# Healthy Growth?

## Risk and Opportunity in Bulgaria's Biomass Industry

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Bulgarian Society for the Protection of Birds/BirdLife Bulgaria

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# Table of contents

# List of abbreviations

| | |
|---|---|
| BSPB | Bulgarian Society for the Protection of Birds/ BirdLife Bulgaria |
| CHP | combined heat and power |
| CEUBIOM | Classification of European Biomass Potential for Bio-energy Using Terrestrial and Earth Observations |
| EFA | Executive Forest Agency |
| EU | European Union |
| EC | European Commission |
| FAOSTAT | Food and Agriculture Organisation Statistics Division FAP - Forest Action Plan |
| FSC | Forest Stewardship Council |
| ktoe | Kilotonne of Oil Equivalent |
| MAF | Ministry of Agriculture and Food |
| MEET | Ministry of Economy, Energy and Tourism |
| MoEW | Ministry of Environment and Water NBDS – National Biological Diversity Strategy |
| NPBC | National plan for biodiversity conservation 2005 – 2010 |
| NLPEBU | National Long-Term Programme to Encourage Biomass Use |
| NREAP | National Renewable Energy Action Plan |
| NSSDFS | National Strategy for Sustainable Development of the Forest Sector in Bulgaria 2006 – 2015 |
| RESA | Renewable Energy Sources Act |
| RDP | Rural Development Programme 2007 – 2013 |
| RE | renewable energy |
| RES | renewable energy source |
| RED | Renewable Energy Directive |
| SFF | state forest fund |
| SPFSD | Strategic Plan for Forest Sector Development 2007 – 2011 |

# Glossary

**Black liquor:** the lignin residue left by the chemical pulping process when extracting cellulose from wood.

**Feed-in tariff:** a long-term premium payment for electricity generated from renewable sources and supplied to the electricity grid.

**Gross final consumption of energy:** the energy commodities delivered for energy purposes to industry, transport, households, services, agriculture and forestry and fisheries. This includes the energy consumed in the production of electricity and heat, and losses incurred in their distribution and transmission.[1]

**Primary energy production:** any extraction of energy products in a useable form from any source such as coal, crude oil, wind, or biomass etc.[2] For example, coal is a *primary* energy source. When it is burned in a power station, the electricity produced is a *secondary* energy source.

**Technical potential of biomass:** the proportion of total biomass that is available given current technical limitations, e.g.: harvesting techniques, infrastructure, accessibility, and processing technologies. This will be smaller than the *theoretical* potential of biomass, which is the maximum amount of biomass available, if technical limitations were not an issue.[3]

1 As defined in the Bulgarian National Renewable Energy Action Plan

2 Eurostat. Statistics explained. http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Primary_production_of_energy

3 http://www.biomassfutures.eu/webtools/webtool_intro.php

# Summary

Recent decades have seen a considerable change in the composition of Bulgaria's energy mix. By 2005, the proportion of renewable energy (RE) grew to reach 10.4 per cent of total energy production.[4] Of this, biomass comprised 63 per cent.[5]

Biomass is the most widely used RE resource in Bulgaria, predominantly in the form of firewood combined with coal. Currently, 86 per cent of biomass energy utilisation in the country is by households. In the last ten years, household consumption of biomass increased fourfold, while at the same time the use of most other fuels has declined. According to data from the 2002 census, 1.9 million (or 65 per cent of) households use wood for heating. Due to negligible investment in biomass stoves and the increasing price of fossil-based energy (electricity and district heating) it is not likely that the number of households using wood will decrease. It should be noted that most of the heating appliances used (stoves and fireplaces) are inefficient, with heat losses of 60 – 70 per cent. Heating with wood by using high-efficiency boilers is underdeveloped.

Biomass is expected to play a central role in the future renewable energy mix of Bulgaria. Projections[6] are that in 2015 the quantity of harvested wood will reach 7 million $m^3$ and increase to 8.5 million $m^3$ by 2020. This represents a growth of 24 per cent and 50 per cent for 2015 and 2020 respectively, compared to 2005. But no comprehensive data exist to show how much wood is available from domestic forests for different uses (energy purposes, timber industry, etc). Moreover, current estimates focus on the technical potential of biomass and do not consider the locations from which this biomass will be harvested or what impact its extraction would have on natural ecosystems, biodiversity, carbon storage, water, soil and other components of the environment. Nor do they take into account relevant economic factors or the feasibility of meeting such demands, which ought to play a crucial role in determining further national strategies. Such information as exists is contradictory, with different sources giving different estimates of biomass potential and use.

Despite this, government targets for increased production and use of biomass for energy are ambitious. To achieve Bulgaria's 20/20/20 targets[7] on schedule, the contribution of biomass to the national energy mix will have to increase significantly. This will require mobilisation of not only woody biomass, but also a large-scale development of agricultural biomass in Bulgaria. This will have significant impacts on land use and biodiversity. Mobilisation of biomass will lead to conversion of natural/semi-natural lands into either agricultural commodities or fast-growing tree stands, as well as intensification of forest management, with the targeting of new wood resources (such as deadwood) that are currently important for biodiversity, and increased pressure on protected territories.

None of the relevant national strategies[8] include any safeguards against irreversible damage to forests or negative impacts on forest biodiversity, soil, water, or forest health. Neither do they ensure that

4 Ministry of Economy and Energy (MEE), National long-term programme to encourage the use of biomass for the period 2008 – 2020, January 2008, available at:http://www.mee.government.bg/energy/energy_doc/Biomass_Programme_EN.pdf, (accessed 07.04.2011).

5 MEE (2008).

6 National Strategy for Sustainable Development of the Forestry Sector in Bulgaria 2006 – 2015.

7 In accordance with the European Union's climate change package, including 20% cut in emissions, 20% improvement in energy efficiency and 20% increase in renewables by 2020.

8 National Strategy for Sustainable Development of the Forest Sector in Bulgaria 2006 – 2015; Strategic Plan for Forest Sector Development 2007 – 2011; National Biological Diversity Conservation Strategy and National Plan for Biodiversity Conservation 2005 – 2010.

additional pressure will not be put on protected and protective forests — all of which are real concerns given the proposed increases in biomass production. Careful planning is required to prevent a mismatch with existing nature conservation legislation at national, European Union (EU), and international level.

The Bulgarian National Renewable Energy Action Plan (NREAP) specifies how much unused arable and degraded land is available in the country but not where these lands are located. In fact, many of them may have a high biodiversity value and may not be suitable for afforestation or planting with energy crops. There is no clear vision for how wood resources will be mobilised, and the measures proposed so far are very unclear. These measures highlight the need to: increase the productivity of existing forest management; build new forest roads to currently inaccessible forests; increase extraction of forest by-products and 'low-quality wood'; and use certification schemes to improve forest management. But increasing the productivity of existing forest management to extract more forestry residues may have a negative impact on the sustainability of forest resources. The 'inaccessible forests' are, in most cases, very old and have high conservation values. Construction of new forest roads will lead to forest fragmentation, as well as easier access and therefore a higher risk of logging, with negative impacts on biodiversity.

There is no definition of 'low-quality wood,' but one can presume that deadwood falls into this category. Its removal could harm the functioning and productivity of forest ecosystems and cause forest-dependent species to become endangered. The negative impacts of increased removal of forest residues and stumps, on soil organic matter and soil carbon stocks, are largely ignored.[9]

Of most concern is that there are currently no sustainability standards for biomass production, at either national or EU level. Meanwhile the interest in Bulgaria in new biomass plants, boilers, and combined heat and power (CHP) plants is growing.

The threat, therefore, is that increased use of woody biomass, combined with a lack of sustainability standards at a sufficiently high level, will lead to irreversible damage to forests — in particular in countries such as Bulgaria with a large biomass production potential and problems with forest law enforcement.

9 During a session of the Council of Ministers in February 2011 the Bulgarian Prime Minister stated that Bulgaria has a huge woody biomass potential including 'deadwood that should be removed in order to keep our forests healthy'.

# 1. The Status Quo: Bulgaria's biomass industry today

### Box A — What is meant by 'biomass'?

The Bulgarian Renewable Energy Sources Act (RESA) defines biomass as follows:

"Biomass" shall be products consisting of any whole or part of a vegetable matter from agriculture or forestry, which may be used as fuel, or the following wastes used as fuel:

(a) vegetable waste from agriculture and forestry;

(b) vegetable waste from the food-processing industry, if the heat generated is utilised;

(c) fibrous vegetable waste from virgin pulp production and from production of paper from pulp, if it is co-incinerated at the place of production and the heat generated is utilised;

(d) cork waste;

(e) wood waste with the exception of wood waste, which may contain halogenated organic compounds or heavy metals.

This report mainly addresses biomass related to forest and wood processing.

