

The situation today

Political context

Renewable sources provide an important energy potential and deliver unlimited ways of utilisation, both at national and international level. The use of renewable energy sources is being made based on three important premises: accessibility, availability and acceptability. Renewable energy sources offer an increased security of energy supply, and a limited energy resources import, in the context of a sustainable economy growth. These requirements are realised in a national context, implementing cost effective energy policies, increasing energy efficiency and superior valorisation of energy renewable sources.

From its validation in 1997, the Kyoto Protocol upon United Nations Framework Convention on Climate Change (1992), renewable energy sources industry has been pushed toward capitalisation on global market, a goal that can be achieved concentrating all the efforts to reduce the greenhouse gases. This Protocol stipulates that advanced countries must reduce the emissions of greenhouse gases up to 5.2% compared with 1990 level. Romania has assumed to adopt the community legislation in energy sector, including the renewable energy sources sector, even that it hasn't been realised a notable progress regarding the promotion of renewable resources.

Having in mind the implementation time of new technologies and replacing the existent equipment, it is necessary to accelerate the development of new and clean technologies and those who implies low energy costs. In the same time we need to change our life style in order to consume as little energy as possible.

In conditions of our country's joining to the EU in 2007, we assumed the strategic objectives in renewable energy resources field. The most important legal document is The Directive 2001/77/EC regarding the promoting of new and renewable energy sources. This Directive stipulates that until 2010, 12% from the total amount of energy must be produced from renewable sources. The contribution of renewable sources (solar energy, biomass, biogas, bio-fuel, wind energy) must be increased from 14% to 22%.

Since 2000 the Commission has proposed a considerable number of new legal instruments to promote renewable energy and energy efficiency. The European Parliament and Council have adopted the followings which are in implementation in the member and also in the accession countries, like Romania:

- Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources (OJ L283/33, 27.10.2001)
- Directive 2003/30/EC on the promotion of biofuels (OJ L123/42, 17.5.2003)

These directives on the promotion of electricity produced from renewable energy sources in the internal electricity market is going to be implemented very soon in Romania, while they have been already included in the national legal frame throughout the Government Decisions: HG-443/10.04.2003 that promotes the electricity generation from renewable sources and HG-1535/18.12.2003 that approve the strategy for the valorisation of renewables for energy.

At national level there has been works looking at biogas production from different types of wastes resulted from agriculture and alimentary industry. Presently, there are only very few installations in our country to produce biogas from waste waters, but none to generate electricity from biogas. These have various capacities and a reduced efficiency, being over dimensioned. Most of them does not work anymore. At the very few sites where still operating, the biogas produced in the existing installations is used for own heating needs of sites.

The policy and strategy documents relating to agriculture are not mentioning yet the raw material cultures for biofuel production purposes.

The Ministry of Economy and Commerce should promote the needed Romanian legislation to transpose this Directive until 31 December 2005.

Nevertheless, within the Romanian Fiscal Code (the Law 571/2003), the non conventional biofuels (biodiesel) are exempted from taxes.

As the transport is a significant source for air pollution, we mention in this context, the legislation regarding the air quality:

For the transposition of the Directive 2000/69/EC relating to limit values for benzene and carbon monoxide in ambient air, the following legal acts were adopted: Order of the Minister of Waters and Environmental Protection No. 745/30.08.2002 (OJ 739/09.10.2002) establishing the agglomerations and the classification of the agglomerations and of the areas for the assessment of air quality in Romania and Order of the Minister of Waters and Environmental Protection No. 592/25.05.2002 (OJ 765/21.10.2002) for the approval of the Norm establishing limit values, threshold values and criteria and methods of assessment of sulphur dioxide, nitrogen dioxide and nitrogen oxides, particulate matter, (PM10 and PM2,5) lead, benzene, carbon monoxide and ozone in ambient air.

For the implementation of the provisions of Directive 94/63/EC on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations, a calendar was established for the elaboration of compliance programmes for the small installations for which transitional arrangements had been requested.

