Planning biomass for energy: Examining the why, how and what of sound biomass policy

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Abstract

Coordination of policies embracing biomass use has been called for in order to speed up progress towards EU goals for bioenergy. Many complex and diverse issues need to be taken into account if sustainable bioenergy development is achieved – a situation that also points strongly to the importance of policy coordination and coherence. Within this context, national biomass action plans and strategies need to play an important role in coordinating biomass related activities.

As such, and with the purpose to advance understanding of that which constitutes 'sound' and 'coherent' biomass policy interventions, this paper reviews existing knowledge on good practice in policy making and strategic planning in the bioenergy context. Three fundamental questions guide the conduct of this research: why to plan, how to plan and what to include in the plans. At the outset of the work, the grounds upon which biomass planning is justified is examined. Then, an applied definition of biomass policy coherence is proposed. The paper continues to explore strategic planning and sound policy principles while discussing the role of action plans in the policy process and structuring the planning process through planning cycle stages. Lastly, key items for biomass strategies and plans are scrutinised.

This research concludes that strategic planning of biomass use is needed to maximise benefits, capture synergies, help balance trade-offs and reduce the potential for negative impacts in the bioenergy production chain. Most importantly, this works shows that the diverse and complex character of biomass production and utilisation demands a strategic planning approach that encompasses the concepts of continuous learning, flexibility and adaptation. This also requires a forward- and outward-looking approach and stakeholder involvement throughout the planning process. Moreover, the work indicates that coherent biomass-to-energy planning must utilise resource assessments that have been based on sound methodology and data; the setting of SMART targets based on SWOT-like analysis; measures to boost biomass availability considering other biomass uses; and assessment of impacts founded on life-cycle analysis and paying attention to all sustainability dimensions.

As well as a working definition for 'biomass policy coherence', this paper also contributes to delineation of a sound policy making and strategic planning framework that can assist in ensuring that biomass planning includes important elements facilitating more sustainable biomass utilisation.

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1 Introduction

1.1 Background

Biomass serves as a fundamental raw material for the energy, food, feed, chemical and material sectors. Its utilisation involves various uses and users, adding to its complexity. Biomass also lies at the intersection of a wide range of political, economic, environmental and social interests; the number of stakeholders and trade-offs related to biomass use all contribute to a generation of a complex decision-making arena (IRGC, 2008, p. 20). One high profile example is the food price increases held to have been contributed to the biofuels production in 2006-2008 (OECD, 2008; Rosegrant, 2008). Moreover, the use of biomass for energy is influenced by numerous, sometimes contradicting policy fields related to biomass use, such as forestry, agriculture, waste, trade and industry (see e.g. Bringezu et al., 2007a; EUREC Agency, 2002; WBGU, 2009). All these aspects point strongly to the importance of coordination and coherence of policies directing the use of biomass for different purposes.

Especially from an energy point of view, global concerns over climate change, growing energy demand and security of supply have stimulated search for renewable pathways emitting less greenhouse gases, providing cleaner air and creating other environmental benefits. Biomass as a renewable energy source (RES) is considered a vital component of meeting the EU's energy and climate goals. It is forecast to contribute around two-thirds of the estimated primary energy consumption of the renewable energy share in 2020 (EC, 2009a). It is noteworthy that the way how bioenergy resources are used for various applications can have a considerable impact on the overall renewable energy strategy. As of 2008, biomass and wastes[1] contributed 6% (or 105 Mtoe/4.4 EJ) to EU-27's primary energy (or gross inland) consumption (representing a 5% increase from 2007) (Eurostat, 2010). Thus, the promotion of biomass use for energy addresses an important share. However, the EC renewable energy progress report (EC, 2009a, p. 9) indicates that the development of the bioenergy sector has not been satisfactory, especially when the projections of the EU Biomass Action Plan (EU BAP) (EC, 2005a) – of 150 Mtoe biomass to be consumed for energy by 2010 – are considered.

The European Commission (EC) perceives that biomass action planning at national level can play an essential role in increasing the likelihood of progress towards the EU's renewable energy 2020 targets and ensuring the long-term and sustainable supply of biomass resources for energy use (EC, 2009b, p. 38). The EU BAP indeed emphasised the need for a coordinated approach to biomass policy and encouraged Member States to establish national Biomass Action Plans (nBAPs) as one of the key measures to boost the bioenergy market. However, one factor potentially contributing to the slow progress of bioenergy is that the existing biomass strategies are often a patchwork of various policies related to different biomass usage that lack coordination and integration (BAP Driver, 2009, p. 114).

This lack of coordination (along with insufficient support systems) of the various biomass related policies was already identified in 2004 (EC, 2004, p. 22). The coordinated approach

[1] Biomass and wastes include wood and wood wastes, biogas, municipal solid wastes (MSW) and biofuels. Note that category of MSW covers both renewable and non-renewable wastes (Eurostat Concepts and Definitions Database (CODED), available at: http://ec.europa.eu/eurostat/ramon).

called for by the EC (2004, p. 35) must take account of actors at all levels. As an example, one major challenge for biomass to meet its expectations is the mobilisation of large additional volumes of biomass for bioenergy applications. For this to happen, extra measures are required at all levels: not only at the EU level, but also at national, regional and local levels (EC, 2005b, p. 22). Moreover, the involvement of important stakeholders at all (sub-EU) levels is regarded as valuable in the development of national renewable energy action plans.

Integrated and coherent energy policy is intended to be at the heart of the EC's "Climate action and renewable energy package" (EC, 2008a), which provides a framework and 2020 targets to promote renewable energy and energy efficiency, and reduce greenhouse gas emissions. In the context of this framework, the new Directive on renewable energy (EC, 2009c) (hereinafter 'RES-Directive') requires that each EU Member State enhance its use of renewable energy so that an overall EU share of 20% by 2020 is reached. To facilitate the target achievement, mandatory targets for each Member State have been set and in order to monitor development. Member States have been obliged to submit national renewable energy action plans (NREAPs) that present how they will reach the national targets set in the RES-Directive by the end of June 2010. As of mid-October 2010, 23 Member States have finalised their NREAP (EC, 2010). An analysis of Beurskens and Hekkenberg (2010) on 21 NREAPs shows that biomass is estimated to dominate both in the heating and cooling sector (80%) and in the transport sector (90%) while biomass-based electricity is projected to be responsible for 18% of the total renewable electricity production in 2020.

Along with the requirement for national renewable action plans, there has been a shift of focus from non-obligatory national BAPs to mandatory NREAPs. Established and planned national biomass action plans are considered to form a vital part of NREAPs (EC, 2008b, p. 17).

1.2 Purpose and focus question

The purpose of this study is to advance the understanding of what constitutes a sound biomass policy intervention. This is achieved through a review of enfolding literature addressing sound policy making and strategic planning. Accordingly, a guiding question for this work has been:

How can established features of sound policy-making strengthen biomass planning processes so as to speed bioenergy progress while still allowing for alternative biomass uses and incorporating sustainability constraints?

To achieve this, the working paper has sought to fulfil the following objectives:

1. Establish the grounds upon which the planning for the use of biomass for energy is justified.

2. Delineate key elements of sound policy making particularly relevant to biomass planning, production and utilisation.

3. Extract a number of lessons from biomass planning documents and enfolding literature demonstrating elements of successful biomass planning.

The overall research aim is to contribute to the knowledge that can be utilised in the establishment and implementation of coherent and effective biomass plans and strategies. The report should be relevant to the actors involved in or informing planning and policy-making in the biomass field.

This study supports a PhD dissertation work, in the heart of which is the analysis of national and regional biomass action plans in the EU countries. It represents a work in progress, which will be upgraded and incorporated into the PhD thesis by early 2011.

1.3 Scope and limitations

This work discusses biomass/bioenergy planning initiatives and recommendations mainly in the context of the EU Member States at national level; however suggestions for improvement can be applied to any country (or region). Along with the features of sound policy making, the focus is on structuring the policy planning process and deepening the understanding of policy coordination in the biomass policy context. The role of action plans in the policy process is also of interest to this research. The scope is essentially to seek answers to *how* biomass planning should be made and *what* biomass plans should contain in order for them to be described as 'better' plans. Thus, the intellectual framework for analysis is largely prescriptive (cf. Hogwood and Gunn, 1984, p. 3).

Recognising the fact that biomass – in its broadest sense all material of biological origin derived from living or recently living organisms (cf. BEC, n.d.) – is used for many purposes, the term is usually perceived to pertain to energy context. The key focus of this working paper is indeed the energy use of biomass; however, as it becomes clear from the study, there are strong reasons to look beyond the energy use and seek for more holistic policy and planning frameworks. A major part of the study therefore talks about biomass planning rather than bioenergy planning, as it can be argued that the latter cannot exist without the first. Alternatively, 'biomass-to-energy' term is used to highlight more holistic point of departure.

This study is based on a desktop research of literature ranging from business management papers and public policy books to bioenergy policy documents. The paper also describes a process that has partly been followed from inside the EU system – namely in the case of the EU guidelines for biomass action plans; thus some of the sources cited are internal. The extent of the literature review is by no means exhaustive, but intended to give an overview of biomass planning and recommendations, and shed light on the research question.

As a limitation, the presentation of strategic planning in this study simplifies and merges some strategic planning stages, which might be presented separately (or overlapping or in different order) in the literature. It is accepted that for some readers this simplification may overly generalise the planning process. Beyond the scope of this paper also are, among others, in-depth review of public policy process as well as detailed discussion on the analogy of strategic planning and public policy stages. This study neither analyses the content of national BAPs or NREAPs. However, as the aim of this paper is to identify how sound policy principles and strategic planning framework can strengthen biomass planning processes, the chosen approach delivers those elements that match with this purpose and does not detract the quality of this work.

1.4 Research approach

The first step of the study is formed by the overview of the biomass planning context. This is intended to provide the justification for biomass planning ('why'). The second step of the study constitutes the 'how' part of the study. The foundation for this is laid by strategic planning framework originated from the business sector. Thirdly, the approach for researching 'what' items is guided by the European Commission's guidelines.

The second step seeks in particular to shed light on strategic planning process through the planning cycle stages and combining strategic planning definitions and experiences of their use in the biomass sector. It also examines the application of one strategic planning model to biomass strategy making. Regarding the third step, the research is limited to the specific biomass-related items and structured in a similar way as the EU guidelines.

Noteworthy is that in the context of this paper, it has been chosen to treat all the sectors using biomass as the 'organisation'. This is similar to the approach applied by Gane (2007, p. 277), who in his study on forest sector strategic management regards the forest sector "as a large, complex organization consisting of numerous parts".

1.5 Structure of the paper

This introductory chapter is followed by section 2, which describes the context of planning the use of biomass for energy. Section 3 examines the definition of biomass policy coherence, while the framework of sound policy making and strategic planning in the bioenergy context is presented in sections 4 and 5. Section 6 presents key items for biomass plans, and subsequently, conclusions are presented in section 7.

2 Planning the use of biomass – the context

2.1 Justification for biomass planning

Planning of biomass use for energy is justified not only based on the widely recognised benefits of biomass over conventional energy sources – such as improved security of supply, reduction of greenhouse gases (GHG), depending on the technology, and creation of employment opportunities (e.g. Bauen et al., 2009; IRGC, 2008) – but also from the fact that biomass as a renewable energy source is more versatile and diverse than any other renewable energy source in terms of feedstock sources and their use; it is also the most complex due to its numerous interlinkages (WBGU, 2009, p. 23). As the background document for the bioenergy plan of Ireland (SEI, 2004, p. III) states, "more than any other area of renewable energy, bioenergy is an inter-departmental issue, touching on many policy areas. Thus, while led by renewable energy goals, the task of promoting bioenergy both merits and requires an inter-departmental response."

Adding to the complexity is that, while yielding many benefits, bioenergy production is believed to affect negatively on some countries and societies (IRGC, 2008, p. 44). Some examples include the impacts on food security as in Sub-Saharan Africa (Rosegrant et al., 2008), biodiversity in oil palm plantations in Indonesia (Danielsen et al., 2009) and water increased water need of energy crops in the US (Stone et al, 2010); for more examples on opportunities and risks associated with bioenergy, see IRGC (2008), UNEP DTIE (2010a, 2010b, 2010c) and WBGU (2009). Also the scale of impacts is important; protection of soil and water resources and biodiversity call for special focus on local and regional level while climate change is more of a global scale issue (EEA, 2008, p. 5). Plans on transition to economy founded on bio-based raw materials instead of fossil ones – called as bioeconomy – further complicates the issue as it is likely to result in growing competition for biomass resources due to increased use of biomass for energy, chemicals and materials. However, it also encompasses the idea of a more efficient and sustainable use of biomass by adding higher value to biomass through so called biorefineries (see more from de Jong et al., 2010). When the prospect of human population growing to over 8.3 billion in 2030 is added, which requires 50% more food and fuel[2] and 30% more water (UK GovNet, 2009), there are concerns of several kinds on the sustainability of biomass use for various purposes.

Based on these points, it is argued here that the use of biomass for energy requires more (strategic) planning compared to other renewables. Certainly, it can be questioned whether bioenergy field is given a "hard time" and if other policy fields have to account for so many areas. Bioenergy seems nevertheless to be rather unique due to its multi-sectoral, multi-level and multi-disciplinary nature. In addition, it is only recently when we actually start to see the true interlinkedness of such areas in real time.

Consequently, planning for uncertainties – or as FAO (2010a, p. 30) argues, for foreseeable changes – would seem essential in order to deal with those negative impacts as early as possible and to balance the trade-offs between environmental, social and economical impacts. A planning framework also serves the purpose of facilitating maximisation of the benefits of bioenergy production; it may also allow for a more swift response to unforeseen

[2] OECD/IEA (2010, p. 7) estimates that in 2030 there will be 2.8 billion people relying on traditional biomass for energy, representing 0.1 billion increase from 2009 in humans using traditional forms of biofuel.

changes. At any rate, the realisation of the impacts is largely reliant on two things at the policy level; as UNEP DTIE (2010d, p. 1) puts it, "it all depends how bioenergy development is designed and implemented". As an additional support for planning, bioenergy policy benefits from better policy making and design like any other public policy field. As an example, the "Better Use of Biomass for Energy" (BUBE) project calls for the establishment of better policy (Fritsche et al., 2009).