## 1.1. The legal and regulatory framework for biomass energy.

Bulgaria's mandatory national RE target for 2020 is a 16 per cent share of energy from renewable sources in the gross final consumption of energy.[10] This target corresponds to 1,666 kilotonne of oil equivalent (ktoe) of energy from renewable sources. By 2005, the share of RE was 9.27 per cent.[11]

The establishment and implementation of the institutional and legal framework for promoting the production and consumption of RE only began in 2007 — much later than in the 'old' EU member states.

In order to fulfil its targets, Bulgaria has introduced several plans and strategies and the national energy legal framework consists of three main regulations and a number of national strategies and programmes.

**1.** **The Energy Act** (2003) supports RE production by obliging electricity companies to connect production units to the national grid and purchase all of the produced electricity at a preferential price (which cannot be lower than 70 per cent of the household retail price).

**2.** **The RESA** (2011) also provides for feed-in tariffs from Renewable Energy Sources (RES) at regulated prices. But, with regard to the use of RES for heating and cooling, the regulatory framework is underdeveloped and does not provide significant incentives.

**3.** **The Energy Efficiency Law** defines energy efficiency as a priority objective for the country. It

10 Expressed in terms of quantity of energy in the additional energy efficiency scenario of the NREAP 2010.

11 MEET, 2010, National Renewable Energy Action Plan

requires the adoption of national and regional programmes for energy efficiency, and sets a national target to increase end-use energy efficiency.

**The Draft Bulgarian Energy Strategy till 2020** describes the three major priorities for energy policy in Bulgaria: energy security, sustainable development and market competitiveness. Energy independence through diversification of energy sources (mainly large hydro power plants and maximised biomass utilisation) is one of the highlighted goals, together with the urgent need for policy instruments to foster market competitiveness.

**The National Long-Term Programme to Promote Renewable Energy Generation 2005 – 2015** provides information on renewable energy potential in the country. There are no clear set targets or measures. The programme concludes that the most significant source of increased renewable electricity by 2015 is the development of biomass-fuelled units. It argues that all the country's heating needs could eventually be met by renewables, in combination with energy-efficiency measures. It estimates that by 2015, RES could provide 40 per cent of the heat energy generated in the country.

**The National Long-Term Programme to Encourage Biomass Use 2008 – 2020** was established in 2008 by the Ministry of Economy, Energy and Tourism (MEET) in compliance with the Renewable and Alternative Energy Sources and Biofuels Act (2007).[12] The document attempts to analyse all sources of biomass available in the country and estimate the potential for their use.

Although these documents each address key aspects of RES, they demonstrate little coordination in their proposed actions for a transition to a sustainable energy economy. And in practice, the actual implementation of these programmes is often poor.

## 1.2. Biomass supply today

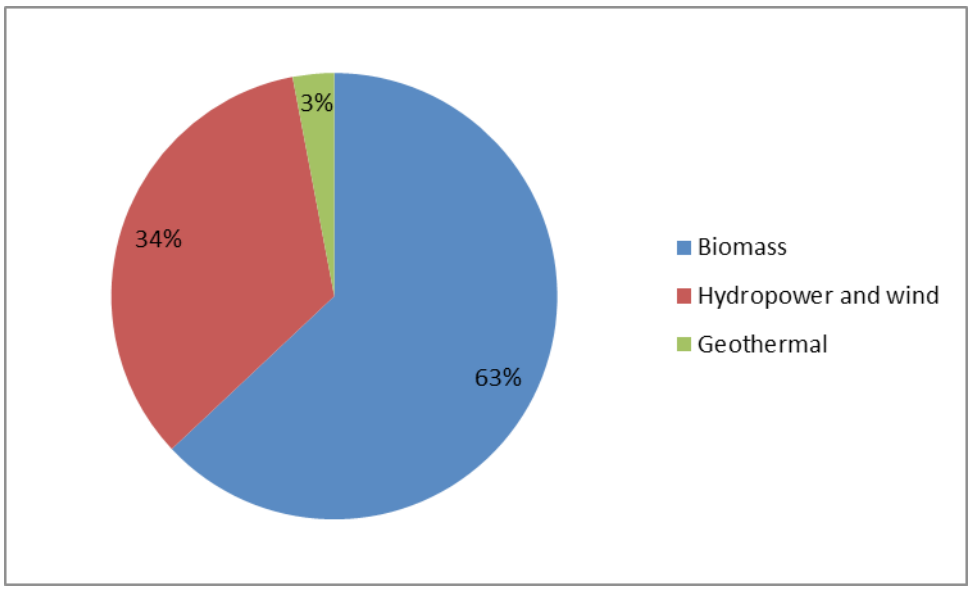
In the last decade, Bulgaria has seen a considerable change in the composition of its energy mix, and RES have become increasingly economically important. The use of biomass has greatly contributed to the steady increase of the share of primary energy production that comes from RES, reaching 10.4 per cent of total primary energy in 2005.[13]

Figure 1 (next page) shows a breakdown of RES. At 63 per cent, biomass clearly has the leading role.

12 Amended in 2011 to a new Renewable Energy Sources Act.

13 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

**Figure 1: Breakdown of RES use in 2005**




*data from MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

Biomass is the most widely used RES in Bulgaria, – predominantly in the form of firewood combined with coal. The consumption of firewood has increased significantly in past decades (1997 – 2005) as a result of the increased prices of other fuels and electricity. Residues from felling and low-quality wood are also a major resource. Unfortunately there is no definition of 'low-quality wood,' but it presumably includes deadwood, the removal of which could harm the functioning and productivity of forest ecosystems.

Processed wood fuels — wood chips, pellets and briquettes — are not popular due to their higher prices and the underdeveloped supply chain. Biomass waste from agriculture is little used and is usually disposed of in situ by the farmers, being burnt or ploughed back into the ground. [14]

**Table 1: Domestic biomass supply in 2006[15]**

| Sector of origin | Amount of domestic resource | Exported | Net amount | Primary energy production (ktoe) |
|---|---|---|---|---|
| (A) Biomass from forestry | 827 | 32 | 795 | 795 |
| (1) Direct supply of wood biomass | 768 | 32 | 736 | 736 |
| (2) Indirect supply of wood biomass for energy generation | 0 | 0 | 0 | 0 |
| (B) Biomass from agriculture and fisheries | 0 | 0 | 0 | 0 |
| (C) Biomass from waste (mainly biodegradable fraction of industrial waste including paper, cardboard, pallets) | 59 | 0 | 59 | 59 |

14 MEET,2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

15 MEET, 2010, National Renewable Energy Action Plan

- One of the main problems identified by the NREAP is that information on the available quantities of biomass is scarce. Obviously, state authorities need to develop and implement an information system to channel information to the national statistical authorities, the relevant departments of MEET, and the Ministry for Agriculture and Food (MAF).

Even though biomass is one of the main RES in the country, its share of overall primary energy production and final consumption is still negligible, at only 6.6 per cent and eight per cent respectively. Table 2 shows the share of biomass in the energy mix for Bulgaria in the period 1997 – 2005.

**Table 2: Basic energy indicators (thousand toe)[16]**

| Indicator | 1997 | 2000 | 2005 |
|---|---|---|---|
| Primary energy production | 10,395 | 10,282 | 10,539 |
| Biomass production | 251 | 550 | 691 |
| Share of total production | 2.4% | 5.3% | 6.6% |
| Gross domestic energy consumption | 21,227 | 19,218 | 20,137 |
| Gross domestic consumption of biomass and other fuels | 261 | 558 | 750 |
| Share of gross domestic energy consumption | 1.2% | 2.9% | 3.7% |
| Final energy consumption | 9,936 | 8,435 | 9,276 |
| Final energy consumption of biomass and other fuels | 254 | 555 | 754 |
| Share of final energy consumption | 2.6% | 6.6% | 8.0% |

*According to the energy balance sheets of the National Statistical Institute

16 MEET, National long-term programme to encourage the use of biomass for the period 2008 – 2020

# 2. Projections for domestic biomass supply

The effective utilisation of Bulgaria's biomass potential depends on the presence of the following key factors:

- Establishment of an organised system for collection and distribution of biomass;
- Use of efficient technologies for the direct combustion of biomass;
- Introduction of energy-generating technologies;
- The presence of infrastructure allowing the use of different types of biomass;
- Development of the biomass market in the country;
- The existence of preferential prices to allow the local population to collect logs to help them meet their energy needs.[17]

This chapter will review the existing projections for domestic biomass supply based on several reports:

a) The National Long-Term Programme to Encourage Biomass Use (NLPEBU) 2008 – 2020;

b) The NREAP[18];

c) Bulgarian Vision for Sustainable Energy.[19]

**The NLPEBU 2008 – 2020** estimated total technical biomass potential at 96.7 petajoules (PJ), including:

Forest biomass – 46.6 PJ (48 per cent);

Agricultural biomass (including rapeseed oil) – 46.9 PJ (49 per cent);

Waste biomass from industry – 3.2 PJ (three per cent).

