



## POLICY BRIEF [23.11.2007]

### Biofuels in Macedonia - Policy and Practices

#### 1. Policy on biofuels' production & utilization

The energy sector in the Republic of Macedonia is under authority of the Ministry of Economy, through its Department of Energy. The Ministry is responsible for preparation and presentation of the legislation in the energy sector to the Government of the Republic of Macedonia, which adopts the legislation and sends it into parliament procedure for final enactment into the legal system of the country.

#### Law on Energy

In the current legislation, the most important document is the Law on Energy (Official Gazette of Republic of Macedonia no. 63/2006), which regulates the energy policy and its implementation; activities in the energy sector and regulation of these activities, construction of energy-production facilities, State Energy Regulatory Committee (SERC), market conditions for electric energy, natural gas, crude oil and oil derivations, conditions for implementation of energy efficiency and promotion of the user of renewable energy sources, as well as other issues related to the energy sector in the country.

The energy policy, regulated in Article 9 of the Law on Energy, among other, is implemented through “promotion of the energy efficiency, encouragement of the usage of renewable energy sources and sustainable development of energy sources.”

The same law regulates the preparation and enactment of 3 strategies in the sector: (1) Strategy for development of energy sector; (2) Strategy for improvement of energy efficiency; (3) Strategy for usage of renewable energy sources.

All three strategies are responsibility of the Ministry of Economy, with operational and expert assistance from the SERC; The first of the three is prepared for the period of 20 years, whereas the other two are for the period of 10 years.

At present, none of the strategies is yet prepared, but the Ministry has opened a public tender for hiring a consultant for preparation of the first of the three: Strategy for development of energy sector, with a target for preparation/ adoption by June 2008.



## Bylaw for Quality of Liquid Fuels

This bylaw adopted in November 2006 (Official Gazette of the Republic of Macedonia no. 123/2006) is enacted under the Law on safety of products (Official Gazette of the Republic of Macedonia no. 33/2006).

This document represents an update of the previous Bylaw for quality of liquid fuels from April 2006, especially in terms of the biofuels; for the first time, it regulates the biofuels: biodiesel, bioethanol, biogas, biomethanol, biodimethyl ester, bio-ETBE, bio-MTBE, synthetic biofuels, biohydrogen and pure vegetable oil.

The stipulations in this Bylaw enable the producers and dealers with crude oil, petrodiesel and gasoline to produce and sell mixed fuels with up to 15% of bioethanol and biodiesel in the diesel and gasoline respectively. The quality of the mixed biofuels is confirmed by an accredited laboratory.

Even though most of the stipulations of this Bylaw are not imposing any obligation but rather represent an encouragement for use of biofuels, the Article 5[11-v] imposes that by 2010, all fuels used in the vehicles must contain 5.75% biofuels; the percentage is determined based on the energetic value and density of both biofuels and conventional fuels.

The energetic value and density of fuels, given in the Table 1 below, is also part of the Bylaw document:

*Table 1: Average Energetic Value and Density of Conventional Fuels and Biofuels*

| Fuel type          | Energetic value (MJ/kg) | Density (kg/L)          |
|--------------------|-------------------------|-------------------------|
| Diesel             | 42.60                   | 0.845                   |
| Biodiesel          | 36.90                   | 0.883                   |
| Pure vegetable oil | 35.17                   | 0.920                   |
| Gasoline           | 43.85                   | 0.785                   |
| ETBE               | 36.29                   | 0.744                   |
| MTBE               | 34.92                   | 0.744                   |
| Bioethanol         | 26.57                   | 0.794                   |
| Biomethanol        | 18.86                   | 0.797                   |
| Natural gas        | 34.08 MJ/m <sup>3</sup> | 0.680 kg/m <sup>3</sup> |
| Biogas             | 32.64 MJ/m <sup>3</sup> | 0.680 kg/m <sup>3</sup> |

## Law on Promotion of Agricultural Production

This Law was enacted in 1992 (Official Gazette of the Republic of Macedonia no. 24/1992), and it stipulates that certain agricultural crops are subsidized from the State Budget: wheat, sunflower, rapeseed and sugar beat. However, the amount of subsidies, determined each year, was decreasing since some of the previous governments weren't seeing this as priority, as a result of what the actual cultivation of these crops seriously declined over years.

This year, MAFWE increased the subsidies: for wheat 5,500 MKD/ha (122 USD/ha) and for sunflower, rapeseed and soya - 5,000 MKD/ha (111 USD/ha).