2.2 Biomass strategies and action plans in the EU and elsewhere

Relevant to this discussion is that biomass use related planning can take place independently and as a part of energy and/or climate strategies. Biomass strategies and action plans have been established in several parts of the world, and many countries have also identified biomass-derived energy as one of the ways to achieve Kyoto Protocol obligations. In addition to the EU Member States, different kinds and levels of specific biomass/bioenergy strategies are known to be made at least in Japan (Government of Japan, 2002), Texas in the US (Office of the Governor Rick Perry, 2007), British Columbia in Canada (British Columbia, Ministry of Energy, Mines and Petroleum Resources, 2008) and Australia (Clean Energy Council, 2008). The BEST project promotes bioenergy strategies in Africa (EUEI Partnership Dialogue Facility, n.d.).

At regional level in Europe, several regional strategies and plans have been drawn up; examples of these are the plans of Central Finland, Northern Karelia (Finland), Scotland, the South-Eastern Ireland and Northern Ireland (EC, 2009a). The REGBIE, MAKE-IT-BE and BEn projects[3] are some of the examples guiding biomass planning at regional level. Strategic planning at local level including bioenergy elements is encompassed by the Sustainable Energy Action Plans within the Covenant of Mayors commitment for tackling climate change in cities (Covenant of Mayors, 2010).

The EU Biomass Action Plan articulated the call for the national biomass action plans in the EU Member States. By May 2009, formal biomass action plans had been prepared by nine EU Member States; see Table 2-1 (overleaf). Six of them submitted their plans to the EC: Estonia, Germany, Ireland, Netherlands, Spain and the United Kingdom. Including these submitted plans, around half of the EU Member States can be considered to have their biomass strategy or action plan under preparation (e.g. Austria, France, Romania and Latvia) or defined at that time. However, the other half of the EU countries did not yet have a biomass plan.

It should be noted that the absence of a formal plan or its preparation does not necessarily indicate the lack of other bioenergy activities or planning in the country. Finland and Sweden for example have highly advanced biomass and bioenergy industries, which have been supported by other means than action plans.[4] In addition, while a country might not have a national BAP, there can be several regional biomass plans, strategies and initiatives being pursued. The table below (Table 2-1) categorises countries with no information in the 'no nBAP' category.

[3] More information on the projects can be found at: http://www.regbieplus.eu, http://www.makeitbe.eu and http://www.ben-project.eu, respectively.

[4] For example, the establishment of national research agendas for the forest-based sector in Finland and Sweden can be regarded as a holistic approach on forest based research and development actions (cf. FTP, 2008).

At the time of this study it was not clear whether the plans in preparation would be published as specific plans or as part of the NREAPs, but it seemed likely that the mandatory request would override the voluntary encouragement and the prepared biomass action plans would be integrated in them at least in some form.

Table 2-1 Status of the national BAPs in the EU-27 as of May 2009 (Developed from Kautto and Jäger-Waldau, 2009).

Status of the nBAP	EU Member States
nBAP officially submitted to the EC	EE, DE, IE, NL, ES, UK
Established nBAP but not submitted to the EC	CY, CZ, SK
In preparation	AT, BG, FR, LV, RO, SI
No nBAP	BE, DK, FI, EL, HU, IT, LT, LU, MT, PL, PT, SE

Note: Preparation stage can signify a plan in the public consultation process or in the process of government approval. In addition, it was considered here that the plan has been established only if it has been officially approved by the government.

2.3 Recommendations for planning the sustainable use of biomass

Biomass planning often stems from the energy viewpoint. The EU BAP and the established biomass plans at national level follow this approach. However, some analysts indicate a need to expand that view with policies that concentrate on issues going beyond biomass for energy, such as land- and water-efficient food production and reduction of emissions from agriculture (e.g. Bringezu et al., 2007a; Fritsche et al., 2009; WBGU, 2009). WBGU (2009) expresses the view that the use of bioenergy should primarily be guided by contribution to climate change mitigation and assisting in overcoming energy poverty. This necessity for looking beyond biomass for energy has been fuelled by questioning the sustainability of its use. As a result, several studies and initiatives have recently addressed the sustainability of biomass from various aspects and provide recommendations on what policy-making revolving around biomass use should take into account.[5] Examples of these studies and their areas include:

- Antikainen et al. (2007): New challenges of bioenergy (in Finland) and their environmental, social and economic aspects
- Avebiom and Junta de Castilla-y-León (2009): A 'methodology proposal' for a national biomass plan
- BAP Driver (2009): Best practice guidelines based on the assessment of national biomass strategies and action plans in 12 EU countries
- Bringezu et al. (2007a): Non-food use of biomass and its environmental sustainability implications

[5] Biomass strategies are not considered here to signify various types of actions or scenarios such as identified in Gielen et al. (2002), Thrän et al. (2006) and Bringezu et al. (2007b) but rather to follow the definition in section 1.3.

- FAO (2008, 2010a): Policy options and recommendations in terms of the opportunities and threats to forestry, policy and institutional frameworks for sustainable wood fuels
- IRGC (2008): Risk governance guidelines for bioenergy policies
- Orthen and Brückmann (2009): Operational guideline for the development of integrated bioenergy action plans
- UNEP DTIE (2010a, 2010b, 2010c, 2010d): Land use and land use change, water, invasive species and stakeholder involvement in the bioenergy context
- WBGU (2009): Recommendations for sustainable bioenergy use and components of sustainable bioenergy policy

Examination of these many and at times disparate viewpoints is beyond the scope of this paper; however, a number of the recommendations found within such work are incorporated in the discussion of sound biomass policy features and key items for biomass plans.

2.4 EU guidelines for biomass action plans

It is noticeable that the majority of the studies addressing the sustainability of biomass appeared after the EU BAP (2005). It recognised the need for a coordinated approach for biomass policy, but this call for the national biomass action plans did not elaborate any guidelines or recommendations for their content. Thus, there was no clear definition of a 'biomass action plan' early on. Wide variability of data in the biomass actions plans has contributed to difficulties in tracking the progress towards reaching bioenergy objectives and a need to provide guidelines for the establishment of biomass strategy that can guarantee the comparability of the BAPs between Member States has been recognised. For example, the data used for assessing biomass resources has been seen as necessary to be better harmonised between different policy fields and on EU level (BAP Driver, 2009, p. 4).

The discussion on national BAPs has attempted to clarify the structure and the content of these plans. The two most important initiatives have been a series of expert meetings on nBAPs convened by the European Commission and the so-called 'BAP Driver project'. In addition to EC efforts (described in the next section), the BAP Driver project has assisted in developing a policy guideline to help the process to develop biomass strategies that feed into the NREAPs (BAP Driver, 2009; Orthen and Brückmann, 2009). Similar to the idea of creating a common structure for a guideline for biomass plans, the template for NREAPs (EC, 2009d) should help the consistency and comparability of plans between Member States.

2.4.1 Evolution of the scope and content of national BAPs

Since the nBAPs were first proposed by the EU BAP, there have been efforts by the EU to involve key national actors in the bioenergy field in developing the scope and content of national BAPs. In the period 2006-2008, three nBAP expert meetings involving Member State and Candidate Country representatives and national experts convened to exchange views and experiences about national BAPs, and to discuss how to achieve a coherent and coordinated approach on bioenergy. The EC also initiated a discussion in this forum on the common elements for national BAPs to clarify the scope and common content of these plans (EC, 2008b).

The meeting minutes show the development of the biomass action plan concept. In the first nBAP expert meeting in June 2006, it was concluded that national BAPs go beyond studies of biomass potentials and summaries of support schemes. Furthermore, they are held to combine inter-sectoral (biomass use) and inter-service (ministries and stakeholders) approaches and to contain 'added-value components' that encompass "a problem-solving, market-oriented approach towards more market dynamics in the bioenergy sector" (EC, 2006, p. 4). In the the second meeting in March 2007 it decided that the nBAP meetings needed to be better focused on specific issues (EC, 2007). Based on results of the questionnaire developed by the EC, a discussion paper was developed on contents and purposes of national BAPs for the third meeting.

The last meeting in February 2008 concerned the dialogue on three topics: the proposal for common elements in nBAPs, collection and documentation of comparable data on biomass availability as well as biomass sustainability criteria (EC, 2008b). A so called 'coherent and coordinated approach' was proposed by the EC detailing four themes as appropriate elements to be included in national BAPs. These are presented in Table 2-2.

Table 2-2 EC proposed elements for nBAPs in February 2008 (based on EC, 2008b).

Physical and economic availability of biomass	Of different kinds; including wood and wood residues, wastes and agricultural crops and residues, including by-products
Priorities for biomass use	Biomass use and setting appropriate targets for three sectors: heating, electricity and transport, including targets or objectives for resource and energy efficiency
Measures that can be taken until 2020	- Develop biomass resources; - Mobilise new biomass resources (identification, cataloguing and exchange of best practices); - Create a competitive and sustainable market and supply chain, including consideration to imports of biomass vs. domestic supply
Implications	Land use, biodiversity and economy, including costs and impact on employment

Concerning the rather slow development of national BAPs during those three years of discussion, it became clear that more had to be done. It was apparent that the encouragement of nBAPs did not yield expected development of nBAPs. The experiences of 12 Member States reported by BAP Driver (2009) explained the slow development of national BAPs and highlighted that the political priorities were often not in biomass planning. For example in Germany and Poland the process has been reported to be initiated many times, but it was outrun by other activities with higher priority. In Austria, the political priorities are indicated to be in food and energy, while in Finland the promotion of RES is not a top priority in general. In Greece, other technologies, such as solar and wind, are favoured over biomass. In addition, a large number of actors involved and the complexity of the issues have been observed to delay the plan establishment.

As already mentioned, the RES Directive's requirement for mandatory NREAPs including various biomass related actions, created a shift of focus from voluntary nBAPs to mandatory NREAPs. Consequently, at this point it is unlikely that there will be more meetings concentrated specifically on national BAPs.

2.4.2 Requirement for national renewable energy action plans (NREAPs)

In contrast to the national BAPs, the content of the NREAPs is dictated by an official template complementing the RES-Directive (EC, 2009d). This provides guidance for the Member States in the detailing of their strategies to reach the national targets. The idea of a template is that it aims to ensure completeness and comparability of the action plans, and that they are structured so as to facilitate future reporting on the implementation of the RES-Directive (EUROPA, 2009).

The NREAPs have been mandated to be delivered by the end of June 2010. Their progress reports should be submitted by the end of 2011 and every two years thereafter until 2020. These plans need to include targets in the shares of energy from renewable sources in transport, electricity, heating and cooling for 2020; in addition, they need to outline the trajectory that renewable energy growth is expected to follow. In addition, it is required that they identify adequate measures to achieve these targets, including national policies to develop existing biomass resources and mobilise new biomass resources for different uses. To highlight it again, national BAPs should form an integral part of the NREAPs (EC, 2008b, p. 10). However, the NREAPs are expected to expand from the suggested 'coherent and coordinated' approach of the EC. An indication of the need to take the various biomass uses and users into account is that the NREAPs are requested to consider the interactions between the energy end uses and interaction with other non-energy sectors (EC, 2009d, p. 56). Then again, as the timeframe from the template development to the submission of the NREAPs has been only about one year, certain issues have had to be left to be covered by the biannual progress reports. These issues include the detailed impact assessment of renewable energy policies. Section 6 discusses NREAP elements more in detail.

Biomass community appears to put great faith in the NREAPs to guide the EU to the 2020 targets (Vagonyte, 2010). Consequently, Member States have been provided guidance especially concerning the biomass part of their NREAPs. The European Biomass Association (AEBIOM) organised a workshop on the bioenergy part of the NREAPs in March 2009 and March 2010. The 2010 event was centred upon comprehensive, specifically focused targets on small scale heat and biogas, effective measures to support market development, and biomass supply issues, in creating 'the right strategy' for bioenergy in the NREAPs. As the NREAPs will define the framework for bioenergy support schemes and investments for the coming ten years, AEBIOM has suggested that clear guidelines should be given to those who have to formulate such plans to ensure that all biomass resources and markets are considered properly (AEBIOM, 2009).

3 Policy coordination, integration and coherence

This section presents the concepts of policy coordination, integration and coherence and combines them with some of the recommendations from the biomass policy literature.

3.1 Definitions

The concepts of *policy coordination, integration, consistency and coherence* are considered to be central for this study. In order to provide insights into biomass planning, this section shall first examine their definition. There are various definitions for all these four terms, and these are shortly discussed as follows.

Coordination: In general terms, *coordination* is "the act of coordinating, making different people or things work together for a goal or effect" (Saxena, 2009, p. 31) or "harmonious combination of agents or functions towards the production of a result", following the physiological definition after OED Online (2010a). According to Jones (2002, p. 391), *policy coordination* means "getting the various institutional and managerial systems of government that formulate policy to work together". This implies for this work that the policy coordination is seen as ensuring that different actors and issues concerning biomass use work together for common goals and results.

Coherence and consistency: It is important to view the concept of policy coordination as only a part of achieving coherence in policy making. Jones (2002) argues that *coherence* goes further than the concepts of policy coordination and *consistency*, the latter focusing on "avoiding conflict among policies in reaching for broader goals" (Jones, 2002, p. 391). The reason is that coherence "involves the systematic promotion of mutually reinforcing policy action across government departments and agencies creating synergies towards achieving the defined objective". It also "stresses the cumulative value-added that is possible from efficiently interweaving the contributions made by different policy communities" (Jones, 2002). Another way to define policy coherence is that it is about attaining a situation in which multiple and potentially conflicting goals can be made compatible (Richardson quoted in Winship, 2006). In this vein Mickwitz et al. (2009, p. 24) indicate that "policy coherence is used to imply that the incentives and signals of different policies – climate and others – provide target groups with non-conflicting signals". Thus, policy coordination is one of the ways to achieve coherence.

