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## **GROWTH OF COMPETITIVENESS AND RENEWABLE ENERGY SOURCES**

At present, the urgency of Moldovan policy is integration into the European Union. Neither Moldova nor the European Union possesses energy resources; they are importing countries. The pressing energy crisis has accelerated the development of green energy in the European Union. Although the share of electricity produced by renewable energy sources in the European Union is significantly higher than in Moldova, it is still insufficient to ensure a continuous production process. The European Union's economy, a significant player in the global market, still heavily relies on traditional energy sources. It is impractical to replace natural gas and gasoline everywhere. As a result of this critical situation, some large companies are forced to close their business in the European Union and move production to other countries, primarily to the United States. The energy crisis has significantly worsened the economic situation in Moldova, highlighting the urgent need to develop renewable energy sources.

In the specialized literature, much of the research on the growth of green energy is devoted to the study of competition in the market for renewable energy resources [1] [10], the impact of tariffs [3] [5] [7], and innovations [4]. Leibowicz analyzed growth and competition in the renewable energy market according to Cournot [9].

Most studies on the competitiveness of renewable energy resources are dedicated to renewable energy [8]. According to calculations made by Chinese scholars, the USA registered the highest competitiveness [13]. However, no work analyzes the impact of green energy development on the competitiveness of goods. That is why this study aims to investigate the competitiveness of goods in Moldova and research the impact of green energy on competitiveness.

When assessing competitiveness, it is necessary to distinguish the competitiveness of goods [2] [6] [14], enterprises [15] [16], regions or countries [17]. The calculation of the competitiveness of goods was carried out using the Lafay index (*LFI*).

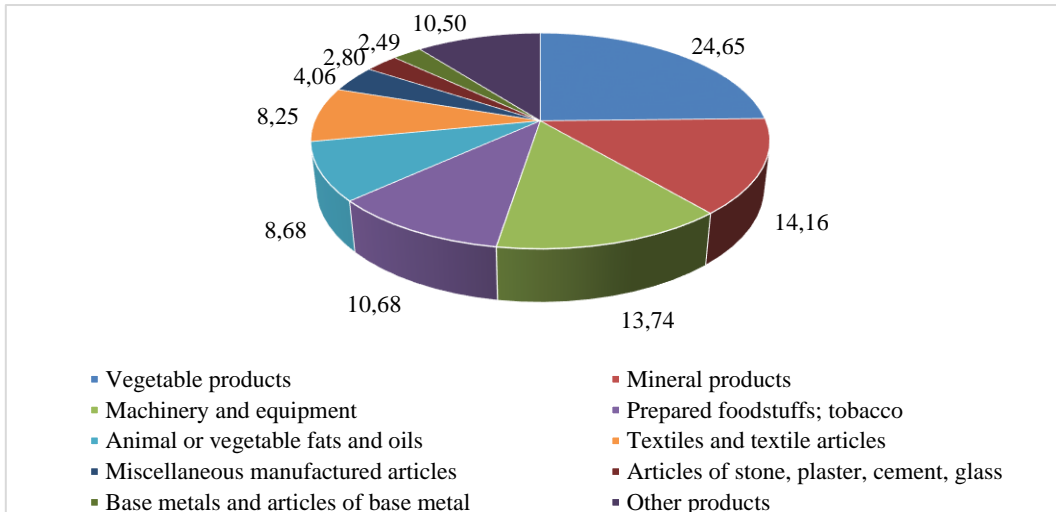
$$LFI = \left[ \frac{X_{ij}-M_{ij}}{X_{ij}+M_{ij}} - \frac{\sum_i(X_{ij}-M_{ij})}{\sum_i(X_{ij}+M_{ij})} \right] \times \frac{X_{ij}+M_{ij}}{\sum_i(X_{ij}+M_{ij})} \times 100\% \quad (1)$$

Where:

$X_{ij}$  – the export of goods  $i$  from the country-of-origin  $j$ ;

$M_{ij}$  – the import of goods  $i$  from the country-of-origin  $j$ .

The analysis of Moldova's export structure in 2022 showed that the most significant share goes to vegetable products (24.65%) and not industrial products (Figure 1). No renewable energy resources are used when harvesting vegetable products.