Such projections were based on forecasts for harvested wood in the draft *National Strategy for Sustainable Development of the Forestry Sector in Bulgaria* (NSSDFS) 2006 – 2015, of 7 million $m^3$ by 2015 and 8.5 million $m^3$ by 2020. This would represent a growth of 24 per cent and 50 per cent, respectively, vs 2005 figures. Table 3 shows how Bulgaria's future wood harvest would look, if these estimates were realistic. [20]

17 MEET, National long-term programme to encourage the use of biomass for the period 2008 – 2020

18 MEET, 2010, National Renewable Energy Action Plan

19 INFORSE, 2008, Bulgarian Sustainable Energy Vision 2050

20 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

**Table 3: Estimates[21] for quantity of timber produced in m³**

| Indicator | 2005 | 2015 | 2020 |
|---|---|---|---|
| Quantity of coniferous timber harvested | 2,116,474 | 2,800,000 | 3,400,000 |
| Quantities of coniferous wood fuels produced (20%) | 429,950 | 560,000 | 680,000 |
| Increase in coniferous wood harvested for fuels (compared to 2005) | – | 130,000 | 250,000 |
| Quantity of broad-leaved timber harvested | 3,545,998 | 4,200,000 | 5,100,000 |
| Quantities of broad-leaved wood fuels produced (75%) | 2,643,109 | 3,150,000 | 3,825,000 |
| Increase in broad-leaved wood harvested for fuels (compared to 2005) | – | 506,000 | 1,181,000 |
| **Total quantity of timber harvested** | **5,662,472** | **7,000,000** | **8,500,000** |

Based on the above calculations, Table 4 gives estimates for the amount of unused wood biomass and its energy equivalence. By 2020, timber harvested for wood fuels could increase by 1,431,000 m³ per year, compared to 2005 figures.

**Table 4: Available unused quantities of woody biomass[22]**

| Origin of wood biomass | Currently unused quantities | Energy equivalent, ktoe/yr |
|---|---|---|
| Wood biomass from forestry, including: | | |
| Branches and twigs | 315,000 m³/yr | 65.1 |
| Possible increase in timber harvested (forecast for 2020) | 1,431,000 m³/yr | 306.8 |
| Industrial wood waste | 50,000 metric tonnes (t) dry matter/yr | 23.0 |
| **Total** | | **394.9** |

Based on the data in Table 3, the energy equivalents of these additional quantities of wood fuels are respectively:

- in 2015: 24.5 ktoe/yr for coniferous wood and 111.2 ktoe/yr for broad-leaved;
- in 2020: 47.200 ktoe/yr for coniferous wood and 259.6 ktoe/yr for broad-leaved.

The NLPEBU states that the major obstacles to the utilisation of branches and small-size trees for energy purposes are: the expense of harvesting and collection; the difficulties associated with the location of forest areas; and an inadequate network of forest access roads. Therefore, the forecasted use of branches and twigs only takes into account the quantities considered technically accessible.

Furthermore, it is difficult to assess the potential of industrial wood waste. Some wood waste is burned in boilers, generating mostly heat energy and small quantities of electric energy. But the remainder is currently unused because of its high humidity, or due to the lack of appropriate technologies to transform it into wood briquettes and pellets. Table 5 shows a detailed breakdown of the forecast share of gross and final energy consumption for biomass.

21 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

22 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

**Table 5: Estimate of key energy indicators and biomass as share of total, (ktoe)[23]**

| Indicator | 2005* | 2010 | 2015 | 2020 |
|---|---|---|---|---|
| Gross domestic consumption | 20,137 | 20,500 | 22,400 | 25,600 |
| Final energy consumption | 9,275 | 10,400 | 11,400 | 12,500 |
| Gross domestic consumption of biomass** | 750 | 1,192 | 1,514 | 2,181 |
| Share of gross domestic consumption | 3.7% | 5.8% | 6.8% | 8.5% |
| Final energy consumption of biomass** | 745 | 1,090 | 1,197 | 1,344 |
| Share of final energy consumption | 8.0% | 10.5% | 10.5% | 10.7% |

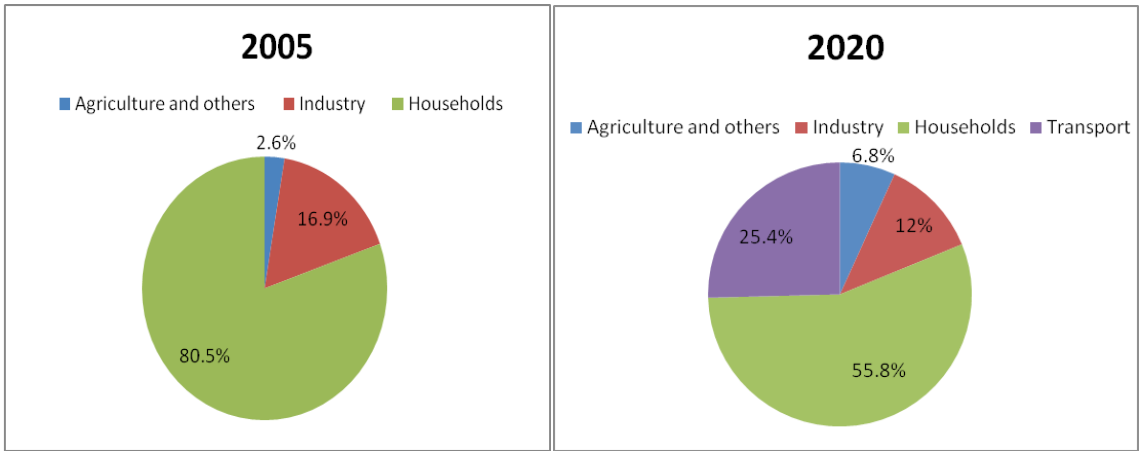
*According to the energy balance sheets of the National Statistical Institute

**Including biofuels

For the purposes of this analysis it was assumed that the gross domestic consumption in the country will grow at an average annual rate of 1.6 per cent. In 2020, if full utilisation of biomass energy potential is achieved, its share will reach 8.5 per cent of gross domestic consumption.

By 2020, about 38 per cent of the biomass utilised is expected to be used for the generation of electric and heat energy, which amounts to about 837 ktoe. About 70 per cent of this will be used for the generation of heat energy, and about 30 per cent for the generation of electricity. The biomass share of final energy use will reach 10.7 per cent. The sector making most use of biomass energy will be households (55.8 per cent), followed by the transport sector (25.4 per cent). Figure 2 compares the final energy consumption of biomass across basic economic sectors for 2005 and 2020.[24]

**Figure 2: Final energy consumption of biomass by basic economic sectors for 2005 and 2020[25]**




The figures illustrate how the share of biomass use by households and industry is expected to decrease by 2020 and that of agriculture and transport to increase. Household consumption is expected to fall (as a proportion of the whole) as a result of the introduction of more efficient biomass combustion technol-

23 MEET, National long-term programme to encourage the use of biomass for the period 2008 – 2020

24 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

25 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

ogies, while concurrently, the transport and agriculture sectors will experience a shift to biomass fuels.

At the end of June 2010, Bulgaria submitted the NREAP to the European Commission (EC). It shows how it expects to reach its legally binding 2020 target for the share of RE in final energy consumption. According to the plan, the technical potential for the production of energy from renewable sources is around 4,500 ktoe. The distribution between the various sources is uneven, with hydropower (around 31 per cent) and biomass (around 36 per cent) having the highest shares. Table 6 shows the expected amounts of biomass for 2010 and 2020, by sector of origin.

**Table 6: Estimated biomass domestic supply for 2015 and 2020[26]**

| Sector of origin | Expected amount of domestic resource 2015 (ktoe) | Expected amount of domestic resource 2020 (ktoe) |
|---|---|---|
| (A) Biomass from forestry — direct supply of wood biomass from forests and other wooded land for energy generation | 830 | 892 |
| (B) Biomass from agriculture and fisheries | 130 | 169 |
| (1) Agricultural crops and fishery products directly provided for energy generation | 100 | 130 |
| (2) Agricultural by-products/processed residues and fishery by-products for energy generation | 30 | 39 |
| (C) Biomass from waste (mainly biodegradable fraction of industrial waste (including paper, cardboard, pallets) and sewage sludge) | 63.5 | 84 |

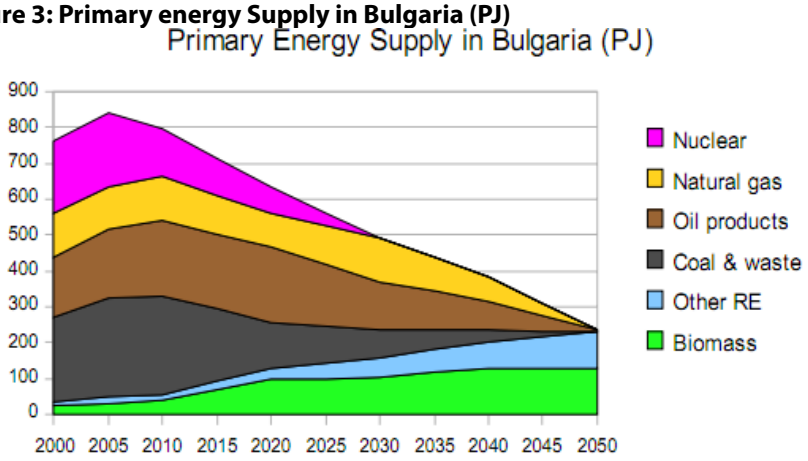
A 2008 joint report by the International Network for Sustainable Energy (INFORSE) and the Bulgarian NGO Za Zemiata, entitled **Bulgarian Sustainable Energy Vision**, analyses the possible changes in energy supply and demand, with a phase-out of fossil energy and energy imports over a fifty-year period. According to this paper, biomass will contribute significantly to the accomplishment of 100 per cent RE for Bulgaria by 2050. Increases in electricity demand and the transition to biomass power will necessitate the construction of biomass power plants to produce 8.5 terawatt hours (TWh), or 45 PJ of electricity and 25 PJ of heat until 2050. This will require construction of 1,500 – 2,000 megawatt (MW) of biomass power plants, with about half of this in operation by 2020.[27]

Figure 3 (next page) demonstrates the crucial role of biomass in the achievement of this scenario.