Integration: Policy integration also contributes to policy coherence as it introduces means to reduce coherence problems, as an example of climate policy integration, between sectoral and climate policies (Mickwitz et al., 2009). In general terms, policy integration holds the idea of inclusion of specific policy objectives into other public policies (Mickwitz and Kivimaa, 2007). Lafferty and Hovden (2003) maintain environmental policy integration[6] to

[6] Developed from the policy integration definition of Underdal (1980), who argues that in order to a policy to qualify as 'integrated' three requirements need to be met: comprehensiveness, aggregation, and consistency. While comprehensiveness signifies time, space, actors and issues, aggregation is about establishing the evaluation of policy on 'accumulated' decisions. Consistency entails harmony and accord of different components. Based on these requirements, a fully integrated policy is one where "…all significant consequences of policy decisions are recognised as decision premises, where policy options are evaluated on the basis of their effects on some aggregate measure of utility, and where the different policy elements are consistent with each other" (Underdal, 1980, p. 162).

be "the incorporation of environmental objectives into all stages of policymaking in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of policy". Moreover, Mickwitz et al. (2009) see it as important that various policy aims and instruments are consistent with each other; or as Lafferty and Hovden put it, contradictions should be minimised, while prioritising environmental concerns when policies have conflicting goals. They argue that environmental objectives cannot be balanced with the objectives of other policy sectors as they link with the protection of the carrying capacity of nature (Lafferty and Hovden, 2003).

3.2 Application of policy coordination, integration and coherence

Based on the abovementioned points, policy coherence, consistency, integration and coordination can all be considered as vital elements of good policy making. However, if the policy coherence reflects the "more positive view of how to reach those broader goals" (Jones 2002, p. 391), then it can be questioned whether that should be the "ultimate" aim also for biomass policies rather than policy coordination, called for by the EU BAP. In any case, this paper takes a more practical approach and fuses the above discussed definitions. Therefore, biomass policy coherence is defined as ensuring that *different actors and issues concerning biomass use work together for common goals and results while minimising contradictions between different policy aims, prioritising environmental objectives and capturing synergies.*

Antikainen et al. (2007, p. 75) argue that bioenergy is an example of environmental policy being integrated into other policy sectors, and when combined effects of these various policy sectors need to be considered in decision making. Several literature sources on sustainable biomass policy have indeed stressed that bioenergy policies should be integrated with or linked to other related policies. As a cross-sectoral issue, it must be integrated (at least) into forestry, agriculture and land-use policies (FAO, 2008, p. 46; IRGC, 2008, p. 55). As Bringezu et al. (2007a, p. 44) state, a sustainable biomass strategy has to consider the interrelations of material, energy and land use, and it should be included in a cross-sectoral strategy for sustainable use and management of resources. It appears logical that limited biomass resources can be used more efficiently when there is a coordinated approach on biomass use. A coordinated strategy can also assist in finding synergies between various biomass pathways. As one example, this can be enabled by the application of 'cascade principle' (e.g. using first wood products that can be recycled, then for energy; see more from section 6.1.2). Furthermore, the efficiency of the conversion of biomass for energy (e.g. combined heat and power, i.e. CHP vs. biofuels) and the capability of biomass to act as an inherent energy storage – buffering fluctuating renewable energy sources like wind in order to allow a higher penetration of renewable energy as a whole – should not be neglected in a biomass strategy.

Furthermore, it is highlighted that bioenergy objectives must be taken into account within broader policy strategies; this encompasses the idea that bioenergy policies must be coordinated with other related policies (IRGC, 2008, 18-20).[7] Thrän et al. (2006, p. 27) support this thought by advocating better coordination of the political frameworks in the agricultural, energy and environmental sectors. In addition, energy policy aims and support instruments applied to these sectors need to be better coordinated to avoid competing use and to plan for uncertainties. A 'good' example of this is the food vs. fuel debate,

[7] Note that bioenergy objectives are often shared with other policies, such as job creation, mitigation of climate change, energy security and environmental quality.

exacerbated by the uncoordinated policy actions among governments internationally; consequently, there is a demand for policies, which enhance the trust in access to food (OECD/FAO, 2010, p. 63). On a same vein, FAO urges greater coherence among agriculture, food security and climate change policy-making; the promotion of Integrated Food Energy Systems (IFES) is suggested to be part of the solution (FAO, 2010b, p. 15). As around half of the human population relies on traditional, and often unsustainable biomass to meet their energy needs,[8] IFES can alleviate the need for food and energy, as these integrated systems aim to produce both of them simultaneously; see more from FAO (2010b). More coordinated take on policies and institutions directing sustainable woodfuels, highlighted by FAO (2010a), appears also to be part of the solution.

Another, albeit related issue is the indirect land use change (ILUC) implications related to biofuels production. According to Croezen et al. (2010), current policies need to be reformulated if we wish to avoid additional emissions associated with ILUC. Directing biofuel production to a more sustainable path needs informed decision making process, and for this purpose UNEP DTIE (2010a) suggests the creation of comprehensive land use planning and management systems. It also necessitates that this planning process adopts a cross-sectoral, multi-level and participatory approach in order to improve coherence of all relevant policies, to collect all available data and to gain support among stakeholders.

BAP Driver operational guideline (Orthen and Brückmann, 2009) aims to guide the integration of the bioenergy sector towards a well balanced political strategy. The list of items to be tackled by national biomass strategies and NREAPs shows the highly diverse and complex nature of the biomass use field: different biomass sectors and/or steps of the value chains, steps of the policy process, administrative levels of the policy processes and various policy perspectives. Just as a one example to portray the complexity, there are various levels at which the policies are made – international/EU, national, regional and local levels. Bioenergy policies are often determined and implemented at the national level. On the one hand, a diversity of sub-national or local conditions (related among other things to differing socio-economic and agro-ecological circumstances; WBGU, 2009, p. 315) ought to be accounted for by developing national policies from the bottom-up and by flexibility in their local implementation (IRGC, 2008, p. 20). On the other hand, various related risks have implications on a global scale and demand a global perspective (IRGC, 2008, p. 21). Moreover, effective multi-level governance and transboundary action is needed as bioenergy policy cannot be developed only within the national context; in short, multi-level policy approach is required (WBGU, 2009, 315-316). Consequently, the IRGC (2008, p. 21) recommends that policies determining the biomass use for energy "allow for full consideration of global, regional, national and local perspectives and also reflect the different capabilities and needs of industrialised and developing countries".

[8] An excerpt of the World Energy Outlook on energy poverty estimates that in 2009, 40% of human population (2.7 billion) depended on traditional biomass fuels for cooking (OECD/IEA, 2010, p. 9).

4 Strategies, plans and strategic planning

To guide the reader, this section presents a selection of theory enfolding the topic of strategic planning, which is followed by main features of sound policy (section 5). Then the paper seeks to relate them with the recommendations of the biomass policy literature (section 6). This is intended to provide understanding of the point of departure of national biomass strategies and action plans.

A linkage between coherence and sound policy making is provided by Bullock et al. (2001, p. 15) with words: "modern public policy needs to be soundly based, enduring and coherent", equating modern policy to better policy. Better policy contributes to better performance, and is described as "policy which is informed by a full understanding of the practicalities of delivery, rigorously assessed for its realism, designed with a capacity for continuous improvement, and understood by everyone with a role to play in putting it into practice" (Mulgan and Lee, 2001, p. 10).

4.1 Key concepts

According to a survey among UK government's civil servants, there is an increasing awareness among policy-makers about the need to adopt a strategic approach to policy-making (Bullock et al., 2001, p. 67). This approach contains an idea of policy-makers being more forward- and outward-looking, i.e. the first including the ideas of taking a long-term view and clearly defining outcomes that the policy is designed to achieve, and the latter being about considering influencing factors and drawing on experience of other countries (Bullock et al., 2001, p. 14).

This approach essentially matches the concept of strategic planning. Understanding its importance starts with understanding the various interpretations of the term 'strategy'. There are a multitude of definitions to strategy; however, it can be on the one hand considered as a plan of action to accomplish a specific goal (Editors of the American Heritage Dictionaries, 2000) and on the other hand, it is "a direction and scope of the organisation over the long-term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations" (Johnson et al., 2005, p. 9). Ask management theorist Henry Mintzberg and he says that strategy is definable by five Ps: plan, pattern, position, perspective and ploy (Mintzberg, 2000, 23-29; Mintzberg, et al., 1998, 9-15). Along with the definitions of Mintzberg, Porter (1996) indeed argues that strategy is about a unique position, which is attained by choosing among a variety of activities those ones that are different from competitors. The strategy definition of Bryson (2004, p. 46) – a pattern of purposes, policies and actions; varying by level, function and time frame – is intentionally broad. He aims to draw attention to seeking consistency across four components: "rhetoric (what people say), choices (what people decide on and are willing to pay for), actions (what people do), and the consequences of those actions".

Furthermore, in the quest of comprehending better the function of biomass strategies and plans, revisiting Mintzberg's strategy definitions can assist. He points out that while strategy as a plan looks into the future, strategy as a pattern describes a consistency in behaviour over time (i.e. looking into the past). These two concepts are called as *intended* and *realised* strategies, respectively. A third type of a strategy is however needed to be defined, an *emergent* strategy, in which a realised pattern was not particularly intended. *Deliberate* strategies

are those which intentions are fully realised (Mintzberg, 2000, 23-25; Mintzberg, et al., 1998, 9-11).

When it comes to planning, it has been held in the business world as the way in which managers develop and change their goals and ensure that these goals are achieved (Smith, 1996, p. 104). According to Mintzberg, planning is "a formalised procedure to produce an articulated result, in the form of an integrated system of decisions" (Mintzberg, 2000, p. 12). He also argues that the key to understanding planning is formalisation, i.e. to decompose, articulate and rationalise the processes by which decisions[9] are made and integrated into organisations. Strategic planning thus fuses planning and decision making (Bryson, 1988); with words of Bryson (2004, p. 6) it can be defines as "a disciplined effort to produce fundamental decisions and actions that shape and guide what an organization (or other entity) is, what it does, and why it does it". It should be noted that strategic planning and strategic management are not synonymous; the first is encompassed by the latter, which pertains to "managing an organization in a strategic manner on a continuing basis" (Poister and Streib, 1999, p. 310).[10]

4.2 Application of private sector models to public policy

4.2.1 From business world to public sector

Strategic planning has its roots in the private sector and has inspired public and non-profit sector planning (cf. Kaufman and Jacobs, 1987; Porter, 1996; Rondinelli, 1976). While strategic planning in the business world arose in the 1960s, the concept is known to permeate the public sector twenty years later, that is in the 1980s (Kaufman and Jacobs, 1987; Pindur, 1992). Public planning at the time was considered to signify long-range planning (also called as comprehensive or master planning), which however was considered to fail to yield desired results (Rondinelli, 1976). The corporate strategic planning approach was introduced to improve its effectiveness, as it was regarded to focus more on action and results, promoting wider participation in the planning process and stressing the assessment of strengths and weaknesses in the context of opportunities and threats (Kaufman and Jacobs 1987).[11] Other benefits of strategic planning entailed clarification of direction and assistance in decision making (Berry and Wechsler, 1995; Bryson, 1988; see more for discussion on benefits Poister et al., 2010 and for comparison of traditional vs. strategic planning Kemp, 1990). In addition, the reasons behind the introduction of this concept to public sector included the argument that due to dramatic changes in the environments of public and non-profit organisations – such as significant demographic shifts and quick technological changes[12] (Kemp, 1990) – they needed to adopt the strategic planning

[9] Planning has been used as a synonym for decision making in the public sector (Mintzberg, 2000, p. 9). According to Smith (1996, p. 142), if a decision includes a commitment to future action, every decision must thus constitute a plan or a part of a plan.

[10] Strategic management in the public sector can also be called as strategic public management (Steurer, 2007). Poister and Streib (1999, p. 323) defined it as "the central integrative process that gives the organization a sense of direction and ensures a concerted effort to achieve strategic goals and objectives".

[11] However, Kaufman and Jacobs (1987) found that corporate strategic planning was not fundamentally different from good comprehensive planning in the public sector; the emphasis was different, but they were the same 'kind'.

[12] This context is relevant to bioenergy and biofuels.

approach in order to successfully meet the various challenges ahead (Bryson, 1988; Kemp, 1990).

While the application of private sector approaches have largely been seen as positive, some critical views include the notion that entrepreneurial values cannot directly be applied to the public sector due to different purposes, tasks and conditions[13] (cf. Smith, 1996; Stewart and Walsh, 1992). However, despite that and the overall failure of planning in both business and public realms, advocated by Mintzberg (1994, 2000) and Voß et al. (2009) respectively, strategic, long-term planning in the public sector seems to have regained its position (Voß et al., 2009). More research is nevertheless called for to properly understand strategic management in the public sector (Poister et al., 2010).

4.2.2 Rational and incremental models

To close the 'circle', starting from searching the origin of strategic planning in the private sector and continuing to public sector applications, it is essential to examine the linkage between strategic management concepts and policy-making. However, before going further to its applications, this discussion will briefly examine the controversy revolving around planning, which also explains the decline in planning described above. As planning is essentially linked with the way policy decisions should be or are made, it is affected by two main decision making theories: *rational* and *incremental* models.

According to the first theory, decision making is about selecting those alternatives that maximise outcomes – essentially based on decision-makers' values, the choice achieved through comprehensive analysis of all alternatives and their consequences (Simon cited in Hill, 2005, p. 146, cf. Howlett and Ramesh, 2003, 166-167). Thus, it is called also as rational-comprehensive model (cf. Lindblom, 1959, p. 81). One of the principal criticisms against this model says that decision making in practice usually is not so purposive or logical; in addition, decision-makers are rarely able to consider all possible alternatives during the process (Hill, 2005, p. 146). Consequently, Herbert Simon, probably the best known critic of the rational model, developed the idea of '*bounded rationality*' to better portray the real life decision making. Instead of maximising their values, decision-makers choose an alternative, which is satisfactory or good enough (Simon cited in Hill, 2005, p. 147; see also Howlett and Ramesh, 2003, p. 170).

Those criticising the rational theory hit exactly on the point that decision making is a complex and collective process in practice; rather than through rational analysis, decision making proceeds by '*successive limited comparisons*' with earlier, familiar decisions (Braybrooke and Lindblom quoted in Hill 2005, 147-148; see also Howlett and Ramesh, 2003, p. 171). According to one of the leading advocates of incrementalism Charles Lindblom (1959, p. 81), developing policies is actually closer to "continually building out from the current situation, step-by-step and by small degrees". He also called this way of formulating policies as '*muddling through*' (or '*disjointed incrementalism'*), in which policies are formed/changed incrementally from the status quo (cf. Hill, 2005, p. 149; Howlett and Ramesh, 2003, p. 171).[14] Comparing to the rational theory, it has also been argued that the incremental way of

[13] For example, typical of the public sector is that it is required to provide 'public goods', in other words "a commodity or service provided, without profit, to all members of a society" (OED Online, 2010b). This is usually contrary to the private sector purposes.