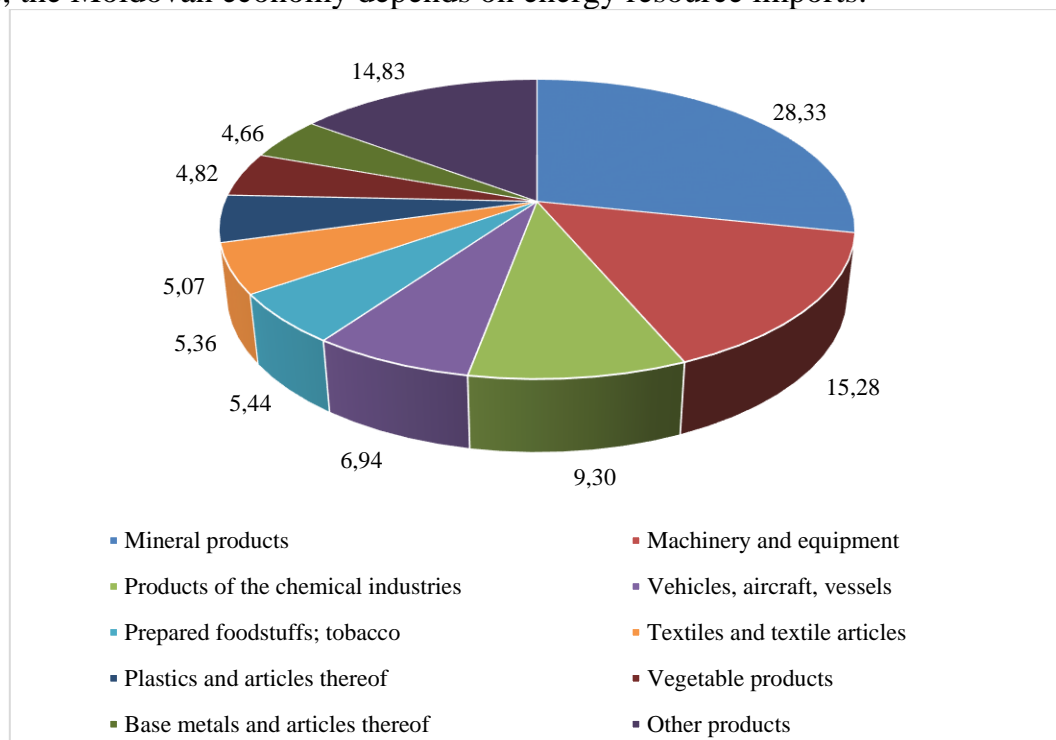


Source: Data from the National Bureau of Statistics of the Republic of Moldova [12].

**Figure 1. Moldova's export structure in 2022.**

The third place in the export structure is the export of machines and equipment (13.74%), and the fourth place is the export of prepared foodstuffs (10.68%). Therefore, we can admit that green energy has an insignificant impact on exports.

Mineral products account for the largest share of imports (28.33%) (Figure 2). Thus, the Moldovan economy depends on energy resource imports.



Source: Data from the National Bureau of Statistics of the Republic of Moldova [12].

**Figure 2. Moldova's import structure in 2022.**

Let's analyze how much renewable energy resources cover the needs of the Moldovan economy. Table 1 shows the volume of electricity production from renewable energy sources.

