Representatives of the German Federal Government	23.02. and 08.04.2011
6	Hungary (HU)	Zsolt Gemesi	Head of Department for Green Economy Development, Ministry of National Development	21.02.2011
7	Ireland (IE)	Richard Browne	Assistant Principal Officer - Renewable Heat, Transport Fuels and Corporate Governance, Department of Communication, Energy and Natural Resources	31.01.2011
8	Italy (IT)	Franco Cotana	Director of the Italian Biomass Research Centre (CRB)	Written response 07.03.2011
9	Latvia (LV)	Egons Jansons	Representative of the Energy Department, Latvian Ministry of Economy	25.02.2011
10	Lithuania (LT)	Viktorija Aleksevičienė	Head of Unit of Renewables, Ministry of Energy	25.02.2011
11	Netherlands (NL)	Wouter Schaaf	Coordinator of Bioenergy, Ministry of Economic Affairs, Agriculture and Innovation	31.01.2011
12	Poland (PL)		Representative of the Energy Department, Polish Ministry of Economy	Written response 18.03.2011
13	Portugal (PT)	Luis Duarte Silva	Head of Renewables and Innovation - Directorate General for Energy and Geology	04.02.2011
14	Romania(RO)	Cristian Tantareanu	Director of ENERO, Centre for Promotion of Clean and Efficient Energy in Romania (non-governmental)	20.01.2011
15	Slovakia (SK)	Juraj Novak	Chief Councillor – Energy Policy Department, Ministry for the Economy	21.02.2011
16	Spain (ES)	Juan Carrasco	Biomass Unit Manager, Energy Department of CIEMAT, Energy, Environment, and Technology Research Centre under the Ministry of Science and Innovation	07.02.2011
17	Sweden (SE)	Sven Olov-Ericson	Ministry of Enterprise, Energy, and Communications	11.02.2011
18	United Kingdom (UK)	Davinder Lail	Climate Change Mitigation Team, Department for Environment, Food and Rural Affairs	07.02.2011
	United Kingdom (UK)	Elizabeth McDonnell	Office for Renewable Energy Deployment, Department for Energy and Climate Change	24.02.2011
	United Kingdom (UK)	Philipp Thiessen	Office for Renewable Energy Deployment, Department for Energy and Climate Change	24.02.2011

Appendix 3 – Member State bioenergy targets and relative efforts



Note: Includes 23 NREAPs as submitted by October 2010. Growth 2010-2020 on right-hand scale. Based on Atanasiu (2010), *The role of bioenergy in the National Renewable Energy Action Plans: a first identification of issues and uncertainties*, (http://www.ieep.eu/assets/753/bioenergy_in_NREAPs.pdf), which focuses on analysing the bioenergy information contained in the NREAPs.

Appendix 4 – Validation of report findings via teleconference and additional interaction with policy makers

Regular teleconferences with different stakeholder groups are a regular part of the Biomass Futures project. We have sent out a draft version of this report to all respondents as well as to other identified policy stakeholders[15] inviting them to comment and take part in a teleconference. The comments received during the teleconference are summarised in this appendix.

Phone call (15.06.2011) with Maria Raytcheva (Head of Energy Efficiency and Climate Department, Energy Efficiency and Environmental Protection Directorate, Ministry of Economy, Energy and Tourism, Bulgaria):

It was confirmed that bioenergy is the most important renewable energy source in Bulgaria. It is anticipated that 83 per cent out of total renewable energy sources by 2020 will be from biomass (2009 bioenergy share: 68 per cent out of total RES). Its importance is facilitated by the fact that bioenergy can be used in the heat, electricity and transport sectors. Also, there is ample scope to increase conversion efficiencies cost effectively for bioenergy pathways. On the other hand, as 35 per cent of Bulgarian land is under Natura2000 status, there are some restrictions to the expansion of renewable energy sources.

The main source of biomass in Bulgaria is forestry biomass. The government has expressed concerns about the sustainability of forest management; the Ministry of Environment and Waters and the Ministry of Agriculture and Food are responding to inappropriate forest management by introducing certain provisions in the relevant acts. Biomass is seen as a limited resource and bioenergy sources should be assessed on the basis of their whole lifecycle. In order to safeguard the sustainability of biofuels and bioliquids, the government is currently preparing a sustainability ordinance to implement the sustainability scheme of the Renewable Energy Directive. It was further mentioned that residue sources are underutilised in Bulgaria so that efforts should be re-directed to change this. In order to do so it could be useful to follow best practices set by other countries.

Teleconference: "Discussing findings of the Biomass Futures Expert Survey" (14.06.2011)

Agenda :

1. General comments on eg findings of the report, representation of results
2. One result that emerged is that respondents perceive a need for greater cooperation to discuss implementation challenges, share best practices in relation to bioenergy etc:
   a. How can Biomass Futures contribute to this?
   b. Are teleconferences a suitable means to facilitate discussions (and time-effective as no travelling is needed)?
   c. Who else should facilitate meetings, exchange forums etc?
3. Do you agree with the list of future research needs at the end of the report?
   a. Do you have elements to add/remove?
   b. And how to effectively tackle them: eg via academic research, cooperation of Member State administrations / energy agencies / etc. other?