[14] Kay (2010, p. 62) interprets Lindblom's term as 'obliquity' as "a process of experiment and discovery". It entails that "[s]uccesses and failures and the expansion of knowledge lead to reassessment of our objectives

making policies is a less technical and more political activity, and that is largely determined by bargaining and negotiations between key decision-makers rather than a comprehensive analysis (Howlett and Ramesh, 2003, p. 166). Benefits offered by this approach include that serious mistakes are avoided through incremental changes (Lindblom, 1959, p. 86) and by dealing with selective issues as they arise (ad hoc), new evidence can be picked up and utilised rapidly (ODI, 2009). Nevertheless, this model is neither without criticism, such as it lacks goal orientation and is conservative (Howlett and Ramesh, 2003, p. 172 referring to the work of Forester); see more for criticism e.g. Boyne and Gould-Williams, 2003; Weiss and Woodhouse, 1992, and discussion on alternative perspectives Hill, 2005; Howlett and Ramesh, 2003; Kay, 2010).

This dichotomy between the two theories of decision making has been the source of debate since the 1960s. Parallel to this discussion is the dispute between the two models of planning as methods to policy formulation, taking place among strategists in two different schools, i.e. planning and learning schools (Brews and Hunt, 1999; Steurer, 2007). As Mintzberg et al. (1998, p. 15) and Chaffee (1985) have confirmed strategy has not one single definition even if there is some kind of consensus of its nature. It has been suggested that this is because strategy is both multidimensional and situational (Hambrick, 1983). Thus, its formation process can also take several forms depending on the perspective or 'school of thought'; Mintzberg (2000, p. 3) and Mintzberg, et al. (1998, p. 4) have defined ten of these schools. As Brews and Hunt (1999) describe the confrontation between the two schools, strategic planning models range from the formalised processes (conforming to the planning school) to incremental processes (learning school). According to the planning school, strategic planning is seen as a rational, linear and formal process (Chaffee, 1985). Furthermore, typical to planning school, strategies must be formed through a controlled, conscious process of formal planning and the result of this process is an entirely ready product to be implemented via detailed attention to objectives, budgets, programs and operational plans (Mintzberg, 2000, p. 42; Mintzberg, et al., 1998, p. 58).

On the contrary, in the learning school's point of view strategies are not formed through rational analysis but through adaptive, dynamic, non-linear, incremental and emergent learning process (cf. Brews and Hunt, 1999; Quinn and Voyer, 1996, pp. 98, 100). Even if Lindblom's disjointed incrementalism was not considered as a suitable theory for strategy formation, he has been said to point the way toward this school of thought (Mintzberg et al., 1998, p. 180). James Brian Quinn expanded the concept and arrived to a conclusion that strategy can be formed incrementally, but instead of 'muddling', the process is about '*logical incrementalism*' (Quinn and Voyer, 1996, p. 96). According to this approach – argued to better match the real life – broad ideas lead to specific commitments in a flexible and experimental manner. Making those specifics concrete as late as possible allows the organisation to decrease the uncertainty and utilise the best available information (Quinn and Voyer, 1996, p. 98). According to Quinn (as cited in Mintzberg et al., 1998, p. 182), it is essential to promote strategic visions that are changing and improving; however Mintzberg (2000) points out that formulation of a document is not necessary.

To return to the failure of strategic planning, Mintzberg (2000, p. 221-321) offers an explanation through his explicit criticism against the planning school. The three 'fundamental fallacies' in his opinion are:

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and goals and the actions that result." For this reason, he establishes that good decision making is necessarily oblique (instead of rational/direct) in complex systems and an uncertain environment.

1. *Predetermination*: Strategic planning assumes predictability and stability during strategy making while ignoring that the process is actually dynamic and uncertain.
2. *Detachment*: Planners and managers (implementing the plan) are both disconnected from strategy making process; while the first often are detached from real life (soft) information, the latter is lacking strategic vision and substituting soft data for hard. Essentially, thinking is detached from acting and formulation is disconnected from implementation.
3. *Formalization*: It is assumed that strategy formation process, including manager's intuition and creativity, can be formalised, and that it can capture "the messy informal processes by which strategies actually get developed".

After this discussion, Mintzberg comes to a conclusion of a grand fallacy: strategy cannot be planned as planning is about analysis and strategy is about synthesis. Thus, he suggests that instead of strategic planning, the term '*strategic programming*' should be used. He further claims that strategic planning and strategic thinking are not the same as strategic thinking involves intuition and creativity, which cannot be developed by formalised planning (Mintzberg, 1994, 2000, pp. 321, 333). In any case, as strategic planning is such an established term, it is continued to be used in this study.

4.2.3 Strategic planning examples in public policy

Looking back to the statement of Mulgan and Lee (2001) on better policy contributing to better performance, studies such as Boyne and Gould-Williams (2003) have iterated along the same lines that there is a notion among policy-makers that better planning leads to better organizational performance.[15] The benefits of applying strategic planning to policy-making contain, among others, the ideas that it supports the definition of policies creating public value (Moore, 1995), suggests how to address community needs and explains how policies should be put into practise (Mazzara et al., 2010). Furthermore, policy implementation is argued to demand strategic planning in order to utilise proper timing and atmosphere for action (Rondinelli, 1976). Examples of strategic management ideas applied to various policy fields include sustainable development planning (Mazzara et al., 2010; Steurer, 2007; Williams, 2002), forest sector (Gane, 2007), tourism sector (Edgell et al., 2008) and military sector (U.S. Air Force of Barzelay and Campbell, 2003). Strategic planning at different policy-making levels are acknowledged for instance by Bullock et al. (2001) and Wechsler and Backoff (1986) (national level), Kasza (2009) (regional level) and Williams (2002) and Mazzara et al. (2010) (local/community level). Supporting the linkage between the business management models and bioenergy policy making, the BAP Driver project has created a model for an integrated bioenergy policy approach, which is based on processes

[15] However, e.g. Boyne and Gould-Williams (2003) and Bryson and Roering (1988) point out that there has been little research especially on the impact of planning on the performance in the public sector. The research of Boyne and Gould-Williams (2003) indicates that the production of action plans has an insignificant impact on the performance of public organisation but acknowledges it is the first empirical study of its kind. Poister and Streib (2005), however, arrive to a more positive conclusion in that the development of action plans is positively associated with the perceived impacts at the city level strategic planning.

drawn from strategic management theory (namely by Hill and Jones, 2010, but adapted for the bioenergy policy guideline (Orthen and Brückmann, 2009).[16]

Relevant to this discussion, and additionally assisting in understanding the role of biomass action plans, is the level of decision making. Harrington and Ottenbacher (2009) have distinguished three levels of organisational decision and process, namely strategic, tactical and operational levels. Such divisions have also been applied by Gane (2007, p. 284), specifying them to concern long-term, medium and short, day-to-day matters, respectively.[17] This is reflected, even if in somewhat varied forms, in the policy development process of Government of South Australia (2007), which argues it to be composed of three connected levels of policy making, i.e. directional, strategic and operational. Similar to these levels, Wilson (2006, p. 153) describes that policy making involves different levels; day-to-day operations might not be policy, but "inextricably linked" with higher level policy making. Strategic decisions are complex in nature, are characterised by uncertainty about the future and demand an integrated approach to managing an organisation (Johnson et al., 2005, p. 10-11); they are also likely to affect operational decisions. Then again, Gane (2007, p. 13) is of the opinion that the uncertainty related to the strategy process is linked with the tactical and operational level issues, such as programme funding (in the context of forest sector). Consequently he suggests that the content and timing of plans need to incorporate enough flexibility.

Reflecting the main levels of decision making, two types of (business) plans are depicted by Smith (1996). Strategic plans are complex and correspond to the decisions made about future activities and long-term goals, whereas operational plans contain clear communication about who is going to do what, by when, with what resources and to what standard (Smith, 1996, pp. 46, 56). Planning can also be used to reduce or remove uncertainty from strategic and operational planning by attempting to answer to "what if" questions about the issues that can affect the achievement of long-term success; these are known as contingency plans (Smith, 1996, p. 236; see also Mintzberg, 2000, p. 252-253).

Based on the discussion on strategic management in the public policy context, a question arises: if strategic planning is so complex and has failed in the past, why is it kept being done? Mintzberg (2000, p. 333) responds that organisations, especially the effective ones, engage in formal planning in order to elaborate and operationalize the consequences of their strategies formally. To clarify based on Mintzberg's grand fallacy, formal planning is not done to create strategies *but to program already existing strategies*. For example in the context of Polish regional development policy, operational programming needs to accompany strategic planning[18] (Kasza, 2009). Boyne and Gould-Williams (2003) confirm that planning (in private organisations) has often been equated with the production of planning documents, and argue that this disregards the conceptualization of planning as a process. As the formal plan, itself an essential part of the planning cycle, does not constitute the whole cycle and may not

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[16] This is based on the information given in the email communication with Robert Brückmann at eclareon, 20 October 2009.

[17] The three decision making levels can also be defined in terms of the scope of the responsibilities: strategic (national), tactics (sub-national) and operational level (day-to-day) (Gane, 2007, p. 13).

[18] Nevertheless, the term programming should not be confused with program planning, which is a "conscious strategy developed to facilitate problem solving in human services", described by Netting et al. (2008, p. 265). However, Hogwood and Gunn (1984, p. 16) present that policy can be viewed as a programme, which is "a defined and relatively specific sphere of government activity involving a particular package of legislation, organisation and resources".

tell about the other parts of planning process (which may not result in a written plan), it is necessary to measure different elements of planning (Boyne and Gould-Williams, 2003). Johnson et al. (2005, p. 572) agree that strategy is not the same as 'the plan', i.e. a written document, but a long-term direction that the organisation is following. Mintzberg (2000, p. 333) further clarifies that "strategy is not the consequence of planning but the opposite: it's starting point. Planning helps to translate intended strategies into realized ones, by taking the first step that can lead to effective implementation."

4.2.4 The role of biomass action plans

The next question that arises is: where do the biomass action plans stand? Even though policy strategies and action plans have been established in numerous public policy fields, from health and human rights to trade and sustainable development, a lack of research is observed on their exact role in the policy process. Sharma (2009, p. 6) and Bryson (2004, p. 50) suggest that an action plan is an implementation tool that identifies implementation options and supports effective implementation process. Additionally, Poister and Streib (2005) see the development of action plans as a tool for implementing strategic initiatives in the city level strategic planning. Mintzberg's notion on the formal plans is useful, as the action plans are essentially 'formalised articulation' of countries' intended strategies. Steurer (2007) further clarifies the issue by noting that formal plans are strategic devices, which should not be rejected when outdated. He touches upon the idea of flexibility and learning in the strategy process, which will be discussed shortly. Moreover, Mintzberg suggest the roles of formal plans – coinciding with the reasons for planning – are two-fold: media for communication and devices of control (Mintzberg, 2000, 351-352). Planning, and its products, can also act as symbolic demonstrators of political will to interest groups (Steurer, 2007). At any rate, action planning in principal seems to follow the theses of the planning school, such as comprehensive analysis of alternatives, relatively tight control of the process with steps and timetables and the idea that decision are made in order to drive behaviour, i.e. as an intended/deliberate strategy. Based on Mintzberg et al. (1998, 52-53), action plans can be seen to fit on the strategy operationalisation stage in the basic strategic planning model.

The positioning of biomass action plans in the policy process relates to the issue whether action plans and strategies are considered as policies per se. As Wilson (2006, p. 153) stresses, operational level decisions are linked with high level policy making. Public policy – among many definitions – is distinguishable from 'decision' (e.g. considered larger than a specific decision) but less readily to be distinguished from 'administration' (Hogwood and Gunn, 1984, 19-20). As Parsons (1995, pp. 462, 465), policy-making does not finish at a policy being established, but continues to be carried out while the policy is being put into effect, i.e. implemented (or administered). In this study, however, such a fine line is seen between biomass action plans (and strategies) as policies vs. policy tools that it is considered to be appropriate to search for ways to better plan biomass use based on sound policy characteristics.

Developing the multidimensional role of biomass action plans requires examination of both the level of policy making (strategy vs. operational) and the context of planning. As the terms seem to often be used interchangeably in today's policy making, it is not always that clear what exactly action plans are supposed to achieve. Initial examination of biomass action plans (Kautto and Peck, 2009) reveals a heterogeneous approach to biomass planning and a mix of terms; in addition to action plan and strategy, the terms implementation plan

and roadmap have been used.[19] One can question whether they all serve a similar purpose. For example, a *roadmap* has been defined as "a means of bringing about or reaching something" and nowadays is often used to signify "a plan or a strategy intended to achieve a particular (political) goal" (OED Online, 2010c). Also Mintzberg, quoting Sawyer, has held the roadmap as a strategy or a strategic plan with a fixed and well-defined target (Mintzberg, 2000, p. 228). This topic is further analysed in Kautto and Peck (forthcoming), which shows that the established biomass action plans in six EU countries do demonstrate a mixture of strategic and operational features. Perhaps the action plans are the products of strategic planning, which integrate strategic and operational levels in a common approach, described by Plant (2009); however this needs to be further examined.

Concerning the context and the form of policy planning, Steurer (2007) has argued that both planning schools show significant weaknesses when it comes to cross-sectoral policies such as sustainable development (SD) policies. Instead of SD strategies following strictly either planning models at the extreme ends of perspectives, he proposes that these strategies rather represent a hybrid strategic approach. This, and the overall existence of SD strategies, Steurer justifies largely by the nature of the concept of sustainable development; it requires a long-term view, concerns various actors and involves several sectors. In addition, the reality of environmental destruction and policy-making in general is much more complex than the ideal planning models suggest. Therefore, Steurer argues that neither a rigid and rational planning model with a top-down approach, nor purely incremental planning lacking shared vision, is suitable for guiding strategic management of sustainable development. Steurer further asserts that SD policies need, to some extent, a deliberate, formal strategy that – quoting Dalal-Clayton and Bass (2002, p. 6) – matches its sophistication with complex challenges (see details on the characteristics of the hybrid concept Steurer, 2007). In addition, Bagheri and Hjorth (2007) speak for 'process-based' approaches instead of 'fixed goal' approaches on SD strategies as they consider sustainability as a moving, continuously evolving target.