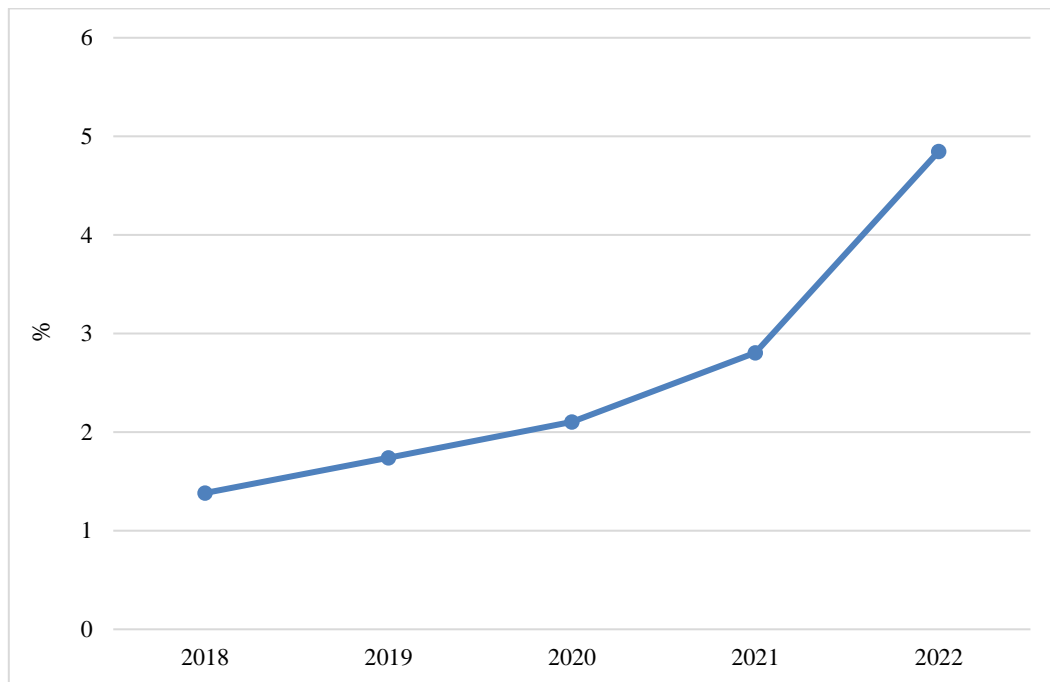
**Table 1.**

**Production of electricity from renewable energy sources in Moldova, million kWh**

	2018	2019	2020	2021	2022
Wind energy	21.968	36.915	50.138	76.310	142.373
Solar energy	1.457	1.437	3.275	7.764	30.297
Biogas	27.961	28.748	27.793	32.239	23.567
Hydroelectric energy	0.279	0.330	0.147	0.239	0.096

*Source: Data from the National Energy Regulatory Agency [11].*

The share of electricity produced from renewable energy sources (RES) in electricity consumption increased from 2018 to 2022 (Figure 3). In 2022, the volume of green energy increased 1.7 times, but its level remains small compared to the volume of electricity demand.



*Source: The author estimates using data from the National Bureau of Statistics of the Republic of Moldova [12].*

**Figure 3. Share of electricity produced from renewable energy sources in electricity consumption, %.**

To determine whether green energy affects the competitiveness of goods, we compare the growth dynamics of the share of electricity produced from renewable energy sources (RES) in electricity consumption and the dynamics of the competitiveness of goods calculated using equation (1). The calculation results are shown in Table 2.

**Table 2.****The Lafay Index of competitiveness of goods, %**

	2018	2019	2020	2021	2022
Live animals; animal products	-0.35	-0.64	-0.78	-0.83	-0.95
Vegetable products	9.10	9.39	7.69	9.94	8.63
Animal or vegetable fats and oils	0.92	0.95	1.63	1.47	3.40
Prepared foodstuffs, tobacco	3.25	3.24	3.69	2.81	2.28
Mineral products	-7.10	-6.65	-4.44	-6.11	-6.16
Products of the chemical industries	-3.26	-3.25	-3.83	-3.26	-3.17
Plastics and articles thereof	-1.94	-1.86	-2.11	-2.06	-1.49
Raw hides and skins, leather, fur skins, and articles thereof	-0.16	-0.21	-0.20	-0.16	-0.13
Wood and articles of wood	-0.65	-0.64	-0.67	-0.65	-0.48
Pulp of wood or other fibrous cellulosic material	-0.52	-0.56	-0.54	-0.44	-0.42
Textiles and textile articles	2.71	2.10	2.02	1.57	1.26
Footwear, headgear, umbrellas	0.25	0.18	0.24	0.17	0.12
Articles of stone, plaster, cement, glass	-0.13	-0.18	-0.11	0.08	0.34
Natural or cultured pearls, precious stones, precious metals	-0.05	-0.07	-0.07	-0.13	-0.08
Base metals and articles of base metal	-2.41	-2.44	-2.04	-0.91	-0.94
Machinery and mechanical appliances; electrical equipment	1.36	1.89	0.74	-0.07	-0.67
Vehicles, aircraft, vessels	-2.45	-2.50	-2.50	-2.19	-1.99
Optical, photographic; clocks	-0.26	-0.15	-0.25	-0.43	-0.23
Miscellaneous manufactured articles	1.69	1.42	1.55	1.22	0.75
Works of art, antiques	-0.01	-0.01	-0.01	0.00	-0.07

*Source: The author estimates using data from the National Bureau of Statistics of the Republic of Moldova [12].*

The Granger test did not yield results since, unfortunately, the growth of green energy did not lead to a decrease in electricity tariffs. Naturally, if the price had fallen, then the competitiveness of goods would have increased.

### **Conclusion**

The primary competitive goods produced in Moldova are vegetable products, animal or vegetable fats and oils, prepared foodstuffs, and textile products. Thus, the plant-growing, food, and textile industries are competitive and not energy-intensive.

The third energy package prevents the reduction of electricity tariffs. Thus, although the volume of green energy is increasing, the price of electricity is not decreasing; it is increasing due to the emergence of a growing number of intermediary companies between the electricity producer and the final consumer.

Currently, energy prices in Moldova are higher than in Europe. If Moldova refused not only the comparatively cheaper Russian pipeline gas in favor of liquefied gas from Europe but also from the Third Energy Package, then the development of green energy would reduce energy tariffs and, as a result, increase the competitiveness of goods.

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