GD No. 142/6.02.2003 relating to the sulphur content limitation of liquid fuels (OJ No. 112/21.02.2003), which transposes Directive 1999/32/EC relating the reduction of sulphur content of liquid fuels, has been adopted. The Ministry of Industry and Resources is the responsible authority for establishing the follow-up and compliance system for the sulphur content from crude oil and diesel oil, used in economic units or placed on the market.

The public RTD programmes contain Energy as a specific thematic direction, including renewables field. Biofuels technologies were considered within several R&D projects. Research centers as INMA-the National R&D Institute for Machinery in Agriculture and Food Industry, ICECHIM Chemical Research Institute, ZECASIN, developed studies and pilot installations regarding biofuel production. The harmonisation and connection with the FP European programmes is a permanent goal.

The Ministry of Economy and Commerce elaborated end 2003 a Strategy for RES use, approved by the GD 1535. The strategy foresees an ambitious RES development and confirms the size of needed capacity and capital costs.

In April 2003 it was issued the Government Decision no. 443 of 10 April 2003, on the Promotion of Electricity Production from Renewable Energy Sources. This act builds the framework for further specific regulations. The document establishes also the target for RES energy as a quota of the gross energy consumption: 11% in 2010.

Fuel quality

The transport sector in Romania is a significant consumer of final energy. In 2001 the final consumption in transport registered 3.96 Mtoe. The share of transport in final consumption has an increasing trend. The unit consumption per vehicle is presented in the following table.

	1995	1996	1997	1998	1999	2000
toe/per vehicle	0.8675	1.0719	1.0263	1.0043	0.7407	0.8541
toe of gasoline/gasoline vehicle	0.4923	0.615	0.5992	0.5887	0.4311	0.5056
toe of diesel/per diesel vehicle	2.4478	3.0043	2.8454	2.7643	2.0321	2.3231

The registered motor vehicles at end 2001 were:

Buses	31,118
Microbuses	16,606
Cars (including taxicabs)	3,225,512
Merchandise motor vehicles	456,324
Total (without motorcycles)	3,729,560

It results a yearly estimated total consumption of fuel of 3.2 Mtoe. Presently, the cost of fuel, at the fuel station pump, is:

- about 0.64 Euro/litre gasoline
- about 0,57 Euro/litre diesel

Biofuels production potential in Romania

Today in Romania, practically there is no production for biofuel purposes, except a rather modest quantity of exported rape.

However, the potential for a future biofuel raw material production is high, and may come from different approaches, regarding land and production availability.

A. re-conversion to biofuel production of a part of the habitual production and use of raw materials.

The information presented above regarding production of different agricultural raw materials as oil, sugar and starch crops, already existing on the market for other purposes than biofuel production, are relevant as it shows the efficiency, capability and experience to manage this kind of crops. These information constitute the starting point for further consideration on biofuel raw material production.

The land area used for these crops has in general a constant or slightly diminishing trend. Some production limitations are needed to ensure in future that the European common market functions properly. These limitations may be expected following the agriculture chapter accession negotiations. Nevertheless, the limitations in agricultural crop production will not be significant, and will be not a major source for production or land availability for biofuel purposes.

Sugar beet production. The only significant decrease is shown by the sugar beet production, following a more profitable raw sugar import from Brazil and Cuba (420,000 tones raw sugar import). It results that the difference between the today sugar beet production and the traditional sugar beet production, registered 7-10 years ago, may be immediately reactivated as raw material for biofuel production. This difference amounts to some 90 thou ha, or 1,800 thou tones, under current production efficiency.

Rape production. As mentioned above, the large majority (90%) of rape production is exported, while the remaining rape and rape oil production is used in Romania for other purposes than biofuel (textiles and chemistry). USDA FAS informs that Romania exported 85,000 tones rape in EU (Germany, Denmark and Sweden) in 2001/2002. It is not known the use of the exported rape in EU, but most probably it is processed for biofuel production.

The rape cultivated area and production have a continuous increasing trend. Currently, we may consider that over 100,000 tones of rape production are exported for biofuels production purposes.

