WOOD ENERGY IN ROMANIA

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ABSTRACT

Wood energy is widely used, providing more than 14% of the world's total primary energy and it is one of the renewable energies with important potential of expansion.

Wood has been the dominant fuel and has a long tradition in Romanian rural areas based on its sustainable, environmentally friendly and renewable natural resource characteristics and represents a significant source of income, especially for the "new forest owners", in the forest restitution process context.

The use of wood for energy in urban areas in Romania is linked with the domestic price of the fossil fuels. There is a also a contemporary fashion for open fires. Fires are no longer just means of warming a room. They are fully integrated architectural features which can be positioned anywhere in the house. People love their elemental look. It seems that elemental forces, come of age in our homes.

The available wood for energy production in Romania is determined by :

- the available allowable cut (determined taking into account the rotation length, average species composition, forest structure according to the site indices and the existing distribution of age classes)
- the wood waste volume resulting from the wood processing industry
- the quality of forest stands
- the accessibility of the forest areas

At present there are no subventions directed towards the use of wood for energy in Romania. Subventions for wood energy in non-accessible forest areas could introduce important volumes of small-size and low quality wood in the economic cycle. Different technical solutions related to the local conditions are envisaged for rural areas and in some cases for urban areas in Romania. The actual rate of wood annual harvest/allowable cut and the current contribution of the forestry sector in Romania to the GDP show us that wood as a forest resource is still an underused resource from the economical point of view, and the use of wood for energy is a viable solution in many cases. The fundamental objective of the present-day national forestry policy and strategy

in Romania is the development of the forestry sector in order to increase the sector contribution to the improvement of the quality of life. In this context wood energy as a strategic option provides heat, power and light as well as important income and employment and has an important neutral effect as fuel in the climate change context. Not only forestry but also other sectors are interested in wood energy systems: energy, agriculture and rural development. In order to strengthen the national capacities for wood energy, new institutions with trained personnel are required.

There are some major concerns for the wood energy sector at international level and FAO, UNECE, EC and interested NGOs established strong links and partnerships at international and regional level with all stakeholders, for promoting and implementing new projects, exchanging ideas and information.

Keywords: wood energy, sustainable, renewable, environmentally friendly, technical solutions, neutral effect

INTRODUCTION

Wood energy is widely used, providing more than 14% of the world's total primary energy and it is one of the renewable energies with important potential of expansion. According to FAO-2003, wood energy represents 3% in EU developed countries and 30% in developing countries, recording a maximum of 80% in some countries from Africa. There is also a contemporary fashion for open fires. Fires are no longer just means of warming a room. They are fully integrated architectural features which can be positioned anywhere in the house. People love their elemental look. It seems that elemental forces, come of age in our homes. Wood has been the dominant fuel and has a long tradition in Romanian rural areas based on its sustainable, environmentally friendly and renewable natural resource characteristics and represents a significant source of income, especially for the "new forest owners", in the forest restitution process context. The use of wood for energy in urban areas in Romania is linked with the domestic price of the fossil fuels.

THE AVAILABILITY OF WOOD FOR ENERGY PRODUCTION IN ROMANIA

The available wood for energy production in Romania is determined by:

- the available allowable cut (determined taking into account the rotation length, average species composition, forest structure according to the site indices and the existing distribution of age classes)
- the accessibility of the forest areas (forest road network development)
- the wood waste volume resulting from the wood processing industry
- the quality of forest stands.

The available allowable cut

Forests cover 6.337 million ha , which represents 26,7% of the total area of Romania, decreasing with more than 0,76 million hectares during the last century (table

Table 1. The evolution of the forest area in Romania (million ha)

Forest area (million ha)									
Year	1922	1938	1948	1956	1960	1980	1989	1996	2002
Area	7.134	6.130	6.487	6.487	6.403	6.337	6.372	6.220	6.367

1). The process of restitution of forests to the ex-owners is ongoing, and it is estimated that around 30% of the total Romanian forest area will be private. 67% of the forest area is in the mountains (30% of the country), 25% in the hilly regions (37% of the country), and 8% on the plains (33% of the territory).

The forest composition is varied: 30,7% conifers, 30,7% beech (pure and mixed stands), 18,2% oak species, 20,4% various hard and soft broad-leaves. The standing

Table 2. The allowable cut and the annual wood harvest evolution in Romania (source Bud, 2000; 1918-1989 and National Forest Administration 1991-2003)

Period (year)	Total allowable cut (million m3)	The wood harvest (million m3)
1918-1923	12	20-24
1923-1925	12	21-22
1926-1938	14	17-20
1951-1955	14	24-27
1958-1962	14	22
1962-1975	24	25-27
1976-1980	21	22
1981-1985	21	23
1986-1990	18	18,5
1991	19	15,3
1993	15	13,6
1994	14,5	12.9
1995	14,4	13,8
1996	14,6	14,8
1997	14,8	14,5
1998	15,2	12.6
1999	15,5	13,7
2000	15,8	14,2
2001	17	13,4
2002	16	16

volume is about 1.350 million m3/ha and the average growing stock is 217m3/ha. In 2002 there was 0,28 ha of forest per capita.