These accounts on sustainable development strategies mark the path for understanding biomass policy planning. Similar to SD policies, it can be argued that policies touching upon biomass use equally require sophisticated, process-based, formal planning with long-term shared vision due to the complexity and diversity of the biomass field. Furthermore, revisiting the earlier discussed concepts, coordination by planning is not a new idea. In fact, that is one of the planning school's reasoning for planning (formally), i.e. "organizations must plan to coordinate their activities", especially because its capacity to enhance communication, building mutual confidence and knitting disparate activities together (Mintzberg, 2000, 16-17). However, as Mintzberg (2000, p. 17) points out, coordination can happen also informally. This way of informal communication, 'mutual adjustment', was described by Lindblom (explained in Hill, 2005, p. 149). This entails coordination between people in the absence of a central coordinator, for instance independent decision-makers coordinating their behaviour. Rondinelli (1976) stressed the dynamic conditions of public policy making and proposed new approaches to planning to develop strategies and policies designed to achieve social acceptance. These new approaches entail adopting various planning styles, one of which is coordinative planning. Rondinelli (1976, p. 81) argues that "planning for policy enactment and implementation requires co-ordination and integration of the decisions of the multitude of participants involved in policy-making". This type of planning aims to reconcile differences among decision-makers. He further purports that

[19] For instance, the Bali Roadmap of the UN Climate Change Conference in 2007 includes The Bali Action Plan (UNFCCC, 2010).

"the great potential for policy co-ordination lies within spheres of influence among groups seeking mutual gains. Co-ordination, to be successful, must have an explicit objective." The views of Rondinelli provide additional justification for seeking coordination with the means of planning in the case of biomass use.

5 Features of sound biomass policy

Looking into the public policy literature and the building blocks of 'good' policy, it is considered to be made, among others, of realistic and meaningful targets reflecting the desired policy outcomes (Mulgan and Lee, 2001, p. 10) as well as of reliance on the use of evidence, analysis and evaluation (Government of South Australia, 2007).[20] Government of South Australia (2007) and Bullock et al. (2001) have listed the essential components for good or better policies, such as fairness, transparency, forward[21] and outward looking, innovation and evidence-based. In the extent literature, these and the other 'good' policy terms have been used in several ways and are often open to many interpretations, but here they are intended to be described to serve the purpose of this paper. The sound policy and planning features relevant to this paper are summarised in Table 5-1 (overleaf), which structures sound policy features mainly according to the terminology of Bullock et al. (2001, p. 14) to maintain a degree of comparability between this paper and earlier work by others.

5.1 Continuous learning

Both public policy making and strategic management in general are considered as continuous processes (Poister and Streib, 1999; Rondinelli, 1976). Reflecting this fact, and supporting the understanding of the characteristics of sound policy, is the idea of continuous learning, adaptation and improvement in the policy process (Mulgan and Lee, 2001, p. 4). Freeman (2006, p. 373) sees public policy making as continuous process of iteration and reiteration, as previous policy is likely to be the most important condition shaping current decisions. Policy evaluation is considered to generate great benefits of policy learning (Howlett and Ramesh 2003, 220-221). Mulgan and Lee (2001, p. 18) confirm this by saying "every new initiative needs a built-in capacity to learn from monitoring and evaluation". In addition, it is suggested that also implementation stage of the policy process can be thought as process of learning and mutual adaptation (Freeman, 2006, pp. 377, 383; see more from Pressman and Wildavsky, 1984 and Schofield, 2004). According to Mintzberg (2000, p. 289), formulation may precede implementation, but "there has to be "implementation as evolution" […] because prior thought can never specify all subsequent action".

This idea of continuous and adaptive learning is reflected also e.g. in the work of Bagheri and Hjorth (2007) and Steurer (2007). Referring to the hybrid strategic concept of Steurer, its characteristics entail among others the idea that strategy formation is seen as an open, circular process (along the lines of Mintzberg, 2000, p. 289), which is also flexible concerning varying circumstances and objectives. Steurer – confirming the work of Mintzberg – stresses that the outcome (realised strategy) depends both on intended and emergent strategies. The product, a formal plan, should be a living document (Plant, 2009), and the process itself should "allow for unexpected events by providing flexibility so that the strategy process becomes responsive to change and allows readjustment as it continues" (Gane, 2007, p. 3).

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[20] Lindblom (1959, p. 81) compares 'good policy' both from the rational and incremental decision making perspectives.

[21] According to OECD Management Agency (quoted in Jones 2002, p. 391) forward vision signifies government being "able to anticipate future problems and issues based on current data and trends and develop policies that take into account future costs and anticipated changes (e.g. demographic, economic, environmental, etc.)".

The emphasis on the process rather than fixed goals of Bagheri and Hjorth is largely based on the notion of social learning resulting from stakeholder engagement. This process "results in adaptive responses to uncertainties" and evolvement of values (Bagheri and Hjorth, 2007, p. 86). Kay (2010, 123), whose message can also applied to policy making, argues that good outcomes are indeed the result of continual – however often unsuccessful – adaptation to ever changing circumstances rather than through a conscious process of maximisation.

Table 5-1 Sound policy features and strategic planning stages.

Sound policy features	***Description***
Forward looking	Clear definition of policy outcomes and a "long-term view based on statistical trends and informed predictions of social, political, economic and cultural trends" (Bullock et al., 2001; see also Jones, 2002).
Outward looking	Consideration of influencing factors in the national, European and international spheres and how policy will be communicated with the public; drawing on experience in other countries (Bullock et al., 2001). External analysis includes the examination of: the industry (or sector/market) environment, the national environment and macroenvironment, i.e. wider socioeconomic environment (PESTLE); internal analysis focuses on identifying the organisation's resources, capabilities and competencies (Hill and Jones, 2010). Setting realistic objectives depends on the awareness of the strengths, weaknesses, opportunities and threats both internally and externally (Smith, 1996).
Joined up	Linkages to the other policy documents in the field; A holistic view and "looking beyond institutional boundaries to the strategic objectives and seeking to establish the ethical, moral and legal base for policy" (Bullock et al., 2001).
Inclusive	Process that considers the impact on and/or meets the needs of all people directly or indirectly affected by the policy; and involves key stakeholders directly (Bullock et al., 2001). The first step to successful planning is often to build communication channels among stakeholders (Sharma, 2009). Planning or decision making should ideally include both top-down and bottom-up processes (Smith, 1996).
Continuous improvement	Knowledge is passed through feedback loops between the final and the first stage, and become an input for the next planning round (Hill and Jones, 2010); continuous learning, adaptation and improvement in the policy process (Mulgan and Lee, 2001)
Planning cycle stages	***Description***
Vision/mission statement	Bridging the present with the future and creating the energy the energy needed to provide an organisation with its overriding purpose and direction (Smith, 1996); setting the desired future state and stating the key values (Hill and Jones, 2010).
Goals and objectives	Goals are general statements of aims or purposes, whereas objectives or targets specify the results and outcomes to be achieved (Smith, 1996). Goals and objectives are formulated on one hand to diminish the threats and weaknesses, and on the other hand to build on the strengths and opportunities (Pindur, 1992).
Formulation	Establishment of a strategic plan, often resulting in a formal planning document (e.g. Bryson, 2004).

Plan how to achieve objectives, i.e. measures	Measures and actions are designed to solve problems, reduce difficulties or utilise the opportunities (Avebiom and Junta de Castilla-y-León, 2009); national bioenergy policy framework, support schemes should be consistent, without forgetting the interplay of single measures (BAP Driver, 2009).
Implementation	Implementation of the policy should be considered already at the policy formulation stage (Slade et al. 2009), and part of the policy-making process (Bullock et al. 2001); good policy anticipates the challenges of implementation and is capable of adapting to the changing realities of the operational environment (Government of South-Australia, 2007).
Evaluation	Formative evaluation monitors and documents the process of implementation ('along the way'); summative evaluation focuses on the outcome or impact of the policy (Netting et al., 2008). Continuous monitoring (review) of policy to ensure that it deals with the right issues; systematic evalution of the effectiveness is built in to the policy making process (Bullock et al., 2001).

5.2 From policy cycle to strategic planning cycle

Mulgan and Lee (2001, p. 4) argue that the policy delivery is better depicted by a circular process rather than a linear one. This corresponds to a 'stage' model of policy process, also called as the 'policy cycle'. Originally developed in late 1950s by Harold Lasswell, this model breaks down the policy process into distinct stages in order to simplify the complexity of public policy-making. It was later improved by Gary Brewer, who recognised the policy process as an ongoing cycle; instead of policies terminating at the final stage of the policy cycle, they are likely to reappear in a modified form (Howlett and Ramesh 2003, 11-13). This supports the Freeman's (2006 p. 373) notion of previous policies forming an essential part of new policies. One suggestion out of numerous models of policy stages is the five-staged policy cycle of Howlett and Ramesh (2003, p. 13): 1) agenda-setting, 2) policy formulation, 3) decision-making, 4) policy implementation and 5) policy evaluation.[22] However, as with so many other models, also the policy cycle has been criticised for being far from reality; in this case it means not recognising the overlapping and interaction between the stages (Hill 2005, p. 21), and ignoring that the stages can be skipped or compressed or change order (Howlett and Ramesh, 2003, p. 14; for more criticism see Howard, 2005).

It is unclear the extent, which the private sector practices have influenced the public policy process in terms of cyclical planning models.[23] Regardless, similarities are discernible in terms of stages and the idea of continuous improvement. The analogy of public policy and strategic planning stages are beyond the scope of this paper; nevertheless, the congruence of implementation and evaluation stages is evident between public policy and business strategy making models. Thus, approaches of both models are utilised in this paper especially in terms of these stages to assist in understanding the strategic planning of biomass use.

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[22] Another, more detailed public policy process model is the nine-step model of Hogwood and Gunn (1984, p. 24): 1) Deciding to decide (issue search or agenda-setting), 2) Deciding how to decide (or issue filtration), 3) Issue definition, 4) Forecasting, 5) Setting objectives and priorities, 6) Options analysis, 7) Policy implementation, monitoring and control, 8) Evaluation and review, 9) Policy maintenance, succession, or termination.

[23] For example Gane (2007, p. 267) – in the context of forest sector strategic management – does recognise that strategy process is cyclical and consists of three basic steps (analysis, aims and action). Also Boyne and Gould-Williams (2003) mention the planning cycle in their study on public organisations.

As discussed before, action plans are seen to act as implementation tools, thus assisting the implementation of a certain policy. Therefore, it can be argued that a (formal) strategic plan fits within the implementation stage in the policy cycle. In addition, the already established biomass action plans seem to have qualities of both strategic and operational plans (the latter are called as action plans in strategic planning terms), and thus a business sector model is thought to be suitable to guide the analysis of biomass action planning. A circular model is also seen to better illustrate the idea of continuous learning and adaptation than a strictly linear model.

Smith (1996, 29-30) presents one of the planning cycles typical of business sector[24] and calls it as a 'control loop'. This control loop – in the form of a circle – is essential to any kind of effective planning with four distinct stages: drawing up the plan, implementation, monitoring and evaluation of the plan. These are incorporated in the cycle of (formal) planning process with more specific stages: developing a vision; setting goals and objectives; planning how to achieve objectives; implementation and monitoring; and the evaluation of results[25] (Smith, 1996, p. 76), see Fig. 5-1. While acknowledging that private sector models are not directly transferable to public policy, this business sector model has been taken as a basis for examining the various stages of biomass policy planning. It is considered to act as a more precise pattern of planning than the policy cycle model, which rather depicts policy making in general.

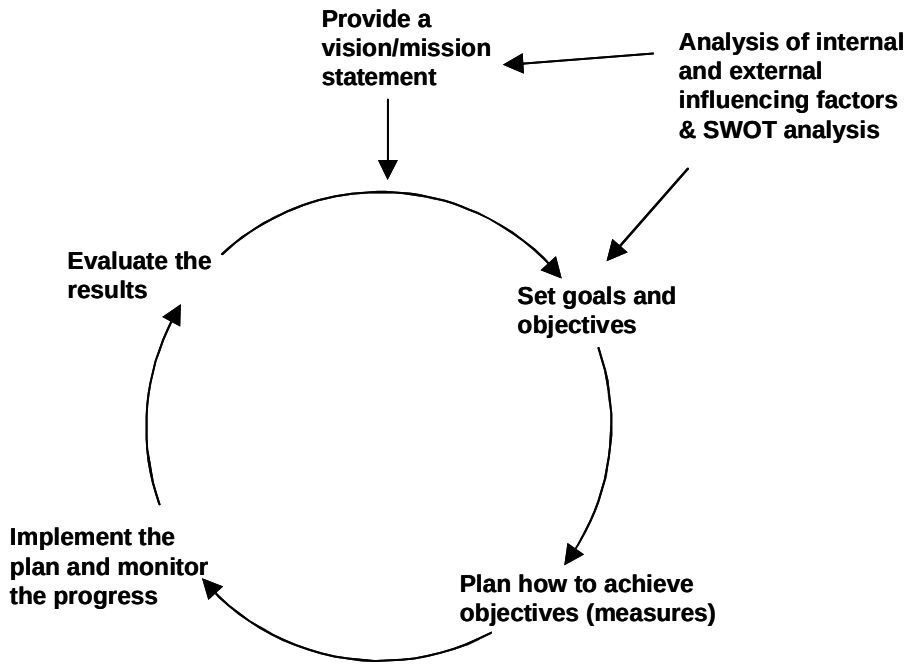

Figure 5-1 Strategic planning cycle (developed from Smith, 1996).

[24] For other, more elaborated private sector models see e.g. Bryson (2004, p. 33) and Hill and Jones (2010, p.13). They both combine linear and circular features in the sense that even if the planning process is described as linear, the feedback loops indicate the idea of continuity.

[25] This circular planning approach can be seen to have similarities with the Plan-Do-Check-Act cycle, also known as Deming or Stewhart cycle, which is central to business process improvement and quality control.

5.3 From vision to evaluation

This section discusses the strategic planning process (i.e. strategy formation) and its stages both in general terms and in the bioenergy context while bearing in mind the purposes of the paper. Public policy cycle stages are given emphasis mainly in the case of implementation and evaluation, as explained above. It also examines to which extent the strategic planning model of Hill and Jones (2010, p. 13) has been applied in the 'integrated bioenergy strategy approach' of the BAP Driver project (Orthen and Brückmann, 2009, p. 14).