26 MEET, 2010, National Renewable Energy Action Plan

27 INFORSE, 2008, Bulgarian Sustainable Energy Vision 2050, available at http://www.inforse.org/europe/VisionBG.htm

**Figure 3: Primary energy Supply in Bulgaria (PJ)**




*Graph: Change in primary energy supply, following this vision. The decrease after 2020 is because assumptions of a less material growth than today and strong emphasis on energy efficiency.*

The report does not provide any specific data on how the calculations for biomass (in particular) have been derived, nor what biomass resources are taken into consideration.

Analysis of Bulgarian RE potential, in the framework of the *Classification of European Biomass Potential for Bio-energy Using Terrestrial and Earth Observations (CEUBIOM)* project, produces a total value of 96.2 PJ/year, consisting of three components: forest biomass (44.4 PJ), agricultural biomass (48.2 PJ), and waste biomass from industry (3.6 PJ). This is equivalent to about 16 per cent of the primary energy supply for 2005.[28]

In spite of the assessments made by international experts of the huge potential for biomass electricity generation in Bulgaria, Bulgarian experts are of the opinion that biomass may only be suitable for electricity generation in CHP plants. Its use in condensing power plants is considered to be inexpedient from an environmental, economic and technical point of view.[29]

The documents discussed above focus mainly on the technical potential of biomass and do not consider the economic and practical limitations, which would be crucial to future national strategies. They lack a clear plan for the promotion of sustainable biomass production and utilisation. Without sufficient thought to sustainability and safeguards, the projected increase in biomass energy risks leading to deforestation and loss of biodiversity.

Overall, information on the available quantity of biomass is rather scarce and inconsistent. Clearly, there is a need for a formal system to channel information to the national statistical authorities, and the relevant departments of MEET and MAF.

28 BGBIOM 2010

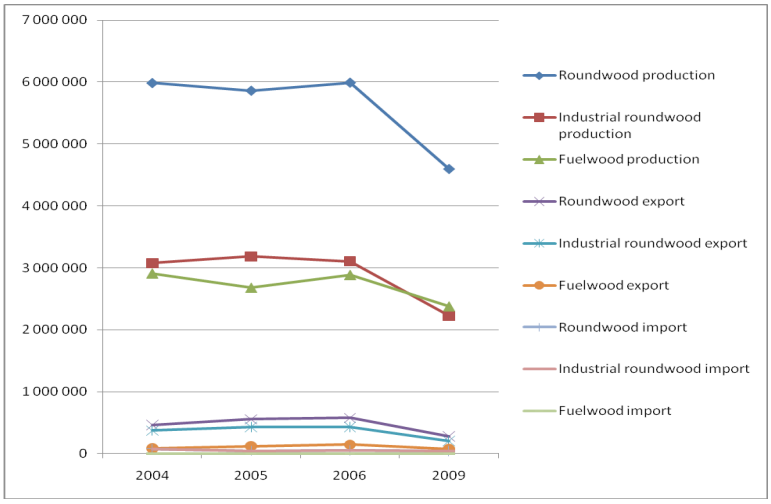
29 MEET, 2010, National Renewable Energy Action Plan

# 3. Export and import markets for biomass

Bulgaria is not a significant player in the international timber markets (Table 7). Timber exports represent 0.4 per cent of total exports and only 0.003 per cent of European imports. Currently, Bulgaria ranks lowest amongst European nations for timber imports and second lowest for exports.

**Table 7: Statistic information for production, export and import of roundwood: industrial and fuelwood[30]**

| Commodities | Production, thousand m³ | | | | Export, thousand m³ | | | | Import, thousand m³ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2004 | 2005 | 2006 | 2009 | 2004 | 2005 | 2006 | 2009 | 2004 | 2005 | 2006 | 2009 |
| Roundwood | 5,986 | 5,862 | 5,992 | 4,599 | 460 | 556 | 578 | 278 | 78 | 48 | 52 | 45 |
| Industrial roundwood | 3,077 | 3,184 | 3,107 | 2,224 | 372 | 433 | 431 | 205 | 78 | 48 | 52 | 42 |
| Fuelwood | 2,909 | 2,678 | 2,885 | 2,375 | 88 | 123 | 147 | 73 | 0 | 0 | 0.2 | 3 |




The Bulgarian roundwood market for the period 1990 – 2005 could be classified as predominantly domestic; as more than 90 per cent of the roundwood harvested was used to meet the needs of manufacturing, construction and other sectors of the Bulgarian economy, and to satisfy the needs of the local population. In the years immediately preceding 2005, Bulgaria exported greater volumes of roundwood, mainly to Greece and Turkey. In 2005, roundwood exports totalled 343,000 m³, of which 133,000 m³ was coniferous and 210,000 m³ deciduous. Most export of deciduous fuelwood – 90,000 m³ was to Turkey, Greece and Macedonia.[31]

Statistical information about exports and imports of roundwood is not gathered annually from the Regional Forestry Directorates, along with data concerning timber harvesting and change to forest

30 FAOSTAT Forestry data for Bulgaria

31 Stoyanov, Stoyanova 2005

areas; so, currently there is little data on biomass exports. What is known is that it increased from 10 ktoe in 1997 to 26 ktoe in 2005[32] and by 2006 had reached 32 ktoe.[33]

In response to the on-going economic crisis, in January 2009 the Executive Forest Agency (EFA) amended the Forest Act to remove the ban on exports of wood to countries outside the EU, opening up a new market in the neighbouring countries of Turkey and Macedonia.

Based on estimates of biomass production potentials, it is expected that Bulgaria should be able to export a substantial part of its biomass. However no detailed data has been provided in any of the strategic documents.

32 MEET, 2008, National long-term programme to encourage the use of biomass for the period 2008 – 2020

33 MEET, 2010, National Renewable Energy Action Plan

# 4. Measures to increase Bulgarian biomass supply

According to the NREAP, MAF estimates that degraded land totals 348,118 ha. Unused arable land is estimated at 461,142 ha. The NREAP provides no further information about the geographical location of these areas. Many of them may have high biodiversity value and may not be at all suitable for afforestation or planting with energy crops. Measures to encourage the use of unused arable land, degraded land, etc for energy purposes are included in the national Rural Development Programme (RDP) 2007 – 2013, which also supports measures for energy production from animal manure (this programme had not commenced at the time of writing); and for biogas (of which current production remains insignificant). There are no specific incentives promoting the production and use of biogas, except for its use in CHP generation. Electricity produced by CHP operations is purchased by the national grid at preferential prices. The NREAP states that efforts are being made to improve forest management in order to increase future growth and sustainable production. Unfortunately, current practice in Bulgaria is limited to building new forest roads to currently inaccessible, biodiversity-rich forests; and increased extraction of forest by-products and low-quality wood (including deadwood). Certification of state-owned and municipal forests is planned in order to improve forest management techniques.

The role of biomass in the energy balance will increase but there will not be a significant increase in the quantities of biomass used. Two approaches are envisaged in the NREAP:

- increasing the share of biomass in the final consumption of energy;
- increasing the amount of heating produced by converting biomass.

The use of biomass has become stable over the past three years for the following reasons:

- the increased price of wood;
- the improved energy performance of residential buildings;
- the improved efficiency of installations used to convert biomass into energy.[34]

The NSSDFS 2006 – 2015 and the Strategic Plan for Forest Sector Development (SPFSD) 2007 – 2011 include measures to support biomass and to increase the quantity of woody biomass used for energy purposes. The NSSDFS states that effective production and utilisation of bioenergy from sustainably managed renewable forest resources is a high priority of the national forest policy. Thus, the EFA will fund technological developments in biomass energy systems, and at the same time make efforts to guarantee additional energy resources through the establishment of new forests, including biomass plantations. The scope for new forests is very wide, due to the availability of abandoned agricultural land. The total area under forest could increase by up to 300,000 ha, 127,000 ha of which are currently un-forested, and the remainder being abandoned agricultural lands. Utilisation of logging residues and stumps also offers good opportunities to increase the total volume of woody biomass used.

