

Opportunities for a Forest Energy Industry in a Developing Country: An Example from Moldova

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Developing sustainable energy from forest biomass presents both opportunities and challenges for the future generations of Moldova. Located in the south-eastern part of Europe between Ukraine and Romania, Moldova is a relatively poor country with limited natural resources compared with other developing European countries such as Albania or Bosnia. This lack of fossil fuels (natural gas, oil and coal) has resulted in a strong economical and political dependence on large neighboring countries including Russia and Ukraine. Historically, agriculture has been the dominant land use; however, poor land practices in the country has degraded some of the formerly richest soils in the world to a greatly diminished economy with few alternatives. The development of a forest biomass and energy industry based on forest resources could diversify and greatly improve the economy.

Forest products and natural resources have had significant and positive effects on the economies of other countries in Europe. In Sweden, for instance, it was the development of the mining, forest and hydroelectric industries from indigenous raw material that enabled them to become a modern industrial nation. Denmark may soon become the world leader in straw combustion and Norway is developing a robust wood pellets industry. Developing a



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A landscape in the north part of Republic Moldova.

bioenergy program for Moldova based on forest biomass may provide a similar strategy that could greatly improve the economy. This approach would encourage farmers to invest money, land and time in commercial forestry practices aimed at

developing a bioenergy economy. The development of a bioenergy program for Moldova could result in economic independence, security and social health for future generations. However, there are numerous cultural, historical and political challenges that need to be overcome before this can be achieved.

The current total land area of Moldova is only about 13,000 square miles and is dominated by agricultural lands (58 percent), pastures (19 percent) and small villages (11 percent). Forest and water areas are limited, with forests and water comprising about 11 percent and one percent



Seed-tree method in Codrii, the most afforested central part of Moldova.

of land area, respectively. The annual average temperature is 30-36 degrees F, and precipitation ranges from 22 inches in the northern part of the country to 15 inches in the south. Forests cover about 804,000 acres with predominantly broad-leaved trees including oaks, acacia, ash, hornbeam and poplar. The total growing stock is 1,241 billion ft³ or 286 ft³ of wood per capita, with an average of 4,379 ft³ per hectare. The average annual growth of the forests is estimated at 117 ft³/year/ha. In comparison, Oregon's annual growth (including all forestland) is 182 ft³/year/ha. The total annual growth

of Moldova is around 39 million ft³ per year. In Oregon, gross total annual growth is 2.2 billion ft³ per year. Moldova's forest sector supplies about 16 million ft³ of wood mass per year to the national economy. From total average annual harvested wood (14 million ft³) only 1.4 million ft³ (10 percent) is industrial timber. Most wood is used for firewood, which satisfies 60-70 percent of the heating needs in rural areas. Almost all forestland is publicly owned and the state has exclusive responsibility for environmental protection functions.

Moldova is a net energy importer, with only three percent of demand for primary energy covered by domestic sources. The total consumption of primary energetic resources (e.g. 6.5 million tones in 2004), could be provided by 670 million ft³ of forest biomass. To meet energy demands, harvesting an average of 9,000-12,000 ft³ from 140,000-190,000 acres of forests would be required. By also improving the production from biomass plantations and using other renewable resources of energy such as sun, wind and water, the forest area could be reduced to 75,000-100,000 acres. Using a forest rotation age of 15-20 years, approximately one to two million acres would need to be converted into biomass energy plantations. This may be difficult to achieve, but creating forestland for biomass and energy production from private lands (most farmland in Moldova is private) would generate diverse economic opportunities for private landowners and include forestry along with agriculture and livestock that is more sustainable.

There are three principal barriers to promote forest biomass as fuel or energy: lack of knowledge and expertise; legislative policy; and traditions. Producing renewable energy in developing countries will require overcoming institutional, technical, economic, financial and informational barriers. The actual impediments

for the promotion of small-scale forestry in Moldova as a condition to produce energy from forest biomass include reconciling conflict between pastures for rural people, priorities for private and state forests, investments in forestry and other economic factors. Bioenergy for Moldova becomes a question of economic independence, security and social health. As a consequence, to produce energy using forest biomass from created private forests will require local rural people to solve current chal-

lenges for future generations of Moldova and to learn to sustainably manage forests. ■

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