5.3.1 Vision and mission statement

Often the first step, preceding the formal planning process, is to develop a vision, which bridges the present with the future and which creates the energy needed to provide an organisation with its overriding purpose and direction (Smith, 1996, p. 77). Hill and Jones (2010, p. 14) hold that a mission statement constitutes of the mission – a statement of the reason for its existence ('raison d'être'), the vision – setting the desired future state as well as the statement of the key values and major goals (however, the last component is discussed separately in this paper). According to Pindur (1992), the mission statement also guides the public sector strategic planning process. As Smith (1996, p. 76) argues, "the results achieved by any organisation depend to a great extent on the quality of the mission, vision and values and the processes by which they are defined". Moreover, Smith purports that the vision is a way to communicate the organisation's purpose to the employees in the private sector, while regarding the scope of this paper, the vision of the plan is a tool to communicate the biomass sectors' purpose to the stakeholders. Worth noticing is that the strategy model of BAP Driver (Orthen and Brückmann 2009) lacks a vision/mission statement stage altogether.[26]

5.3.2 Analysis of internal and external factors

It can be considered that the real starting point for planning is the analysis of the factors influencing the vision and objective setting. According to Smith (1996, p. 131), setting realistic objectives depends on the awareness of strengths and opportunities both in the external and internal environment. Hill and Jones (2010, p. 17) suggest that the external analysis should include the examination of three interrelated environments: the industry (or sector/market) environment, the national environment and macroenvironment, i.e. wider socioeconomic environment (see also Johnson et al., 2005, p. 65). The external factors (or forces or trends) in the macroenvironment can be divided into six main areas that influence the development of an organisation: political, economic, social, technological, legal, environmental areas (also known by an acronym PESTLE or PESTEL) (Johnson et al., 2005, p. 65; Smith, 1996, p. 112). The internal analysis, on the contrary, is focused upon identifying the organisation's resources, capabilities and competencies (Hill and Jones, 2010, p. 19; also called as strategic capability by Johnson et al., 2005, p. 117).

It is often not easy to draw the line between the internal and external factors, especially in the public policy context. This is apparent from the strategy approach of Orthen and Brückmann (2009, p. 14), which applies the analysis of internal and external factors to bioenergy sector. Orthen and Brückmann (2009, 14-15) divide the factors enabling or constraining national biomass use for energy into three linked areas: different bioenergy

[26] The reason for this may be that the authors consider the vision to be included in the goal setting (see section 5.3.4.)

sectors (electricity, heat and transport fuels), different renewable energy technologies and non-energy use of biomass (such as food and materials). As the organisation in this case constitutes of a cluster of biomass using sectors at national level, external factors include factors such as EU targets and legislation whereas the internal factors entail the assessment of domestic biomass resources. Those factors that the strategy approach of Orthen and Brückmann have categorised as internal factors, such as competition with other renewable energy technologies could also be considered as an external factor. Furthermore, at this stage it is of importance to take account of the conflicts with the non-energy use of biomass.

5.3.3 Strategic choice and SWOT analysis

Comparison of the strengths, weaknesses, opportunities and threats both internally and externally – also called as a SWOT analysis[27] – is aimed to yield a range of strategic alternatives or choices. Based on these alternatives, those strategies are identified which best match the resources and capabilities to the environment (Hill and Jones, 2010, p. 19). Bryson (2004, p. 42) calls this stage as identification of strategic issues;[28] these issues being central policy issues or crucial challenges impacting the organisation. As he points out, at this stage the organisation might find out that their mission needs to be reformulated because of the new understanding acquired through the external and internal analysis (see Bryson, 2004, 153-182, for further approaches on strategic issue identification).

In the context of bioenergy planning, resulting from this analysis should be a sound assessment of the biomass potential, as Orthen and Brückmann (2009, p. 15) argue. This analysis necessitates that availability of biomass is assessed by means of sustainability criteria. This is related to much more than just endogenous resources and their availability – here Member States must decide on to what extent biomass resources outside the EU should be exploited (Bringezu et al., 2007a, p. 9). In fact, one way to manage bioenergy related risks is to apply sustainability criteria and certification schemes (IRGC, 2008, p. 56) (for more information on sustainability criteria and certification see e.g. Peck et al., 2010; WBGU, 2009 and Vis et al., 2008).

5.3.4 Goals and objectives

Goals and objectives are formulated on one hand to diminish the threats and weaknesses, and on the other hand to build on the strengths and opportunities (Pindur, 1992). Even if they are often considered to mean the same (and treated as such to a certain extent in this study), Smith (1996, p. 24) offers a distinction by stating that goals are general statements of aims or purposes, whereas objectives or targets specify the results and outcomes to be achieved (see also Johnson et al., 2005, p. 209 and Pindur, 1992).[29] Thus, the objectives could also be regarded as measurable goals. As Mintzberg differentiates them, "goals are the intention behind decisions or actions…an objective is a goal expressed in a form by which its attainment can be measured" (as cited in Smith 1996, p. 23). In the business world, objectives are often aligned with the SMART principle, which contains the idea of sound

[27] Bryson (2004, p. 44) uses the term SWOC, replacing 'threats' with 'challenges'.

[28] For another example on issue selection and identification, see Pindur (1992).

[29] For instance, Hill and Jones (2010, 16-17) do not seem to make this difference, but consider goals as precise and measurable.

objectives being specific, measurable, attainable, realistic, and time limited (Smith, 1996, 24-25). As Pindur (1992) stresses, objectives are focused on what and when instead of how and why. Concerning the number of goals or objectives, an 'economic approach' entailing setting only few primary goals per initiative (in the policy context) is suggested by Mulgan and Lee (2001, p. 18). This is supported by the finding of Boyne and Gould-Williams (2003) on more targets linking with poorer performance in the context of planning in public organisations.[30]

Concerning the objectives of biomass action plans, the qualitative objectives (i.e. goals according to the terminology above) can be described as governing principles and priorities creating coherence (Avebiom and Junta de Castilla-y-León, 2009). The quantitative objectives are normally known as precise targets, e.g. a certain percentage of bioenergy production at a given year. Avebiom and Junta de Castilla-y-León (2009) propose that the formulation of targets takes account of bioenergy market scenarios or forecasts. In addition, the bioenergy targets should certainly be aligned also with the national RES targets (Orthen and Brückmann 2009, p. 15). Moreover, bioenergy policies are urged to be established with a clear focus and have a transparent and deliberate objective in order to avoid negative outcomes due to attempt to achieve too many (possibly conflicting) goals at the same time (IRGC, 2008, p. 21). For instance, Berndes and Hansson (2007) remark the possibility of conflicting objectives between employment creation and greenhouse gas reductions when promoting bioenergy, and policymakers needing to consider the related tradeoffs. Furthermore, it is argued, that the issue of equity should be included in the bioenergy policy goals. Governments are recommended to build social and economic "safety-nets" for short- and long-term losers, namely for those nations and societies who are negatively affected by bioenergy development (IRGC, 2008, p. 44). These include the countries suffering from high food prices connected in part to biofuel advancement (see e.g. WBGU, 2009, 65-70).

5.3.5 Plan to achieve objectives: strategy formulation

After clarifying the mission and setting the objectives based on the identification of strategic issues follows the stage in which strategies are formulated. As discussed before, this is the stage of the strategic planning process in which a (draft) strategic plan is made, often resulting in a formal planning document, such as an action plan or a roadmap (see e.g. Bryson, 2004, p. 46). A variety of strategy formulation approaches include so called five-step process and mapping of action-to-outcome relationships (Bryson, 2004, 46-48); cf. Mintzberg et al. (1998) and Bryson and Anderson (2000) for other approaches. Referring to the broad strategy definition of Bryson (2004, p. 46), strategies are – apart from strategic choices – actions. Along these lines, strategies at this stage are regarded as "types of action that are required to achieve the objectives" and tactics as sub-strategies, that is "the individual actions and tasks that will be required to implement the strategies" (Smith 1996: 26). Worth to point out here is the notion of Bryson (2004, p. 48) concerning criteria for effective strategies, which include the following features:

- technically workable;
- administratively feasible;

[30] Boyne and Gould-Williams (2003, p. 128) explain this in part by the confusion created "in the minds of managers about what they are supposed to achieve". Furthermore, their analysis concerns a number of precise quantitative targets (not making a distinction between their number and precision), according to George Boyne in email discussion 1 November 2010.

- politically acceptable to major stakeholders;
- results oriented;
- fitting the organization's values;
- ethical;
- moral;
- legal;
- dealing with the strategic issue it was supposed to address; and
- creating public value.

What it comes to bioenergy plans, these strategies (as actions) are usually called as measures. Like in the case of setting objectives, it is suggested that they are based on the identification of threats and opportunities (Avebiom and Junta de Castilla-y-León, 2009; Orthen and Brückmann, 2009). Measures and actions are thus designed to solve problems, reduce difficulties or utilise the opportunities (Avebiom and Junta de Castilla-y-León, 2009, p. 7). Numerous recommendations regarding measures include points such as the one of WBGU (2009, p. 325), according to which principally only pathways contributing to climate change mitigation "in a particularly sustainable way" should be promoted.

In examining the consistency of national bioenergy policy framework and support schemes, the BAP Driver (2009, p. 114) concluded that a sustainable, long-term commitment of the government to a strategy can be more relevant than the description of the individual support schemes. Concerning the consistency of single support instruments, the interplay should be considered, as their interaction can have both positive and negative effects. Stability of the policies over a long time period also counts, to avoid "stop and go" policies (BAP Driver, 2009, p. 114). In broader terms, if the management of the risks related to bioenergy is considered as a set of measures, these risks can be managed by for example establishing proper land-use policies, which balance all competing demands including food, fibre, fuel, biodiversity conservation, ecosystem management and GHG emissions reduction, and ensure mutually supportive land-uses (IRGC, 2008, p. 55).

The bioenergy strategy approach of Orthen and Brückmann (2009) relates this stage to combining the roadmap and set of political measures in a single document, which is to be included in the NREAP. They also argue that the measures should be accompanied by the description of the bioenergy policy and regulatory framework. In the original model of Hill and Jones (2010, p. 13), strategy formulation actually comprises all the abovementioned (mission, internal and external analysis, SWOT analysis and the selection of best strategies to meet the goals). Thus, the bioenergy strategy model deviates in this sense from the model of Hill and Jones as it has created a specific step for strategy formulation (like in the "strategy change cycle" of Bryson, 2004, p. 33).

5.3.6 Strategy implementation

As highlighted before, the implementation of strategies is assisted by implementation vehicles or tools, such as action or implementation plans. Poister and Streib (1999) remind that organisations do not reach the desired future state with plans, but by decisions and actions; therefore, the plan needs to be implemented in a purposive way. In the public policy context, implementation can be described as "what happens between policy expectations and (perceived) policy results" (Hill and Hupe, 2009, p. 2, paraphrasing Freeman). As mentioned earlier, Parsons (1995, pp. 462, 465) considers that policy-making continues to be carried out while the policy is being put into effect, thus it does not stop at

the policy establishment. Seeing implementation as an evolutionary process or as a 'policy-action continuum' like Barrett and Fudge (cited in Parsons 1995, p. 472) fits into the idea of policy learning mentioned earlier.

According to the internal policy making guide at the South Australian government department, good policy anticipates the challenges of implementation and is capable of adapting to the changing realities of the operational environment (Government of South Australia, 2007). Thus, implementation of the policy should be considered already at the policy formulation stage; an idea that is supported by Bryson (2004, p. 47) and Mintzberg (2000, p. 25), and in the bioenergy policy context by Slade et al. (2009, p. 683). Mintzberg (2000, p. 25) claims that "…every failure of implementation is, by definition, also a failure of formulation". Furthermore, linking to one of the strategy definitions given earlier, Eden and Ackermann (as cited in Bryson, 2004, p. 46) argue that: "Effective strategy formulation and implementation processes link rhetoric, choices, actions, and consequences into reasonably coherent and consistent patterns across levels, functions, and time". FAO (2010a, p. 30) is of the opinion that transparency and accountability of those implementing the policy are the factors for a policy to succeed and to improve.

The BAP Driver strategy model (Orthen and Brückmann, 2009, p. 16) considers this stage as managing policies in practice. Points to take account of include, among others, efficient support scheme management, streamlining administrative processes of bioenergy projects, strengthening energy sector infrastructure and implementation of technical regulations and quality standards. Involvement of stakeholders is also seen as important (discussed in section 5.4). Adapting the message of Hill and Jones (2010, p. 20), all these issues aim to improve the design of the system to put the chosen bioenergy strategy into action.

5.3.7 Monitoring and evaluation

Monitoring and evaluation often seem to be understood as similar concepts, and are treated here as such. However, an important distinction is that the first can be seen to denote assessment 'along the road' (*formative assessment*) whereas evaluation signifies *summative assessment* (e.g. when the policy timeframe is in its end). According to Netting et al. (2008, p. 258), formative evaluation monitors and documents the process of implementation, thus running parallel to implementation instead of caring only about the outcome or impact of the policy. Fischer (1995, p. 2), who calls this type of evaluation as "process" evaluation, focuses both on policy formulation and implementation processes. Summative evaluation "judges overall merit or worth based on whether goals were achieved" (Netting et al. 2008, p. 160). Both types of evaluation appear to be necessary;[31] advocates of this idea include Hogwood and Gunn (1984, p. 219) and Smith (1996, p. 37). However, as Hogwood and Gunn point out, it is highly challenging to carry out evaluation due to, among others, unexpected events, possible interactions with other governmental interventions and difficulties in isolating the effect of a single programme. They go on to recommend that the means of evaluation must in fact be considered already at options selection and design stages; in the context of this paper this signifies the stages of strategic choice, goal setting and formulation.

[31] See Netting et al. (2008, Chapters 4 and 5) for the relative importance of the evaluation type depending on the planning approach.

Mulgan and Lee (2001, p. 10) emphasise formative evaluation by saying that "effective measurement of performance, in as close to real time as possible, and in as widely accessible a form as possible" is a prerequisite for better policy.[32] Moreover, effective monitoring, or review as Bullock et al. (2001, p. 14) calls it, requires a continuous and systematic check and record of the progress towards set objectives. This entails the collection of information appropriate for monitoring purposes (Hogwood and Gunn, 1984, p. 220). The idea of the constant review is to ensure that the policy is really dealing with the problems it was designed to solve, considering related effects (Bullock et al., 2001, p. 14). Thus, monitoring serves as a control mechanism which is fundamental part of effective planning (Smith, 1996, p. 30). Hogwood and Gunn (1984, p. 221) highlight that monitoring is not only information collection but requires also decision on which actions are going to be taken if performance is not as expected. On the basis of the monitoring results, the decision is urged to be made between three actions: to continue as-is, to correct the performance in some way or to revise the plan (Smith, 1996, p. 35).