The SPFSD is committed to the implementation of the National Strategy, in line with which it has defined four overall strategic objectives and key measures for their implementation. Key measure 7 (*Contribution to the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol implementation*) includes activities intended to stimulate the use of woody biomass for energy purposes. These include: development and implementation of the National Woody Biomass Action Plan; mapping and evaluation of woody biomass as a RES; development and implementation of regional and local pilot projects for energy production from woody biomass; legislative changes to encourage use of biomass for energy purposes; and establishing plantations of fast-growing species for production of biomass. So far, none of these activities has been implemented.

34 MEET, 2010, National Renewable Energy Action Plan

Neither the NSSDFS nor the SPFSD include any safeguards to ensure that the planned increase in production and use of biomass won't cause irreversible damage to forests; that they won't have negative impacts on forest biodiversity, soil, water, forest health; and that no additional pressure will be put on protected and protective forests.

# 5. Impact of increased biomass use on other sectors

According to the NREAP, no assessment has been made of how the increase in biomass energy production might impact other sectors. Such an assessment will be carried out as part of the future elaboration and implementation of the sustainable development policy. The increased production of processed biomass (e.g. wood chips, pellets and briquettes) would lead to a decrease in price for end customers. This would decrease the consumption of firewood.[35]

The increased use of biomass will certainly lead to increased competition with other sectors. This competition will have a big impact on natural ecosystems. Energy production from biomass, encouraged by the new preferential feed-in tariffs, could lead to increases in the market price of biomass and make the resource too expensive for other wood-processing companies. For example, the furniture producers could hardly compete with the purchasing power of the energy producers. Even now, many wood-processing companies are forced to stop production due to resource shortages. The National Biomass Association, BGBIOM,[36] recently argued that the development of RES, specifically biomass, requires good knowledge of biomass-for-energy potential. A consistent supply of high quality and low-cost biomass is very important. The competition between different use of biomass — for food and feed versus industrial use — should be carefully planned and controlled through statistical data collection.

35 MEET, 2010, National Renewable Energy Action Plan

36 BGBIOM 2010

# 6. Household consumption of biomass for energy

Currently, households consume 86 per cent of the biomass energy. In the last 10 years, households increased their biomass use fourfold, while at the same time the use of most other fuels has declined.

In the period 1997 – 2005, fuelwood consumption increased more than threefold. In 2005, total domestic consumption (*Table 9 – in green*) was 2,594,372 $m^3$. Local population consumption was equal to 969,570 $m^3$. In contrast, for the period 2005 – 2009 fuelwood consumption by the local population shrank to a third of its previous size to 335,002 $m^3$. The main reasons for this were the economic crisis and milder winters.

Meanwhile, by 2009, the volume of fuelwood actually harvested was three per cent above the targets laid out in the forest management plans (335,002 $m^3$ versus 325,656 $m^3$).

Most biomass energy consumption in Bulgaria takes place in rural areas. Products are fuelwood, followed by the residential consumption of wood briquettes from forestry wastes and saw mill by-products. Processed wood fuels (wood chips, pellets and briquettes) are not popular due to their higher prices and the underdeveloped supply system. Biomass waste from agriculture is not used to a great extent and is usually disposed of in situ by the farmers, by burning or ploughing in.[37]

According to the 2002 census, the number of households using wood for heating purpose was 1.9 million, or 65 per cent of the total. Due to negligible investment in biomass stoves and the increasing price of fossil-based energy (electricity and district heating) it is unlikely that the number of wood-using households will decrease. It should be noted that most of the heating appliances used — stoves and fireplaces — are obsolete and inefficient, with heat losses amounting to 60 – 70 per cent. Heating by high-efficiency boilers for local systems is underdeveloped.

The pattern of biomass usage does not seem sustainable, given that:

- The biomass resource used by the vast majority of households is firewood. It is a very labour-intensive fuel, as consumers have to manually feed the stoves, and often they are also involved in the collection, transportation, and chopping of the wood. The wood given to local communities is mainly used as fuel and the local population get it at a preferential price. They pay only stumpage fees that are on average very low.
- Most households burn wood in stoves with an efficiency of between only 20 – 40 per cent, resulting in unnecessary consumption of wood and leading to unregulated deforestation.
- The number of modern boilers in use is still negligible due to the preponderance of low-income households in Bulgaria, and a lack of awareness.

In recent years, this pattern has gradually started to improve, as more high-efficiency pellet and briquette boiler-based technologies are installed.

Due to the lack of organised biomass collection and distribution schemes, it is difficult to gather accurate and up-to-date data. Many households in rural areas do not follow any uniform and sustainable method of biomass collection and some of the wood used for heating might be considered to have come from illegal logging. The scattered nature of wood and wood residue used by households makes data tracking problematic.

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37 REC report: JI POTENTIAL IN CENTRAL AND EASTERN EUROPE, Final Report (A Project Contracted from Overseas Environmental Co-operation Centre) July 2005, page 18 (http://www.kyomecha.org/document/pdf/REC_report_part1(profile).pdf)

# 7. National Biomass Sustainability Criteria

In the absence of EU-wide rules, the EC recommended that Member States introduce their own national schemes for biomass sustainability. Bulgaria has yet to introduce any such scheme.

Conversations conducted with representatives of the EFA showed that their position was generally in favour of sustainability criteria. They suggested that such criteria should be linked to those used by the Ministerial Conference on the Protection of Forests in Europe (MCPFE), and to forest certification principles. So far only the Forest Stewardship Council (FSC) certification scheme is used; the Programme for the Endorsement of Forest Certification (PEFC) has, historically, not been active in Bulgaria, but has now started operations.

The Ministry of Environment and Water's (MoEW) representatives were less agreeable to a potential sustainability scheme and suggested that the Renewable Energy Directive (RED) should first be incorporated into Bulgarian legislation (including the biofuels sustainability criteria) before criteria for biomass could be developed. Amendments to RAESBA, incorporating RED have been presented to the Council of Ministers but a lack of consensus between the responsible ministries – MEET, MoEW and MAF — has meant that at the time of writing, all decisions are still pending.

A Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA)[38] of the NREAP were prepared in 2010. Both documents proposed important measures to mitigate negative impacts on biodiversity, and imposed bans on unsustainable development of RES within areas covered by the Natura 2000 network. They stipulated requirements for the biomass industry, such as: a ban on logging in high-conservation-value forests; a ban on the use of deadwood as a biomass source; a ban on afforestation of unused arable areas of significant biodiversity; a ban on the use of Genetically Modified Organisms (GMO) for fast-growing tree plantations; and enforced use of existing forest certification schemes. All of these could form the basis for a set of national sustainability criteria for biomass extraction.

During the public consultations for the latter documents, the Bulgarian Society for the Protection of Birds (BSPB) submitted a joint statement with other major NGOs (on behalf of the coalition For the Nature in Bulgaria) in support of the SEA and AA recommendations. The statement also called for a measure to be included in the SEA for development of biomass sustainability criteria. Due to a massively negative response to the SEA and AA from business, the MoEW had to organise public hearings and redraft the assessments.[39]

38 The term for Assessment of the plans and projects in relation to NATURA 2000 network.

39 SEA and AA were finally approved by the MoEW in August 2012.

# 8. Inconsistencies and incoherencies in government policy

The RDP 2007 – 2013 portrays Bulgaria as a country with great potential for production and utilisation of biomass. Forest cover in Bulgaria is steadily increasing despite the fact that the rate of creation of new forests has dropped significantly in recent years. Of 12,000 ha planned for afforestation each year, only 5 – 7,000 are being realised due to lack of funds. Therefore, the potential exists for additional afforestation of about 300,000 ha of abandoned and degraded agricultural land as well as non-forested forest land.[40] The total timber growing stock amounts to approximately 591 million $m^3$, according to 2005 figures from the EFA. The increment is 3.9 $m^3$ per ha, so that the total increment is about 14 million $m^3$/year. According to the forest management plans, the prescribed yield was on average 5.2 million $m^3$/year for the period 1996 – 2004. This means that only 37 per cent of the annual increment will be used. The main reasons for this are: lack of infrastructure (especially in mountainous areas where most of the growing stock is found); and a lack of investment in silvicultural activities in young plantations (a large part of which is under 40 years old) where the revenue is equal or lower to the costs of extraction. The reported actual volume of roundwood harvested for the same period was, on average, 4.4 million $m^3$.

Instances of illegal logging in Bulgaria occur at an alarming high rate. According to the World Wildlife Fund (WWF) Danube Carpathian Programme Report of 2005, the annual volume of illegal logging is approximately 3.7 $m^3$, or 80 per cent of the reported annual harvest.