The low values of annual wood harvest in the last decade are similar to those in other European countries with important mountain forest areas. The correlation between the period with high values of annual wood harvest and floods is a subject of discussion in Romania. The sustainable forest management in Romania has a long tradition and the national forest area has been managed in terms of the silvicultural regime (system of technical, economic and legal norms/regulations issued by the Central Public Authority for Forestry). The main characteristics of the Romanian forest management are: functional repartition by forest zone, the maintenance of natural composition in forests; the use of natural regeneration, maintenance of a high-level rotation age for native forest species, utilization of adequate treatments to maintain the ecological balance, evolution towards multi-use forests. The current method used to determine the allowable cut is based on a traditional sustained yield approach: it takes into account the rotation length, the average species composition, the forest structure according to the site indices and the existing distribution of age classes. The rotation length is calculated based on the maximum rent principle, and has been set according to the average increment of the target dimensional class, reflecting a conservative policy with an environmental dimension. The current structure of age classes results in a reduced share of exploitable forests with important consequences for the wood industry (Sustainable Forest Management in Romania-National Forest Administration 2000). The accessibility in the Romanian forest areas is assured by a network of forest roads with a total length of 39,200 km and a density of 6,2 m/ha. This means that only 65% of the whole forest area can be considered accessible. On this surface, the distance for wood collecting, from the stump to the transportation network is on average 1.2 km with a maximum of 2 km.

The wood waste volume resulting from the wood processing industry

The methodology to calculate the wood waste volume resulting from wood processing (traditional wood industry in Romania) includes the calculation of the industrial wood, small-size wood (fire wood) and bark from the possibility:

1-the veneer logs total volume was excluded,

2-the possibility (calculated in the Management Plans of the Forest Districts for 10 years) is graded by species, groups of species and by areas (production units), and then the results are marked in: industrial wood, small-size wood and bark according to classification of Giurgiu, et al (1972),

3-the total volume of wood wastes resulting after processing was calculated using the methodology proposed by Ene and Bularca (1994), by species.

In the specific case of the Faget region, located in the West of Romania, the possibility was estimated 35 km around of the Faget town. The total available wood for energy production represents 52,2% of the total possibility (2 039 844 m3) in this region. The estimated wood wastes (including sawdust and bark) represent 20,1% of the possi-

bility and small-size wood represents 32,1% from the possibility. Taking into account the apparent conventional density by species (Giurgiu-1979), the available wood for energy in the Faget region represents 579 39 metric tones/year (Borlea et al 2003). This could significantly contribute to fulfil the local needs for energy in the Faget town.

There are two sources of raw material for wood energy Borlea et al. (2003): the small-sized wood in regions with weak development of wood industry, where the industrial wood is exported to other areas and the wood waste from wood industry or from different not-recycled wood materials.

There are many situations in which all 2 or 3 sources of raw material for wood energy are available.

The total wood waste volume resulted from wood industry in Romania is still used in an unorganised way. There are some important new investments where the wood wastes are used, but this is very limited and important quantities of wood waste are either used for domestic purposes as firewood or unused. This is due to the availability of wood with low price and also to the unorganised development of the wood industry in Romania. The current contribution to the GDP of the forestry sector, shows us that wood as a forest resource is still an underused resource from the economical point of view, and the use of wood for energy is a viable solution in many cases.

In the context of using wood wastes as energy resources, there are two ongoing projects in Romania (Istratescu-2003):

The project NNES/1999/48 (wood wastes use as fuel in thermal station of the manufacturing companies in the wood industry), financed in proportion of 62,86% by EU funds,

The PHARE project "Utilization of wood wastes for urban heating", implemented in Campeni town (10,000 inhabitants), Alba County. The extension of this solution to other 5 localities is envisaged.

The potential for producing energy from wood is important at local level in the context of large mountainous regions of Romania.

CONCLUSIONS

There are some major concerns for the wood energy sector at international level and FAO, UNECE, EC as well as interested NGOs established strong links and partnerships at international and regional level with all stakeholders, for promoting and implementing new projects, exchanging ideas and information, in which Romania can play an active role.

At present, wood fuels are traditionally used in local domestic heating and there are no subventions directed towards the use of wood for energy producing in Romania, but the situation can change after EU accession. Subventions for wood energy, Austria (Egger, 2003) or in other EU countries (Erlbeck, 2003, de Gallembert-2003, Hillring-2003), if applicable in Romania, could introduce important volumes of small-size and low quality wood in the economic cycle, especially in the in non-accessible forest areas

and important quantities of energy can be produced for domestic market. Different technical solutions related to the local conditions are envisaged for rural areas and in some cases for urban areas in Romania. The modern bio-fuel energy production industry can change dramatically the consume pattern for small-size wood and wood wastes, resulting in a competition for raw material with the traditional wood industry.

The fundamental objective of the present-day national forestry policy and strategy in Romania is the development of the forestry sector in order to increase the sector contribution to the improvement of the quality of life. In this context wood energy as a strategic option provides heat, power and light as well as important income and employment and has an important neutral effect as fuel in the climate change context. Not only forestry but also other sectors are interested in wood energy systems: energy, agriculture and rural development. In order to strengthen the national capacities for wood energy, new institutions with trained personnel are required.

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