Sweet sorghum production. For the moment the sorghum crops have a very modest volume and are used only as a cereal to obtain grains for animal food. The Chiminform research center, specialized in chemical processing engineering, developed recently a study stating the advantages of a future sweet sorghum production for biofuel production. The sweet sorghum production is not demanding as meteorological and soil conditions, while the specific ethanol production is equivalent as for the sugar beet culture, - around 6,000 liters/ha. From the plant, one obtains 3-8 tones sugar/ha, with a processing cost 40% lower than for sugar beet. The present production is up to 1 tone/ha for grains, and up to 50 tones/ha for the whole plant.

B. increase of agricultural production intensity

One of the most important sources for land and production availability will come from the increase in the production efficiency.

Today, approximate 10.3 millions ha agricultural land are owned by 4,170 individual households, which fragments the ownership on land. Currently, cereals use nearly 37% of the utilized agricultural area of 14.8 million ha. The area used for maize is largest with 56% of cereals area in 2000, followed by wheat with a share of 35.5% .

The next most important crop by area utilized is sunflower, with an area of about 900,000 ha . Arable production intensity is likely to go up, leading to higher yields per hectare and

increased use of fertilizers and pesticides. The productivity increase may be about 3% per year. This trend is the response to a more stable agro-economic environment, and the gradual introduction of modern technology and machinery. The efficiency of production is much lower than in the EU countries. As example, for cereal yields the EU-15 reference is 4.77 t/ha, while in Romania the average is 3 t/ha. Regarding the oil, sugar and starch crops, the efficiency in Romania is even 50 % lower than in EU countries (see table below). Considering that the production level is kept at the 1998-2002 level, the improvement of productivity means that less land is needed for the same production and an important land area will become available, including for biofuel production purposes.

A general estimation made by the Research Institute for Soil Science and Agrochemistry shows that from the total agricultural land resources - 14.8 mill. ha, ca. 3.7 mill. ha are arable land of good and very good quality. If intensively cropped, this area could be the basis (ca 0.17 ha per capita) for ensuring the food security of the country population and to allow conversion of the remaining area of arable land (ca. 5.6 mill. ha) to other uses. These other uses may be mainly grassland or forestland (those strongly degraded, one estimates that at least 1.5 mill. ha of agricultural land have to be afforested/reafforested), but biofuel raw resources crops may be considered here as well.

Following the above estimation we consider that, following the increase of production efficiency, up to 1,000 ha may become available for other purposes (including biofuel raw material production) by 2010.

C. engaging part of the today not-used agricultural land

It is estimated that the amount of uncropped arable lands varies from year to year between 5 and 10 percent of the total farmland. It includes not only degraded or marginal lands, but also important areas of high quality lands whose holders do not crop due to different reasons: aged persons, decapitalization, especially lack of agricultural equipment for tillage or for other agricultural works, or simply because of the low income that can be obtained by agricultural activities.

Through land restitution, an important share of the agricultural land (between 30% and 40%) according to different estimates was allocated to the owners that do not activate in agriculture (city dwellers and rural pensioners), who are not interested to cultivate directly the land.

As example, in 2003 in comparison to 2002, the area cultivated with cereals decreased with 496 thou ha, which represents some 5% from the arable land.

In general it may be considered that from the 9.3 mill ha of arable land, the non-cultivated land totals between 0.9 and 1.4 mill ha.

Summing the above consideration on land and production availability for biofuels raw materials purposes, it may be considered that currently the existing potential is:

- 90 thou ha formerly used for sugar beet production
- 85 thou ha rape area
- 1,000 thou ha available arable land, presently uncropped
- 1,000 thou tones agricultural and forestry residues

There is a high reserve for this potential to increase in the near future, as the available land resulting from higher production intensity may reach another 1,000 thou ha by 2010. The total figure of about 2,200 thou ha available land around 2010 for non-food crops is confirmed also by subtracting the arable land area agreed within the Agriculture chapter, - 7,013 thou ha, from the total arable land – 9,300 thou ha.