A study conducted in 2002 by the Sofia Energy Centre, under the PHARE Programme, estimated the total annual potential for biomass resource as follows:

- fuelwood: 2,146,761 (t);
- wood waste: 942,232 (t);
- agricultural solid waste: 4,912,000 (t);
- agricultural liquid waste: 494,860,000 (t) (as biogas);
- biofuel: 60,000 (t);
- energy crops: 2,000,000 (t)[41].

The greatest potential for biomass production is found in: forestry by-products (branches and lopping); industrial wood residues (sawdust, barks, chops, black liquor, etc); demolition wood; wood residues from parks and gardens; and possible additional extraction of low-quality wood from forests. Perennial energy crops like short-rotation willow or poplar coppice are another possible source of biomass.

The establishment of an appropriate infrastructure for the production of energy from RES, including integration with the transmission and distribution network, is directly related to the pre-accession to the EU commitment by Bulgaria that by 2010 an indicative 11 per cent share of gross home consumption of electro-energy will be from RES.

Currently, the electro-energy produced by RES consists mainly of hydroelectric power stations and a smaller number of wind powered generators. The share of hydroelectric energy in the total forecast of electro-energy for the period 2005 – 2015 (without substantial additional development) is around 5.5 per cent, on average. In 2005, 4.6 gigawatt hours (GWh) of energy were produced from wind, which is less than one per cent of the total energy produced from RES in the country. Approximately 116 GWh (10 ktoe), representing 25 per cent of total electro-energy, is produced from biomass — mostly

40 Non-forested land is land that is not covered by forests such as wood pastures etc. but is part of the forest territories.

41 Source: http://ws2-23.myloadspring.com/sites/renew/Shared%20Documents/2005%20Country%20Profiles/bulgaria.pdf

from black liquor from cellulose and paper production. To achieve the national target, electro-energy production from RES had to increase to 4.61 TWh by 2010, this would have required the utilisation of biomass in all its forms; the construction of facilities for CHP; the use of existing possibilities for new hydroelectric facilities, and use of wind energy in the areas with wind potential.

Bulgaria has a great potential for the production of energy crops. Approximately 4.8 – 5.2 million tonnes of biomass annually remains on the field after harvesting is complete. The largest share of plant residues (around 3 million tonnes) comes from cereals. Part of it is used for livestock and the remainder is ploughed in. The main crops that could be used for the production of biofuels in Bulgaria are: cereals; technical crops (including root crops such as beetroot, etc); oleaginous crops (sunflower, rapeseed, etc); fibrous crops (cotton, flax, etc); tobacco and other industrial crops); vegetables; and perennials.

Significant investments are needed for improvements in forest management, wood felling and forest infrastructure. The RDP states that by planting appropriate species for timber production (including for biomass production) and investing in installations and equipment for processing and utilisation of this woody biomass, improvement of the economic value of forests could be achieved. Presently, no research has been completed on the unused biomass capacity of the forests.

Overall, the RDP is generally very positive about the production and utilisation of biomass, assuming that it will increase the economic value of forests; create job opportunities for rural regions through use of RES; and lead to better management of woody biomass as a whole. It is also a fact that there is an increase in the use of timber for firewood, as the cheapest source of household heating. During recent years the number of households using firewood has doubled and now 40 per cent of households use firewood for heating and/or hot water.

The RDP includes a number of measures that, directly or indirectly, support timber harvesting for production of biomass for energy. However, the Bulgarian RDP does not mention any safeguards to protect biodiversity, ensure careful collection of felling residues collection, or other appropriate measures.

The following measures in the RDP are directly related to biomass production in the country:

- **"Adding value for agricultural and forestry products."** Relevant initiatives include: investment in processing of primary and secondary biomass (for working operations before industrial processing); purchase and installation of new machines and equipment for improvement of energy production processes, for RES.

There are a number of indirect measures:

- **"Training, information and diffusion of knowledge"** in the spheres of the technology, RES, and bio-energy;
- "Improving the economic value of forests" (only non-state forest owners are eligible) includes tending of coppice stands between one and ten years old; pruning of pine plantations younger than 40 years; and thinning of young coniferous plantations, not older than 40 years. All these activities would provide wood material for heat and energy generation;
- "Provision of Farm Advisory and Extension Services in Bulgaria and Romania" to improve human potential in the agricultural sector through transfer of knowledge and improvement of skills. The operational objective is to ensure adequate levels of technical and economic knowledge and skills in management and business; new technologies; product quality and safety; sustainable management of natural resources (including the requirements for cross compliance); renewable energy sources; and organic production;
- **"First afforestation of non-agricultural land"** will provide timber for energy for local people, in particular in the lowland region. According to the programme, support for afforestation will contribute to the protection of the environment, the prevention of natural hazards and fires, and climate change mitigation. But there are no provisions to ensure that the proposed actions

are suited to local conditions or compatible with environmental requirements, particularly biodiversity. Only in NATURA 2000 sites could afforestation be supported on the basis of management plans. Although it is stated that afforestation would be achieved with native tree species, suitable for restoring biodiversity, it is not clear if this rule will be universally adhered to in practice. The activity "tending of young afforested land up to five years after afforestation" could also provide material for heat and energy production;

- **"Diversification into non-agricultural activities"** will support production of renewable energy, via: production of biofuels from biomass; production of biogas; and co-generators using biogas;
- **"Support for the creation and development of micro-enterprises"** is designed for job creation and to promote investment in modernisation, and growth of micro-enterprises that are otherwise too small to invest in their own development. The measure will provide grant aid to micro-enterprises active in a variety of sectors such as wood-processing, furniture production, light engineering, biomass treatment/processing, and RE production;
- "Basic services for the economy and the rural population" aims to enhance living standards and to prevent depopulation, through diversification of services. Types of services supported include installations for the production of electric power and/or heat for a municipality from renewable resources; and distribution networks for bio-fuels or heat/electric power from biomass.

The Bulgarian SPFSD (analogous to the EU Forest Action Plan (FAP)), under the heading "Contribution to the UNFCCC and Kyoto Protocol", contains various proposals for the promotion of biomass for energy. These include among other things: promotion of the use of forest biomass for energy; preparation of a plan to define the part of the wood that should be used for energy; estimation of forest biomass as a bioenergy resource; pilot projects for the use of forest biomass; legislation changes to stimulate new installations using woody biomass; and creation of forest plantations of fast-growing species.

In order to avoid undermining existing nature-conservation legislation at national, international and EU Level, or environmental objectives within the RDP, a realistic balance must be found between the production of biomass and the conservation of valuable habitats, the landscape and indigenous genetic resources. The same is true where the afforestation of natural and semi-natural grasslands and afforestation with non-indigenous species is concerned. But at present neither the National Biological Diversity Conservation Strategy (NBDCS) nor the National Plan for Biodiversity Conservation (NPBC) 2005 – 2010 provide any information on potential impacts of the use of RES on biodiversity and protected areas in the country, and specifically lack information on the impact of biomass for energy purposes. In June 2012, both the national strategy and the national plan were in the process of being updated.

# 9. Analysis

## 9.1. How much wood is available?

There is no comprehensive assessment of how much wood is available in Bulgaria from domestic forests for different uses. Existing assessments are based on the limited data from the EFA's annual reports, and reported data of harvested and consumed roundwood.

The volume of harvested timber in Bulgaria is governed by annual Forest Management Plans (FMP). According to EFA data, in recent years the actual harvested volume of timber has ranged from 86 to 92 per cent of the volumes set out in the annual plans.

In 2009, state ownership of forests and forest lands in Bulgaria accounted for 74.4 per cent of forest territories.[42] Seventy per cent of the state forest territories is managed by the EFA. Forests in private ownership (compromising 10.2 per cent of the forest territories) are small, with most having an area less than one ha. Individual estates with an area bigger than 50 ha only number around 150. Municipal forests account for 12.1 per cent of the forest territories and usually have a size of several hundred ha. It is interesting that 20 per cent of forests in Bulgaria are planted or self-regenerated on abandoned agricultural land.

Complete analysis of harvested and consumed wood exists for the year 2005. The total volume of harvested wood in 2005 (according to EFA statistics) is 5,768 million $m^3$ (Table 8). The annual total of harvested wood from the state forest territories remained relatively constant during the period 2001 – 2005. The amount of harvested wood from non-state forest territories increased almost threefold from 2001 – 2005, but because of the relatively small private forest sector in Bulgaria, the bulk of the harvest was from the state forest territories.

According to the EFA, the total consumption of roundwood in 2005 was approximately 99 per cent of the total supply. Woodworking companies, timber-yards and wood-trading companies took approximately half (2,658 million $m^3$) of this. The local population used 1,074 million $m^3$, or approximately 40 per cent of total domestic consumption (Table 9).

42 Forest territory in the Bulgarian Forest Act is defined as territory, which main purpose is to be forest; and covers forests, bushes, and land for afforestation and non-timber production land, listed in the cadastre. Urbanised areas, separated settlements and agriculture lands are not included in the Forest Fund. MAF 2006 data is used for the analysis in this section.