## 2. Current situation of utilization and production of biofuels in Macedonia

### Biofuels Utilization

As stipulated in the above-mentioned Bylaw, the producers and dealers with liquid fuels are allowed and encouraged to use up to 15% of biofuels mixed in the conventional vehicle fuels. According to the Bylaw (Article 5[11-b]), both producers and dealers are responsible for keeping record of the quantities of biofuels placed on the Macedonian market; on January 31 of each year at latest, they are obliged to submit a report to the Ministry of Economy on biofuels utilization for the previous year. As this Bylaw was enacted in November 2006, but was put in force from July 1, 2007 (Article 6), there are still no official data for the first (half) year of its implementation.

### Biofuels Production - Potentials

Macedonia is a country with total agricultural employments of 1.6 million people/months or the equivalent of 145,000 full-time employees, more than half of whom are engaged in the crop production; this represents a huge potential for production of biofuels (biodiesel and bioethanol).

The area occupied by farm land in Macedonia, amounts to 1.3 million hectares (51% of the total area of the country), of which 577,000 hectares (22%) are classified as arable land.

The amiable climatic preconditions enable the presence of nearly all the plants that can be used to produce bio-diesel and bio-ethanol (Table 2). The arable land is not used to its full capacity that makes room for investments in this area, as well.

*Table 2: Area and Biofuels-suitable Crops produced in Macedonia (in 2004)*

| Plant type      | Area (ha) | Crop (tons) | Crop (t/ha) |
|-----------------|-----------|-------------|-------------|
| Wheat           | 103,166   | 373,359     | 3.6         |
| Corn            | 44,769    | 179,000     | 4.0         |
| Barley          | 49,969    | 170,116     | 3.4         |
| Sugar beat      | 1,033     | 43,182      | 41.8        |
| Sunflower seeds | 5,000     | 5,422       | 1.1         |
| Potato          | 13,430    | 174,600     | 13.0        |

Source: Ministry of Agriculture, Forestry and Water Economy of the Republic of Macedonia

The agricultural products have a low buy-out price (e.g. the wheat price is 6-8 MKD denars/kg i.e. 0.13-0.17 USD/kg). Since the production of these crops is not very popular and getting lower every year, the Ministry of Agriculture, Forestry and Water Economy has considered introduction of subsidies for production of biofuels-suitable crops.

## **Biofuels Production - Actual Situation**

As for the production of biofuels in Macedonia, particular interest is expressed in the production of biodiesel; currently there are two strains of production - experimental and commercial.

### **A. Experimental biodiesel production**

There are several initiatives of experimental biodiesel production; two of which are initiated and implemented by NGO sector, and one by an academic institution. All three are in the Eastern Macedonia:

#### 1. STAR, Association of disabled citizens, Makedonska Kamenica “Biodiesel production from used cooking oil”

This is a project jointly funded by GEF Small Grant Programme and British Embassy in Macedonia; the association produces biodiesel from used cooking oil, donated by the McDonalds-Macedonia and some other major restaurants in the country. The produced biodiesel cannot be sold on the market, so the association is giving it away to the Association of Women Farmers, which use it in their agricultural mechanization (tractors, combines, etc.).

#### 2. CRPRC STUDIORUM, Skopje “Experimental biodiesel production in Eastern Macedonia on agricultural soil contaminated with heavy metals”

This project, also jointly funded by GEF Small Grants Programme, CRPRC Studiorum, Municipality of Probistip and one small Macedonian company, provides rapeseed and fertilizers to volunteer farmers in the heavy metal contaminated area in Eastern Macedonia (Probistip area). The produced biodiesel is returned to the farmers for their use in the agricultural mechanization (tractors, etc.) and for home heating. ~The farmers have obligation to give seeding material (from the crop) and start-up quantity of biodiesel to other farmers in order to spread this practice (the incubator approach). The equipment for biodiesel production, currently provided by CRPRC Studiorum and Municipality of Probistip, will be operated by local farmers.

#### 3. Academic-private initiative, Kocani “Exploring the possibilities for biodiesel production”

Partially funded by an academic institute from Ukraine, and by private company from Kocani, this project is exploring the potentials for commercial (profit-based) biodiesel production in the vast arable land of Kocansko Pole, which was once big producer and major supplier of high-quality rice to the ex-Yugoslavia market.

## **B. Commercial biodiesel production**

The commercial production of biodiesel in Macedonia at present is represented by three oil refineries; one of which is completed and ready for production, the other two being in prospective stage:

### 1. Makpetrol AD, Biodiesel Production Plant, Skopje, Macedonia

This oil refinery opened in July 2007, was constructed by the major crude oil dealer in the country - Makpetrol AD. The total investment is estimated at 25 million EUR. At the initial stage, the production capacity of the plant is 25.000 tons of biodiesel annually, with the potential of 30.000 tons/year in future. The primary raw material for biodiesel production is raw rapeseed oil derived from rapeseed and the production process applies a flexible technology-transesterification. The biodiesel fuel produced at this plant it is said to meet EN 14214 technical standards. The plant also has a processing laboratory on the site.