For the information gathered through monitoring and evaluation to have an impact, it needs to be fed back to the decision makers. Smith (1996, p. 37) purports that evaluation provides a basis for future decision making when it is used as a part of a continuous improvement process; thus, evaluation is both the final stage and starting point of the planning. Information and knowledge should be passed through feedback loops between the final and the first stage, and become an input for the next planning round (Hill and Jones, 2010, p. 21). As mentioned before (section 5.1), there are valuable lessons to be learnt from policy evaluation (see e.g. Howlett and Ramesh, 2003, 220-222); learning from the experience is also seen as one of the nine features of modern policy making (Bullock et al., 2001, p. 14). Moreover, Mulgan and Lee (2001, p. 18) advocate for a built-in capacity to learn from monitoring and evaluation; this is understood as institutional learning.

The integrated strategy approach model of Orthen and Brückmann (2009) suggests monitoring to assess policy impacts. Even if the term monitoring is used, this is understood as summative evaluation. As the increased biomass production is largely recognised to have a range of implications (both positive and negative as mentioned in section 2.1), in areas such as on land use, biodiversity, international trade and the economy, then this appears to be particularly important. However, the feedback loops shown in the integrated bioenergy strategy model (Orthen and Brückmann, 2009, p. 14) is not elaborated in the operational guidelines for biomass action plans. Thus, there is a danger that following these guidelines, the knowledge derived from evaluation a bioenergy strategy or a plan is not fully utilised.

FAO (2008, p. 47) suggests that wood energy policies at national level should be monitored regularly and systematically to avoid negative impacts on environment and rural communities.[33] In addition, the monitoring and evaluation of bioenergy policies are recommended to be based on sound statistical information on market and industry progress (Orthen and Brückmann, 2009, p. 16). However, due to the lack of this data, policy performance monitoring is challenging. Contributing to this fact is that a comprehensive approach to market and industry monitoring is largely missing at the national level, as BAP Driver (2009, p. 125) reports.

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[32] Nonetheless, as e.g. Boyne and Gould-Williams (2003, p. 123) argue in the case of the measurement of organisational performance, it is surrounded by theoretical and empirical problems.

[33] FAO (2008) also argues that a national bioenergy strategy should consider cost-effectiveness and environmental performance.

According to the best practice report of BAP Driver (2009, p. 126), effective policy performance measurement includes items such as a clear approach for impact monitoring, clear indicators to evaluate policy performance, sound data and statistics and how the results of the evaluation are fed back to the policy-making process. Another biomass plan model of a Spanish region (Avebiom and Junta de Castilla-y-León, 2009, p. 8) calls this stage as a control and monitoring system, and suggests establishing a system of evaluation indicators, setting control and BAP revision procedures with responsible actors and performance criteria to evaluate the connection between the targets and results achieved, and the measures implemented. In addition, Avebiom and Junta de Castilla-y-León (2009, p. 8) suggest a periodic assessment of markets and stakeholder consultations, which enables the improvement of measures, modification of support schemes and setting of new quantitative objectives. Thus, the assessment of the progress acts as 'lessons learnt' stage, which benefits the future objective setting and implementation.

Sharma (2009, p. 39) points out – based on the experiences of national biodiversity strategies and action plans – that the indicators should in particular be centred upon periodic assessment of shorter term goals as the broader, longer term goals do not adequately indicate the progress during the implementation. Avebiom and Junta de Castilla-y-León (2009) further recommend that target setting should consider the eventual evaluation of achievement of specific targets by selecting indicators for the evaluation (type of quantity/unit).

To summarise, while formulating goals, the plan makers must determine how the assessment – both monitoring and final evaluation – of meeting the goals and the overall success of the planning exercise will be done. Furthermore, this assessment offers an opportunity to learn from the planning process.

5.4 Stakeholder involvement – inclusive approach

In addition to previously mentioned features, effective (strategic) planning requires that organisations map various stakeholders' expectations and understand where they might conflict (Smith, 1996, p. 49-54). Smith continues to highlight that planning or decision making should ideally include both top-down and bottom-up processes, as in general, stakeholders will not be committed to a plan or decision which affects them but has excluded them. Indeed, one of the important features of better policies is an inclusive approach, i.e. a process that considers "the impact on and/or meets the needs of all people directly or indirectly affected by the policy; and involves key stakeholders directly"[34] (Bullock et al., 2001, p. 14). Moreover, Bass, Dalal-Clayton and Pretty (as cited in Dalal-Clayton, 1996, 29-30) note that "successful past sustainable development strategies appear to have been participatory in nature and conversely, those, that appear to be going nowhere – even though the documentation may look good – frequently have been characterised by a lack of participation".

What does this inclusive approach then entail? For the IRGC (2008) it is an essential part of risk governance, including key actors – such as industry, civil society and NGOs – in

[34] Also related to one of the other nine features of modern policy making of Bullock et al. (2001, p. 14), i.e. evidence-based: "…all key stakeholders are involved at an early stage and throughout the policy's development".

decision making.[35] This approach "would not only ensure the ongoing input of scientific knowledge, but also enable the negotiation and implementation of the sustainability targets and criteria…" (IRGC, 2008, p. 44). UNEP DTIE (2010d) calls it as a multi-stakeholder and -sectoral approach, which not only listens to the concerns of those impacted by policy decisions but also balances the different facets of sustainable development and the diverse interests through dialogue and debate. The ultimate aim of the consultation of stakeholders is to make appropriate decisions through "meaningful, participatory and informed processes that ensure that all stakeholders are aware of the considerations behind the final decisions" (IRGC, 2008, p. 49). The involvement of stakeholders should take place from the start of a bioenergy project and continue throughout the process; from feasibility phase to evaluation (UNEP DTIE, 2010d).

Effective stakeholder engagement plays several roles. According to the FAO (2008, p. 45), it is of great importance to involve all stakeholders in the development of bioenergy strategies as it offers a chance to balance the earlier mentioned trade-offs between economic, social and environmental impacts and benefits (see section 2.1). Furthermore, while stakeholder involvement on the policy development level provides assistance for governments with compliance and ensuring social accountability as well as education about foreign investment constraints and opportunities, on the project level it aids optimisation of the local benefits and keeping an eye on less apparent negative impacts (UNEP DTIE, 2010d). Involvement of stakeholders is also seen as essential for policy improvement and to build public support (FAO, 2010a, p. 30).

From the standpoint of national biodiversity strategies and action plans (called for by the UN Convention on Biological Diversity, UNCBD), bringing the stakeholders together to agree on common policy may pose a great challenge (Sharma, 2009, p. 10). However, the ownership of the national plan is likely to be stronger if there is broader involvement of key actors. In this light, Sharma proposes that the first step to successful planning is often to build communication channels among stakeholders. Similarly, BAP Driver (2009, pp. 4) is of the opinion that key stakeholders should be engaged for instance by means of communication platforms. Other related proposals include the creation of multi-stakeholder task teams and stakeholder forums (UNEP DTIE, 2010d).

The character of biomass contributes to a large network of actors in various stages of the bioenergy supply chain. This reinforces the need for involving especially "critical" stakeholder groups (such as agricultural associations and farmers) in the planning and implementation of policies; sharing of good quality information is considered as vital (BAP Driver, 2009, p. 135). The key players ought also to cooperate, as in the case of the development and application of worldwide sustainability criteria for biofuels; according to Solomon (2010, p. 131), the Roundtable on Sustainable Biofuels exemplifies such an initiative.

Based on the analysis of bioenergy strategies and action plans in 12 EU countries, BAP Driver (2009, p. 123) argues that integration of relevant stakeholders in policy making processes is generally insufficient at the national level, as these 'top-down processes' coordinated by national/federal ministries are poorly communicated to the regional and local level administration, industry and final users. It also highlights that for bioenergy

[35] See UNEP DTIE (2010d) for more information about stakeholder mapping, i.e. identification of stakeholders and their interests, and e.g. Buchholz et al. (2009) for Multi Criteria Analysis of bioenergy system stakeholders.

policies to be successful, they need to have a strong element of regionalisation to ensure the effective communication between national/political and local/market players. The European Commission indicates that it takes this into account by asking information on the involvement of local and regional authorities in preparing NREAPs (EC, 2009d, p. 62).

6 Key items for biomass strategies and plans

This section discusses some of the various recommendations on sustainable biomass-to-energy strategies and action plans highlighted in the recent literature. It is structured similar to the 'coherent and coordinated approach' of the EC (see section 2.4.1), and includes NREAP elements related to biomass (based on EC, 2009d).

6.1 Assessment of resources and capacity

Assessment of biomass resources seems to be an essential building block for any biomass strategy. Consideration of competitive uses and environmental constraints is a crucial element of an appropriate resource assessment (JRC-SETIS, 2009, p. 79). In addition, there are various aspects to be taken into account in order to achieve a comprehensive assessment with comparable and consistent data. As Siemons et al. (2004, p. 77) point out the assessment of biomass resources in general is touched upon by two related problems: the definition of available resources and the reliability of data.[36] According to Rettenmaier et al. (2008, p. 11), harmonisation of biomass resource assessments will improve the consistency, accuracy and reliability of the resource assessments.

6.1.1 Categorisation and quantification of biomass resources

The point of departure for harmonising biomass resource assessments is agreeing upon the definition of biomass. Vesterinen et al. (2009, p. 63) indicate that the term "biomass" has different meanings and that many EU Member States have their own definitions – complicating the comparison, However, they also imply that one of the most popular definitions is the one the 'RES-E Directive' (EC, 2001), i.e. "the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste".

In its NREAP template, the EC considers important that Member States assess the domestically available bioenergy supplies from three main sources: forestry, agriculture including fisheries and waste. These resources can further be divided into sub-categories in the NREAPs, when the information is available, such as forestry biomass into fellings and landscape management residues. The aim is to compile data that is directly comparable and consistent with other Member States and Eurostat requirements. Temporal aspects are also important in terms of comparability as the biomass resources must be reported for 2006 (as a baseline) and with estimates for 2015 and 2020.

The BAP Driver project stresses the importance of sound methodology and comprehensive, reliable statistical data for assessing biomass resources. By practical recommendations it has developed detailed performance criteria for the assessment of biomass resources. This also includes consideration of cross-border effects (such as consideration of the use of foreign biomass resources for the national bioenergy strategy) (BAP Driver, 2009).

Concerning other relevant recommendations for biomass resource assessment, IRGC (2008, p. 47) emphasises the importance of estimating the quantity of domestic, industrial and

[36] Especially when all biomass types for relatively large geographical areas are concerned

agricultural waste that can be used in bioenergy feedstock production. It further suggests that the resource assessment should be done both at a national level and comprise a sub-national breakdown. A regional BAP establishment model in Spain (Avebiom and Junta de Castilla-y-León, 2009), proposes that biomass supply analysis should consider all possible biomass resource types, and that they should be defined and categorised.[37] Another relevant issue is the origin of the biomass resources. For instance, AEBIOM (2009, 6-7) considers the statistics showing the origin of biomass as necessary. NREAPs are mandated to include data on domestic resources and express the role of imported and exported biomass. Bringezu et al. (2007a, p. 9) also connect the resource assessment to a decision to what extent biomass resources outside the EU may and should be exploited.

6.1.2 Availability and potentials

Closely connected to a resource assessment is availability of the resources, which usually relates to some potential. Authors such as Rettenmaier et al. (2008, p. 17), Siemons et al. (2004, 34-35) and Thrän et al. (2006, 52-53) indicate a selection of different potentials, varying from theoretical and technical potential to economic, market and ecological or environmental potential. This variety in different assumptions behind the potentials contributes to a huge range of estimates like shown by Peck et al. (2010, pp. 3,5) in the case of global biomass resource potentials. Therefore, there are considerable differences and challenges for the analyst in this light, and it is suggested that to facilitate the comparison between different resource figures, it is important to define the type of the biomass potential (cf. Vesterinen et al. 2009, p. 60).

For example, European Environment Agency (EEA, 2006) estimated the technical potential of the EU-25 bioenergy production, taking into account environmental constraints. The BEE project (Biomass Energy Europe) results show that biomass resource assessments based on any other than technical potential are barely comparable. Technical biomass potential is defined as the theoretical biomass potential limited by the demand of land for other purposes (e.g. food, feed and fibre production, including conservation areas) and based on an assumed level of technology (Rettenmaier et al., 2008, p. 125).

However, availability is typically seen in a context of combined technical and economic boundaries (Siemons et al., 2004, p. 77). Siemons et al. (2004, p. 22) further argue that we should talk about the economy of bioenergy technologies that limits the employment of biomass as a sustainable energy resource rather than the available quantities of biomass. Sustainable management and delivery of energy to the place of demand can also considered to be more crucial issues than availability of biomass resources (World Energy Council, 2004, p. 269). In fact, the NREAP template places biomass availability (supply) in the context of the measures for biomass resource mobilisation.

In addition to the AEBIOM recommendation that biomass availability should take limiting factors into account such as technical, economic and environmental aspects, it should take account of the other uses and users of biomass (AEBIOM, 2009, p. 9). This supports a more holistic approach with a view that biomass use for energy purposes is only one of the non-food uses of biomass resources. An EEA (2006) study highlighted that considerable biomass potentials exist within the EU without damaging the environment. However,

[37] This analysis is recommended to be made in terms of related actors (companies, consumers, land owners and institutions), resource quantification (actual situation, total potential and available potential), evaluation of costs, and competitive uses and markets (Avebiom and Junta de Castilla-y-León, 2009, p. 5).

Bringezu et al. (2007a, p. 9) indicate that that study did not take into account of the competition between biomass use for energy and food production for domestic food supply. The aim should be optimisation of the different types of use and their benefits (Bringezu et al., 2007a, p. 9), which is in turn connected with the strategic management of the use of biomass as an industrial feedstock (WBGU, 2009, p. 16).