### Table 8: Wood harvested in 2005[43]

| Type FF | Type of activity | Large-sized | | Middle-sized | | Small-sized | | Fuelwood | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m³ | % from total | m³ | % from total | m³ | % from total | m³ | % from total | m³ | % from total FF |
| Total FF | Forest Management Plans (FMPs)* | 1,202,918 | 18 | 1,447,529 | 22 | 818,875 | 12 | 3,116,105 | 47 | 6,585,427 | 100 |
| | Actual harvest | 1,247,467 | 22 | 1,057,899 | 18 | 313,049 | 5 | 3,150,804 | 55 | 5,768,133 | 100 |
| | **%, Actual: FMPs** | | 104 | | 73 | | 38 | | 101 | 88 | 100 |
| SFF | FMPs* | 934,403 | 19 | 1,087,371 | 22 | 601,336 | 12 | 2,253,734 | 46 | 4,876,844 | 74 |
| | Actual harvest | 851,849 | 20 | 868,000 | 21 | 277,248 | 7 | 2,145,860 | 52 | 4,155,797 | 72 |
| | **%, Actual: FMPs** | | 91 | | 80 | | 46 | | 95 | 85 | |
| NGFF | FMPs* | 268,515 | 16 | 360,158 | 21 | 217,539 | 13 | 862,371 | 50 | 1,708,583 | 26 |
| | Actual harvest | 395,618 | 25 | 189,899 | 12 | 35,801 | 2 | 1,004,944 | 62 | 1,612,336 | 28 |
| | **%, Actual: FMPs** | | 147 | | 53 | | 16 | | 117 | 94 | |

### Table 9: Supply and consumption of roundwood in 2005[44]

| Type and category of wood | Coniferous roundwood, m³ | | | | Deciduous roundwood, m³ | | | | Total m³ |
|---|---|---|---|---|---|---|---|---|---|
| | Large-sized | Middle-sized | Small-sized | Fuel wood | Large-sized | Middle-sized | Small-sized | Fuel wood | |
| **I. Supply of roundwood** | | | | | | | | | |
| 1. From SFF | 511,309 | 582,528 | 193,960 | 346,300 | 340,540 | 285,472 | 83,288 | 1,812,400 | 4,155,797 |
| 2. From NSFF | 289,177 | 120,942 | 20,618 | 116,431 | 106,441 | 68,957 | 15,183 | 874,587 | 1,612,336 |
| Total from FF | 800,486 | 703,470 | 214,578 | 462,731 | 446,981 | 354,429 | 98,471 | 2,686,987 | 5,768,133 |
| **Total supply** | **800,491** | **703,470** | **214,578** | **462,731** | **499,026** | **354,429** | **98,471** | **2,686,987** | **5,820,183** |
| **II. Consumption of roundwood** | | | | | | | | | |
| 1. Woodworking companies and wood traders | 713,374 | 328,602 | 105,665 | 153,752 | 439,474 | 133,706 | 25,088 | 758,806 | 2,658,467 |
| 2. Large consumers* | 41,535 | 423,655 | 182,753 | 182,753 | 44,124 | 117,665 | 44,124 | 529,491 | 1,566,100 |
| 3. Local population | 14,042 | 20,704 | 12,446 | 116,731 | 10,281 | 31,305 | 16,049 | 852,839 | 1,074,397 |
| Total domestic consumption | 768,951 | 772,961 | 300,864 | 453,236 | 493,879 | 282,676 | 85,261 | 2,141,136 | 5,298,964 |
| 4. Export of roundwood | 2,712 | 67,790 | 33,895 | 31,183 | 15,795 | 126,355 | 31,590 | 142,150 | 451,470 |
| **Total consumption** | **771,663** | **840,751** | **334,759** | **484,419** | **509,674** | **409,031** | **116,851** | **2,283,286** | **5,750,434** |

* Large consumers are wood-processing companies harvesting an annual volume above 50,000 m³ technological timber.

43 EFA statistics 2005

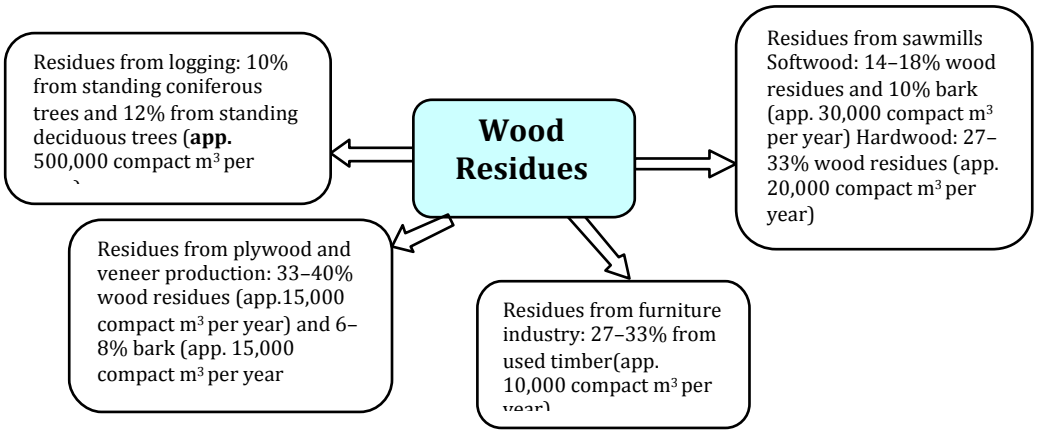
44 EFA statistics 2005

During the period 2001 – 2009, the actual volume of harvested wood from the State Forest Fund (SFF) was less than planned in the FMPs. In 2009 it stood at 914,000 $m^3$ less than 2008 — a drop of 22 per cent. Compared with 2007, the 2009 harvest was 502,000 $m^3$ down.

The main reasons for this are:

- low density of the forest road network (7 – 8 m/ha) compared to other European countries with broadly similar topographic conditions e.g.: Austria 36 m/ha, Switzerland 40 m/ha, France 26 m/ha, Germany 45 m/ha. The average transportation distance is about 150 – 200 km;
- poor condition of forest roads;
- the economic crisis.

Wood residues from the woodworking and furniture industries (wood residues, wood chips, sawdust and bark) are also used for energy purposes. According to accepted Bulgarian standards the volume of wood residues is calculated as follows:[45]



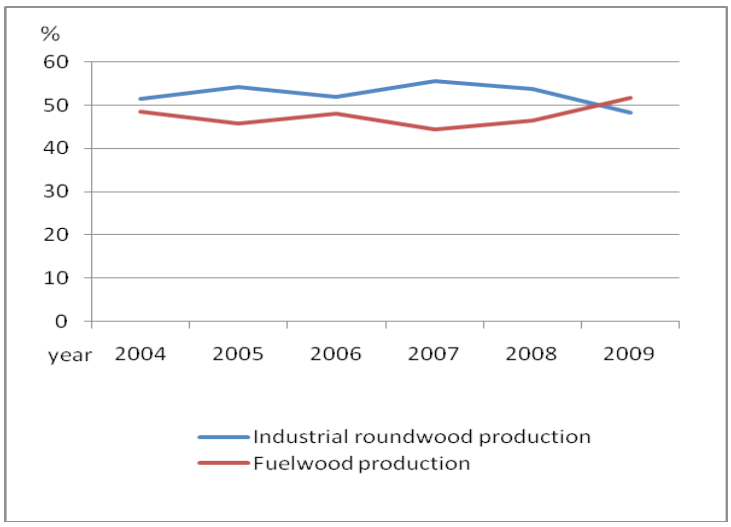

According to research published by the Technical University of Sofia in May 2008, the volume of waste from sawn-timber production is in the range 28 – 46 per cent. In the other woodworking industries the volume of waste is 7 – 23 per cent.

In 2006, a private survey of the biggest pulp, paper and panel-board companies showed that only Mondi Packaging Stambolijski EAD sold part of their wood residues (bark and sawdust), but they had invested in a biomass boiler which was to be installed in 2008. The rest of the largest companies (panel boards and furniture) burned their wood residues to cover their own heating needs. Most small wood-processing companies sell their solid wood residues and give the sawdust to local people for free.

According to the Food and Agriculture Organisation Statistics Division (FAOSTAT), industrial roundwood production was bigger than fuelwood production in the period 2004 – 2008. In 2009, fuelwood production was four per cent larger than industrial roundwood production (Fig. 4).

45 Forestry University of Sofia data, 2005

**Figure 4: Industrial and fuelwood production as a percentage of total roundwood production[46]**




As a whole, data reported by EFA and FAOSTAT are inconsistent.[47]

46 FAOSTAT

47 EFA sent data to the FAO for FAOSTAT, but most data in FAOSTAT is different to that which EFA reports in its annual statistics.