The factory is located north of Skopje, near the main highway.

### 2. Brillijant Oil Producing Company, Stip, Macedonia

The renown cooking oil production factory "Briliant" from Stip (Eastern Macedonia) has made announcement for commencement of construction of biodiesel production facility in 2007. The factory's construction has not yet been started; prospectively, the company will invest a total of 10 million EUR (approx. 14 million USD), mainly in the equipment supplied by the German producer "GEA Westfalia". The planned production capacity will be 100,000 tons/year, of which 30% will be for the domestic market, and the rest to the neighboring markets. The proposed location of the factory is in Southern Macedonia.

### 3. Crystal Chemicals-Velingrad, Bulgaria

The Bulgarian company announced the start of biodiesel production activities in Macedonia in January of 2007, with capacity of 80,000 tonnes/year. The factory has not yet completed its production installment to start the production. The decision of the Bulgarian company to start activities in neighboring country was based on the levies on excise tax on biofuels that Macedonian government allows.

The location of the factory is is Northwest Macedonia, near city of Tetovo.

## **Biofuels Production - Potential Investors**

British-based company Organic Fuel Ltd. has already expressed interest to build biodiesel and bioethanol factories in the fertile regions of Polog (Northwest Macedonia) and Pelagonija (Southwest Macedonia). The possible investment totals around 50 million EUR (approx. 70 million USD).

It is expected that more investors will show interest as a result of levies on excise taxes; however, the agricultural production at present being on a very low level, needs to be increased in order to supply the demanding biodiesel

producing capacities that are planned to be opened.

### **3. Problems and Opportunities on utilization of biofuels in Macedonia**

Macedonia's energy infrastructure has been neglected due to many reasons, some of them being directly related to the heavy times of economic and political transition, since disintegration of Yugoslavia. It is a fact that Macedonia has some of the highest coal production figures in the region and good potential for hydroelectric energy; however there is an increased sense of urgency to develop indigenous energy generation especially due to the fact that Macedonia imports over 40 percent of its electricity.

From the renewable energy sources, it appears that hydropower is among the most appreciated ones; current policy is favorable toward the construction of large and small hydropower plants and rehabilitation of existing ones.

Biomass opportunities are seen as potential, but not much is done to increase this production; at one occasion, the SERC reported that they are "not anticipating any increase beyond the current use of wood as an energy carrier."

Other major challenges for increasing the biofuels production in Macedonia:

- further increasing of the subsidies for the biodiesel-suitable crops for encouraging farmers to change cropping patterns (as the offered subsidies are 5-10 times lower than those of the Serbia, Croatia and Bulgaria);
- introduction of more seed types on the Official Seeding Material Register, in order to enable cheaper high-yield types of rapeseed to be used for production of biodiesel (as this will enable levies on import tax for these seed types);
- introduction of increased subsidy for farmers growing rapeseed and sunflower on heavy metal contaminated soils (as that farmland cannot be used for any other agricultural activity until decontaminated).

### **4. Donors in the area of biofuels**

At the end of 2006, the World Bank Board approved implementation of a **Sustainable Energy Project** for Macedonia; the project is funded by a grant from the Global Environment Facility (GEF) Trust Fund in total amount of 5.5 million USD, with expected contributions from private commercial banks and project beneficiaries of about 24.7 million USD.

The objective of this project is to develop a sustainable market for energy efficiency and renewable energy by supporting the development of an enabling framework, institutional capacity, and necessary financing mechanisms, in order to help Macedonia's economy to become more competitive, and to contribute towards reducing its energy dependence.

The project consists of: 1) Technical assistance and institutional support for creating an enabling framework for investment in energy efficiency and

renewable energy; and 2) Financial support through a guarantee and revolving loan facility, on a co-financing basis with commercial institutions.

EBRD has its initiative for Renewable Energy Initiative (REI) since 2006; yet besides the investment in one energy-intensive industrial facility (Mining Company Mlttal, Macedonia), other initiatives or funding have not been received for the renewable energy source use.

The EU funding in this area is mainly on research level - through European Research Area (ERA) funding instruments, such as Framework Programs FP6 and FP7. Since January 2007, Macedonia has been made an equally eligible country for FP programs, as all other EU member states, as a result of gaining EU candidate status; this means that Macedonian institutions can make independent application to the FP7 calls for proposals, including those of the Intelligent Energy Europe (IEE).

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