

ECONOMIC ASPECTS OF BIOMASS UTILIZATION

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ABSTRACT

This paper deals the overview of characteristics and prices of Biomass. The agriculture in Hungary has big potential in energy production from biomass. Economic aspects of the utilizing the Biomass for energy production is very important. The price of biomass production mainly depends on internal agricultural preferences, on biomass transformation prices and the government biomass utilization support.

1. INTRODUCTION

The energy consumption of Hungary was decreasing till 2000. In 2001 the consumption starts to increase. In 2003 the energy consumption was over 1213 PJ. The energy import of Hungary was in this year around 780 PJ, which represents the 64,3 % off the total energy consumption. This shows that Hungary was mainly depend on energy import.

From the all imported energy, the gas was the biggest energy source with over 42,2 % from all imported energy. The second was the petroleum which represents 29, 9 % of imported energy amount, and the coal represents about 13%. The renewable sources represent only 3 %.

In energy consumption the public represent 38, 3 %. The second energy consumption sector was the industry with 34, 9 %. The communal sector represents around 18,9 % and the agriculture 4 % investments [1], [2], [3]. Biomass is treated as renewable energy source. It includes wood from rapidly growing trees in short-term plantations, wood waste in forestry and wood industry, waste from grass trimming, manure from animal husbandry.

Depending on the type of biomass, various processing technologies are applied. In energy production are used agricultural and plant production. The energy value has the largest impact on the usefulness of the substance. Tables 1 and 2 below present the energy specifications of certain types of straw and wood which are used as biomass fuel [4], [5].

Tab. 1 Net calorific value of wood as a function of moisture [6]
Net Calorific Value of Wood [GJ/m³]

Moisture [%]	Larch	Spruce	Willow	Beech, Oak	Pine, Alder	Birch
0	8.74	7.60	6.65	10.83	7.98	9.69
15	8.55	7.43	6.50	10.59	7.80	9.47
20	8.46	7.36	6.44	10.49	7.73	9.38
25	8.37	7.28	6.37	10.37	7.64	9.28
30	8.27	7.19	6.29	10.24	7.55	9.17
35	8.15	7.08	6.20	10.09	7.44	9.03
40	8.00	6.96	6.09	9.92	7.31	9.87
45	7.84	6.81	5.96	9.71	7.16	8.69
50	7.64	6.64	5.81	9.46	6.97	8.47
55	7.39	6.43	5.62	9.16	6.75	8.19
60	7.08	6.16	5.39	8.78	6.47	7.85

Tab. 2 Net calorific value of certain biomass [6]

Grey Straw	15.2 MJ/kg
Reeds	14.5 MJ/kg
Firewood	13.0 MJ/kg
Yellow Straw	14.3 MJ/kg

2. BIOMASS POTENTIAL IN HUNGARY

The last researches show that Hungary has substantive potential of Biomass. The total biomass amount in the country is around 350 – 360 million ton. 105 – 110 tons was renewable. The yearly produced amount of biomass energy was over 1185 PJ. This amount of energy was bigger than the total Hungarian energy consumption which was 1124 PJ.

The biggest biomass produces was the agriculture with 58 million tons of biomass yearly. The biggest energy potential in the agriculture was the flammable straw from fields, the planted energy tree fields and the crops used for bioethanol. Little amount of energy was produces by herd of cattle.

The biggest problem with the utilization of biomass from agriculture was the investments [1], [2], [3].

The utilization of biomass for energy producing was conditioned by two things:

- price of energy carriers;
- price of production of energy carriers.

The price of biomass production mainly depends on internal agricultural preferences, on biomass transformation prices and the government biomass utilization support.

Beside these two main indicators on the biomass utilization for power engineering was affected by other influences. These are visual change of nature and the attitude of people to change the environment.

The two alternative fuel biodiesel and bioethanol without VAT was able to compare in price with normal fuels.

The prices of these biofuels are affected in 57 – 68 % by price of colza and corn.

The amount of produced power from biomass is affected by the price of the biomass production, logistic prices, construction and efficiency of furnace and the operational cost.

From the all biomass fuels the priceless power production is from the forest pulp. The price of the power generated from the forest pulp can compare to the power generation from gas [1], [2], [3].

3. ECONOMIC ASPECTS OF THE USE OF BIOMASS

The biomass utilization depends on cooperation of consumers, energy producers and government. In assessing the economic efficiency of the use of biomass for energy purposes, we must take into account all financial expenditure. During using biomass for energy purposes, the impacts on the environment by the manufacturer or the consumer are ignored.

Harmful substances emission reductions cost can differ based on various research data's. The next table shows the cost of the energy carriers include environmental protection prices.

Tab. 3 The prices of the energy carriers

Energy carrier	Commodity, Amortization (ft/GJ)	External costs (ft/GJ)	Total cost (ft/GJ)
Brown coal	993	1.533	2.526
Black coal	1.138	1.000	2.138
Heating oil	3.738	86	3.824
Propane-Butane gas	2.151	4	2.155
Gas	950	4	954
Fire wood	1.1129	0	1.129
Energy plant	628	0	628
Baled straw	769	0	769

The benefits from low costs of biomass energy carriers are significantly reduced by high cost of furnace. In near future, the spreading of modern furnace, the delivery distance optimization and revenues from the reduction of harmful emissions make biomass more competitive for energy purposes.

4. CONCLUSION

From the biomass from the agricultural sector can competitively produce various biofuels and bioethanol. Energy production from energy plantation, forest pulp and baled straw is competitive. With utilizing this biomass, the Hungarian agriculture can generate 10 % of the total energy consumption.

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