Also relevant to such discussion is the efficient use of biomass resources. Bringezu et al. (2007a, 32-33; 2009, 83-84) hold that limited biomass resources can be used more efficiently through cascading systems (mentioned in section 3.2., cf. Haberl and Geissler, 2000 and Sathre and Gustavsson, 2006 as examples of such discussions).[38] The NREAP template (EC, 2009d, 54) addresses the issue by asking Member States to report on their conversion efficiency – the efficiency that available resources are converted into primary energy carriers (as an example, the conversion of wood from cubic meters to tons of oil equivalent).

In addition, availability of biomass needs to be assessed by means of sustainability criteria (Bringezu et al., 2007a, p. 9). Indeed, one way to manage bioenergy related risks is to apply sustainability criteria and certification schemes (IRGC, 2008, p. 56). The NREAPs are required to explain the strategy regarding the fulfilment of the sustainability criteria of biofuels and bioliquids and on the verification of compliance with the scheme (EC, 2009d, 48). For example, WBGU (2009) recommends the combination of a minimum demanding standard and additional criteria should be set as precondition for any kind of bioenergy promotion.

6.1.3 Capacity assessment

In addition to the resource availability, IRGC (2008, p. 46) suggests that initial elements of bioenergy policy guidelines should include the determination of potential use of waste and land availability for growing bioenergy feedstock while taking into consideration the alternative uses of the same land, such as for food and other uses (for identification of suitable land for bioenergy cf. UNEP DTIE 2010a). In addition, this assessment should take into account water availability, soil quality, and variability in the future based on climate change models. All these items form a part of the assessment of domestic capacity for bioenergy production, feeding into the overall assessment of bioenergy related risks with the overall aim to understand both the potential and the limitations of domestic bioenergy production (IRGC, 2008, p. 47).

Another part of the capacity assessment is the evaluation of technology capacity. IRGC (2008, p. 47) recommends that every country should consider the level of available technology and its capacity for developing and installing appropriate future technologies. Two other elements of the domestic capacity assessment are the promotion of research and development and technology transfer as well as mobilisation of capital investment (IRGC, 2008, p. 48); these are connected to the support measures and costs of the implementation, and will be discussed further in the following sections.

[38] This principle pertains to the concept of exergy, i.e. mass and energy flows; see more for exergy analysis Peck (2003, p. 85-100).

6.2 Bioenergy use and production, including demand analysis

There is a need to know how much biomass is required to meet the targets. Therefore, the current use of biomass needs to be shown in a comparable and systematic way (AEBIOM, 2009). The NREAP template (EC, 2009d, 52-55) asks Member States to fill in tables for primary energy production for 2006, 2015 and 2020 as well as estimate final energy consumption from 2010 forward until 2020 in three sectors (2005 as a base year), namely in electricity, heating & cooling and transport. Part of the bioenergy risk assessment, IRGC (2008, p. 46) suggests that each country should assess its own energy needs with long-term scenarios on the evolution of the energy demand with the development of the supply.

Bioenergy is transformed into electricity, heating or cooling and transport fuels with a certain conversion efficiency, i.e. the transformation of the biomass resource into the final output such as unit of base material or final energy (Bringezu et al., 2007a, p. 23). One of the indicators for 'better' use of biomass for energy is improving the efficiency in the use of sustainable biomass resources (Fritsche et al., 2009, p. 6). However, the Member States are not required to explain in their NREAPs the energy efficiency of the biomass use from primary energy to final energy (from joules of stored chemical energy in the biomass energy carrier to units of delivered energy).

6.3 Bioenergy targets

It is recommended that bioenergy objectives must be regarded within broader policy strategies (IRGC, 2008, p. 18). This call is supported by Antikainen et al. (2007, p. 62); an important element of the promotion of sustainable biomass use is the treatment of bioenergy not separately but as a part of the energy system. In other words, bioenergy can advance sustainability only as a part of a sustainable energy system.

The EC mandates setting of sectoral renewable energy targets, and it has argued that the these sectoral targets should be realistic, feasible, and in line with the overall national renewable energy strategy of the Member State given the EU's target of 20% renewables and the national targets to be realised under the RES-D (EC, 2008b, p. 12). These sectoral targets can be met with any renewable energy source, depending on the resources of each Member State. The NREAP template (EC, 2009d, 40-43) however does ask the Member States to estimate the contribution of each renewable energy technology to achieve sectoral targets. Thus, the contribution of biomass should be forecast in terms of each energy sector and bioenergy technology (solid, gaseous and liquid biomass) yearly until 2020. This is called as a trajectory, acting as a possible future scenario, instead of setting any specific technology target.

Especially in the business management spheres, it is recommended that objectives follow the SMART-principle, i.e. setting targets that are **s**pecific, **m**easurable, **a**ttainable, **r**ealistic and **t**ime limited (Smith, 1996, 24-25). According to IRGC (IRGC, 2008, p. 21), bioenergy policies need to be clearly focused and have transparent and purposeful objectives to avoid negative outcomes due to attempt to achieve too many (conflicting) goals concurrently.[39] As one of the BAP Driver's (2009, p. 109) performance criteria, setting of targets and priorities for biomass use include determining the level of the achievement of national targets for RES

[39] According to IRGC (2008, p. 25), the primary policy objective for industrialised nations should be to reduce GHG emissions, whereas developing countries and nations with economies in transition should develop bioenergy with the principal objective of providing affordable energy and support to rural development.

and biomass, level of ambition of the targets and 'translation' of EU targets to each bioenergy sector. Targets should be set both to the supply side (primary production of biomass) and for demand (consumption of bioenergy) (Avebiom and Junta de Castilla-y-León, 2009, p. 6; see section 5.3.4 for more discussion on policy goals and objectives).

6.4 Measures

Apart from general support measures for renewable energy, the RES-Directive calls upon Member States to set specific measures on the promotion of the use of energy from biomass. These consist of measures to mobilise new biomass resources, i.e. to increase biomass availability, and they should take into account other biomass users. In the NREAP template, a set of open questions inquires about the measures boosting of biomass availability (EC, 2009d, 55-56). These concern land use, unused resources, biogas production and improvement in forest management techniques. The variety of mobilisation measures in the forest sector is articulated by Standing Forestry Committee (SFC, 2008). Significant new biomass flows for energy purposes are indicated to be attained through strategies stimulating agricultural intensification and efficiency as well as via multi-functional land uses (Peck et al., 2010, p. 100). From a slightly different perspective, i.e. enhancement of efficiency of biomass production, Bringezu et al. (2009, p. 19) argue that improved yields may be realised, for instance, through adjustment of cultivation methods to local conditions, restoring formerly degraded land and genetic manipulation; however uncertain risks delimit the last option.

Recent recommendations concerning bioenergy policies include various suggestions for policy measures (see section 5.3.5 for more details on the 'how' aspect of measures). For example, EEA (2008, p. 5) stresses that bioenergy benefits of can only take place in the case of policy and economic incentives steering the production in the beneficial direction, including decrease in soil erosion and water pollution risks and providing biodiversity benefits. One example is to create such market mechanisms that encourage sustainable water use and diminish harmful effluents (UNEP DTIE, 2010b). WBGU (2009, p. 315) in turn highlights that, principally, only those pathways that contribute to climate change mitigation in a particularly sustainable way, should be promoted. The targets and measures are connected; if the GHG emission is the main goal, it also determines the type of measures to be employed. In this light, the WBGU analysts indicate that biomass production for energy purposes should be promoted only if the land use contributes to nature or soil conservation. Furthermore, support of liquid biofuels for transport is not regarded as justified from the sustainability perspective (WBGU, 2009, 14-15); however, it can be argued that this depends on the context as liquid biofuels can have a strong sustainability case when reducing the dependence on foreign fuels. Also FAO (2008, p. 46) suggests considering potential carbon efficiencies of forest- and agriculture-based energy in the bioenergy strategies at national level. Furthermore, sustainability standards and certification can be considered as measures (see section 6.1.2).

6.5 Assessment of impacts

Increased biomass production is largely recognised to have a range of both positive and negative implications, for example on land use, biodiversity, water quantity and quality, and the economy (EEA, 2008; IRGC, 2008; UNEP DTIE, 2010a, 2010b; WBGU, 2009); see also section 2.1). There is also a potential risk of invasiveness of species used for biofuel production (UNEP DTIE, 2010c). The RES-Directive demands that Member States assess the impact of increasing biomass availability on other sectors using biomass, namely

agriculture and forestry based sectors. As an optional element, the NREAP template asks to report on costs and benefits linked with RE support measures; this entails estimating renewable energy use, cost associated with this use, GHG reductions and job creation per measure (EC, 2009d, p. 61).

As mentioned earlier (section 2.4.2), the detailed impact assessment is left to NREAP progress reports. It is in the context of these reports that the RES-Directive requires reporting on items such as commodity price and land use changes within the Member State that are associated with its planned increased use of biomass and other forms of renewable energy (Article 22 of the RES-Directive). In addition, the Directive demands reporting on the estimated impact of biofuel production on biodiversity, water resources, water quality and soil quality. As such, Article 22 draws the main issues to be addressed as the NREAPs prepare information for the national reports (AEBIOM, 2009, p. 17).

Already before the call for NREAPs, the EC considered that national biomass action plans should take into account the impacts of the increased production of biomass to ensure the sustainability of bioenergy (EC, 2008b, p. 15). According to Antikainen et al. (2007, p. 62), the discussion on sustainability of bioenergy is often dominated by environmental aspects. However, the concept of sustainability or sustainable development consists of three dimensions: environment, economy and social dimension. Promoting sustainable development is linked to a holistic approach, in which these three dimensions are connected. Thus, assessment of sustainability should take into account the three dimensions of bioenergy systems (Antikainen et al., 2007, p. 62).

According to Antikainen et al. (2007, p. 63), the assessment of the environmental dimension, namely environmental impacts of bioenergy production and use should be based on life-cycle thinking. In the same vain, the IRGC (2008, 50-51) stresses that comprehensive life-cycle assessments (LCA) should be used to determine the full environmental impacts throughout the life cycle of the various forms of bioenergy. Bringezu et al. (2007a, p. 23) propose that various biomass pathways need to be made comparable in order to know how to use biomass best. For this purpose, they also adopt a life-cycle analysis perspective. UNEP DTIE (2010c) concurs with this regarding finding the most water efficient forms of bioenergy production.

Nevertheless, Antikainen et al. (2007, 63-66) also highlight that in addition to the life-cycle environmental impacts of bioenergy production, there are also other issues to consider. For example, economic sustainability is affected by societal costs and benefits and their allocation. Social sustainability is more context-specific; it is based on the ability to adapt to changes and to create pathways generating favourable opportunities to act. Thus, it can be concluded that the impacts should be assessed regarding all three sustainability dimensions.

As biomass is used for a great number of purposes in addition to energy, direct competition can follow between different uses of the same type of biomass, or there may be competition for land on which to grow biomass, also with other uses of land (e.g. for nature protection) (EEA, 2008, p. 5). Considering the fact that biomass production strongly interacts with the environment, it is of utmost importance to assess its impacts. EEA (2008, p. 5) further argues that before global sustainability standards and related control mechanisms are in place, it is preferred from the environmental perspective that EU bases its bioenergy on domestic resources. The competition between different uses of the same type of biomass or for land is connected both to impact and resource assessment, and thus should be considered at these both stages of planning.

7 Conclusions

The research objectives posed at the outset of this paper touched upon three fundamental questions concerning biomass planning: why to plan, how to plan and what to include in the plans. In terms of the first question, this study indicates that there is evidence of a lack of coordination, integration and coherence in biomass policy. That is seen in slow progress of bioenergy and conflicts between biomass use for energy and for other purposes, and consequently, negative impacts materialised for example in the form of endangered food security and water quality. Therefore, the biomass planning is justified based on the one hand on maximising the benefits and capturing the synergies, and on the other hand it is needed to balance the trade-offs and avoid negative impacts of bioenergy production. This necessitates, for example, reconciliation of differences among decision makers and engaging stakeholders fully throughout the process. Most importantly, the diverse and complex character of biomass of biomass production and utilisation demands a strategic planning approach. Arguments in favour consist of the various levels, interrelations of a number of uses, multiple stakeholders and interests, and consequently interlinked policies, which require multi- and cross-sectoral as well as interdepartmental, multi-ministerial approach. As argued earlier in this paper, biomass seems to be unique compared to other renewables due to its multisectoral, -level and -disciplinary nature, and that it equally demands more holistic and coherent planning.

All the abovementioned points strongly indicate that the use of biomass should be strategically planned. The framework of strategic planning appears to be useful in structuring the planning process and making sure that all the essential items are there in order to enable more efficient and sustainable use of biomass for energy. Also, this study suggests that better biomass plans expand the point of departure beyond energy use, and seek coherence by ensuring that different actors and issues work together for common goals while creating synergies and avoiding contradictions between various policy objectives. This is assisted by applying in the planning process a combined sound policy-strategic planning framework presented in this paper. It concretises the much needed strategic approach to policy making that entails the concepts of continuous learning, flexibility and adaptation. This also requires a forward and outward looking approach and being inclusive, i.e. involving stakeholders throughout the planning process. Full understanding of the practicalities by everyone, as suggested by Mulgan and Lee (2010), along with the theses of the rational decision making model, can be questioned in terms of whether policy intervention in general can ever reach such status. The proposal to fuse planning and decision making – essentially strategic planning – via a 'hybrid' planning approach (as suggested by Steurer, 2007) can be applicable also in the context of biomass policy and planning.

With respect to the third question, the lessons extracted from the literature for the content of biomass plans are challenging to put in any order of importance, but as this study indicates that a coherent biomass-to-energy planning should include the principal elements of resource assessment based on sound methodology and data; the setting of SMART targets based on the awareness of the strengths, weaknesses, opportunities and threats (SWOT); measures to boost biomass availability considering other biomass uses; and impact assessment founded on life-cycle analysis and paying attention to all sustainability dimensions. The requirement for National Renewable Energy Action Plans currently guides bioenergy action planning in the EU Member States and shows an attempt to take into account other uses of biomass. The analysis of the NREAPs will show how well these items have been covered and what chances they will have to forward sustainable biomass use.

This working paper has sought to clarify pathways towards a coherent approach for biomass policy with the aim to assist the development of better biomass plans and strategies. The prospect of bioeconomy reinforces the need to view biomass utilisation more holistically and coherently. In addition to this aspect, further research needs lie, among others, on the role of biomass plans and strategies in the national and regional context as well as on searching for more evidence on the field regarding the success of biomass planning.

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