[15] For further information, see http://www.biomassfutures.eu/work_packages/work_packages.html, WP 7 'Dialogue mechanisms'.

4. In particular: Are there any immediate / near-term policy issues that could be sensibly tackled in Biomass Futures teleconferences now, hence engaging those interested in cooperation (eg in relation to sustainability of solid and gaseous biomass)?

Discussion points:

The report was perceived of as being well structured, covering all important issues at the right level of detail. It was seen as a useful source of information.

Cooperation across Member States (eg via teleconferences)

The following comments were made by participants:

- It would be good to understand where other MS are on sustainability issues, especially as policy still develops on EU level; teleconferences good as a quick, cheap way, not for very detailed negotiations, but good to get an impression about position of countries; focus on one topic at a time, given the bioenergy issue is so wide: narrow the topic down;
- Semi-formal dialogue eg in the comitology committee preferred. Also the concerted action group is useful but limited time scheduled;
- Bioenergy is a broad topic, which necessitates involving a broad range of actors/departments in discussions, eg facilitated by the European Commission;
- Network on technology innovation would be useful;
- Cooperation between research institutes and technical bioenergy experts including energy agencies very useful; especially regional projects between countries with similar biomass resources; on industry level, cooperation is more straightforward and already further developed;
- Common Scandinavian/Baltic states position on sustainability standards for wood biomass mentioned as a successful example of Member State cooperation;
- Teleconferences only suitable for informal exchange of views rather than decision making. As policy maker, more interested in a database with detailed information on renewable energy policies in different countries than in actual meetings or teleconferences *(Note Biomass Futures team: the REPAP2020 project funded under the IEE programme provides useful information in that respect: http://www.repap2020.eu/)*[16].

Research needs / useful information sought by policy makers

- As part of a new national strategy on bioenergy being developed in the UK, main research needs are:
    - how can advanced biofuels help dealing with sustainability problems,
    - which are the most promising advanced biofuels,
    - ILUC: options to address and how do these options address price and supply of biofuels; how does ILUC affect biodiversity (only focus on GHG emissions at the moment);
    - relative carbon benefits of non-energy uses (construction, food);
    - biomass with CCS (technical feasibility as different from CCS with coal);

[16] Also note that the European Commission is launching a project on 'renewable energy policy database and support' that will 'provide a thorough and regularly updated database of renewable energy measures, in particular financial support and market/grid access, for each Member State of the EU': http://ted.europa.eu/udl?uri=TED:NOTICE:189227-2011:TEXT:EN:HTML.

- Sweden: similar research needs to the ones just mentioned; official policy on bio-CCS in SE, no credit for bio-CCS under ETS is a severe shortcoming; active forestry policy maximising yields and using different parts of trees where the can best be used; ILUC: looking forward, forestry done over 100-year cycle, for true GHG effect you cannot look at only a few years (ie 20-year horizon under RED), have a more fair representation of carbon balance of bioenergy by looking at managed forest as a whole, including planting, managing trees, tree growth phases;
- District heat and advanced biofuels can be integrated: using excess heat from advanced biofuels production processes; make link to energy efficiency directive incorporating former CHP directive;
- Does bioenergy contribute to using waste heat?
- What if gasification does not develop into feasible/viable technology?
- What if syngas turns out to be of limited applicability?
- Independent, research-based potential studies are most important (to give reliable sources beyond industry, NGO studies etc);
- Identify in more detail what barriers for regionalised biomass potential are and map regional potentials; AEA study for UK has demonstrated the need to look at competing uses for biomass *(Note Biomass Futures team: This will be discussed in June in the Biomass Futures context and decided based on the input we can get for international commodities from Globiom; current cost supply curves estimated by Alterra include competition)*;
- Robust ILUC criteria and how to influence non-EU countries when it comes to sustainable production;
- Active sustainable forestry management important, cross-cutting, international aspect; how does this fit into other work/standards: update FSC, go beyond FSC etc? How do you actually operationalize it and in a sustainable way?
- Biowaste: Pilot projects and demonstration plants needed to make efficient use of biowaste; gasification: joint projects likely to be important due to costs;
- Impact of RE policies on energy end-use prices;
- Social and economic impacts, such as employment (in rural areas).

Suitable topics for teleconferences identified

- Advanced biofuels;
- ILUC;
- Linkage between bioenergy and other eg agricultural policies (make linkages and connections to prevent inconsistent policies, need to maximise synergies etc);
- Sustainability: national standards and certification schemes to make sure the intra-EU market for sustainable bioenergy functions.