# 10. Problems related to increased biomass production

If Bulgaria is to achieve her EU 2020[48] targets, the contribution made by biomass will have to increase significantly. This will require mobilisation of forest and agricultural biomass on a very large scale, using a very significant amount of land and resulting in negative impacts on biodiversity and potentially sensitive species and sites. Mobilisation of biomass will lead to conversion of natural/semi natural lands into either agricultural commodities or fast growing tree stands, intensification of forest management (including. targeting of novel wood resources such as deadwood,) and will put pressure on protected territories.

Since the amendment of the Bulgarian RESA in May 2011, awarding a preferential tariff to energy from biomass for the next 20 years, interest from investors has grown. The tariff can be revised annually by MAF, to reflect the changing costs of raw materials, production and payroll. Such a measure does not exist for other RES. These changes could stimulate overexploitation of forests, and destruction of valuable forest ecosystems.

Significant barriers to the use of biomass for energy needs are:

- Poor practices and technology for harvesting and using woody biomass;
- Insufficient investment in specialised equipment for the harvesting, transport and processing of wood biomass;
- Poor implementation of national development policies and subsidies to energy crops;
- Current practice in the wood-processing industries, with a significant proportion of waste biomass being used for chipboard production and for export;
- Significant fragmentation of land between the large number of owners with diverging interests;
- Lack of funding for research and development of fuel biomass.

At present, the targets for increased production and use of biomass as an energy source are very high.[49] Unfortunately, these targets are not based on accurate assessments of available resources, including wood. Information on the quantities of available biomass is scarce. There is a very low correlation between the different sources of information on biomass potential and use. Often there are differences between the estimates given (see Table 5 and Table 6). Additionally the estimates given are not based on sufficient analysis. They do not take into account, for example, the available quantities of biomass, or the location of this biomass and what impacts its extraction would have on natural ecosystems, biodiversity, carbon storage, water, soil and other components of the environment. Nor do they take into account economic and practical limits to their exploitation.

The research and knowledge base is very poor in regard to potential impacts on biodiversity, water, and soil and forest health. Biomass is still considered to be carbon neutral and there is no discussion of the carbon debt of biomass: when the biomass is from forests, the time to recapture the carbon stored is generally longer, and the carbon storage capacity of the forest may be reduced overall if destructive forestry techniques are employed. What is more, the emissions from forest management have to be taken into account when estimating the greenhouse gas (GHG) reductions achieved through biomass use. The carbon-storage capacity of forests must be protected, but increased use of biomass could lead to an intensification of forestry practices and a reduction of forest carbon stocks as a result. This makes possible an imbalance between supply and demand, to meet existing material use plus projected RE needs.

48 GHG emissions 20 per cent (or even 30 per cent if the conditions are right) lower than 1990; 20 per cent of energy from renewables; 20 per cent increase in energy efficiency

49 During a session of the Council of Ministers in February 2011 the Prime Minister stated that Bulgaria has a huge woody biomass potential incl. „deadwood that should be removed in order to keep our forests healthy".

Bulgaria specified in the NREAP how much unused arable and degraded land is available in the country but did not specify where these lands are located. Many of them may be very valuable for biodiversity and not suitable for afforestation or planting with energy crops. There is no clear vision of how further wood resource will be mobilised. The measures proposed so far are very unclear, emphasising an increase in productivity of existing forest management; building of new forest roads to currently inaccessible forests; increased extraction of forest by-products and low-quality wood; and use of certification schemes to improve forest management. Increasing the productivity of existing forest management to use more forestry residues may lead to a less sustainable forestry industry with greater conservation impacts. The inaccessible forests are, in most cases, very old and with high conservation value. Construction of new forest roads leads to better accessibility to the forest but higher risk of human intervention. Moreover it causes forest fragmentation and negative impacts on biodiversity. Initiatives to harvest deadwood also give cause for concern. Deadwood plays a key role in the functioning and productivity of forest ecosystems through its effects on biodiversity, carbon storage, soil nutrient cycling, energy flows, hydrological processes, and natural regeneration of trees. Its removal could harm the functioning and productivity of forest ecosystems and cause loss of endangered forest-dependant species. The increased removal of forest residues and stumps has a negative impact on soil organic matter and soil carbon stocks, but this problem is largely ignored. Forest certification standards in Bulgaria are not structured in such a way that they could be adapted to certify biomass-for-energy purposes.

Another significant concern is that the biomass is currently used in boilers with very low efficiency (see chapter 6).

Another problem is that no assessment of the impact on other sectors of using biomass for energy had been conducted at the time of writing.

Of most concern is the fact that at the time of writing there are no sustainability standards for biomass production at either the national or EU level. Meanwhile, interest in new biomass plants, boilers and CHP schemes is growing. Biomass has a leading role in comparison to other RES, but no environmental safeguards are proposed to ensure an increase in biomass production will not harm ecosystems and exacerbate the global biodiversity crisis.

Many policies already exist at the national level to shape biomass production and use. But coherence among different plans is usually lacking. As an example: the NREAP doesn't fully take into account the information on forest biomass provided by the SPFSD, nor the objectives set in the NPBC.

# 11. Measures currently in place to address these problems

Sufficient measures do not exist, at the national level, to deal with the envisaged increase in production and use of biomass-for-energy purposes, and subsequent potential negative impacts. A positive step in this direction has been the development of the Strategic Environmental Assessment and Appropriate Assessments of the NREAP. Both documents proposed important measures to mitigate negative impact on biodiversity and imposed bans for unsustainable development of RES within the Natura 2000 network (see chapter 7).

# 12. Future measures required: the importance of EU-wide biomass standards and regulation

It is very probable that biomass will play an important role in the future energy portfolio of Bulgaria. Since the continued existence of forests and other sources of biomass is not a given, it is essential that a clear national vision on sustainable production and use of biomass based on accurate data, research and analysis is developed. Sustainability of biomass supply should be assessed and controlled. The conditions of its sustainable production and use must be clearly formulated, taking into account impacts on other sectors. Only when bio-energy from woody biomass is sustainable, should it be embraced as an energy source. There are clearly more environmentally sustainable sources of biomass (such as waste and residues) and indeed opportunities for improved conservation practice. For example, there are unrealised conservation opportunities in restoring unmanaged woodlands through reinstating coppicing or reed bed harvesting, thus providing a market price for these products and adding economic value to these landscapes.

Bulgaria should set up a participative process to develop biomass-management criteria at the national level in order to ensure that its policy contributes to reducing GHG emissions by increasing RE production, but at the same time does not create unintended negative environmental and social outcomes. Strong sustainability standards should be set for all bioenergy production and environmental safeguards put in place for all RE developments.

It is important that any further planning and developments in regard to production and use of biomass for energy purposes are subjected to strategic environmental assessment and that they set out how they will cohere with other national legislation and in particular with nature-conservation objectives.

In addition, a certification regime could contribute to ensuring the sustainability of biomass. It can prevent negative impacts on the social well-being of local communities; ensure that biomass production contributes to local prosperity; and prevent negative effects on biodiversity and other environmental factors (soil, water and air). Current certification schemes (e.g. FSC) should be adapted in order to allow certification of energy sources such as woody biomass.

Equally important is the promotion of the value of energy efficiency and energy saving as, less energy-use means less renewable energy is required.

## The importance of EU-wide biomass standards and regulations

Climate change is the greatest threat facing the planet; without immediate action to reduce GHG emissions there will be devastating consequences for humans and we risk the extinction of thousands of species. Rapid and deep emission cuts in developed countries are essential to avoiding dangerous climate change. This will require a massive reduction in energy use, a dramatic increase in energy efficiency and a rapid switch from high to low carbon sources of energy in all sectors.

However, whilst renewable energy is essential to safeguard biodiversity from the impacts of climate change, inappropriately designed and/or located renewable energy projects can also seriously damage biodiversity. Such damage is not inevitable, but depends on specific choices about energy saving, and about how and where to develop renewable energy sources. If policies are appropriately designed and safeguards put in place, damage to wildlife can be avoided or at least minimised.

Bioenergy has an important role to play in tackling climate change. However, it is also a finite resource that should be produced and used in the most efficient and sustainable manner. Therefore bioenergy support policies should focus on achieving GHG savings and should be underpinned by strong, mandatory efficiency and sustainability standards.

Since the EU has a binding target for renewable energy, equivalent, common, binding sustainability criteria for biomass should also be developed. They should be based on the best available research and knowledge base and rely on an accurate assessment of the potential for sustainable use of biomass. This will enable the harmonisation of available national biomass standards and prevent encouragement of the cheapest and often most destructive forms of biomass production. Common criteria will also contribute to coherence of bioenergy policies with other EU legislation. But the common EU criteria should be incorporated into national legislation according to the specific conditions in each Member State.

The absence of any binding rules gives Member States carte blanche to propose any kind of biomass standards, however weak, which will endanger existing climate change, nature conservation and quality of life objectives. Additionally, the current EU policy in regard to biomass makes it unclear whether any Member States will actually introduce national schemes in the absence of EU-wide rules. An absence of sustainability standards (either at the national or EU level) could lead to irreversible damage to forests, in particular in countries such as Bulgaria with a large biomass production potential, paired with poor governance.

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