Biodiesel market and expected trends in Romania

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Abstract: In this paper we research the issues and facts that are critical for biodiesel success in our country examining the emerging trends in biodiesel industry with forecast for the next years. This paper also tracks the growth and fall in different product categories of the biofuel industries and their future markets. The quality of this fuel and the general support of the government play a major role in promoting this new fuel.

1. INTRODUCTION

The rising price of the fuel environmental concerns and ominous signs of global warming has many sustainable farmers looking for alternative to petroleum diesel. Biodiesel fuel is an accessible for those who wish to get involved in creating their own energy solution right on the farm. Biodiesel as alternative to diesel fuel can be run in any unmodified diesel engine including tractors trucks and other equipment. Biodiesel is made from vegetable oil through a simple chemical process. There are two divergent trends in biodiesel today.

The first is industrial biodiesel made from virgin vegetable oil. This is likely the avenue through this biofuel will become available to mainstream costumers in the coming years. The other trend is that o small-scale home and farm-made biodiesel which is taking place in mini-refineries all around the globe.

2. BIODIESEL OPPORTUNITIES AND DRAWBACKS

Biodiesel as alternative fuel for automotive industry offers a lot of opportunities which if are used can help to reduce the dependence of the diesel petroleum in mean time assuring a low emission of toxic gases.

The main opportunities for biodiesel are:

- Lower maintenance cost if is a good quality biodiesel;
- Healthier for occupants especially children and work environment for diesel mechanics;
- the possibility of garage conversion of waste vegetable oil for low cost perhaps 60% less than retail fuel supply;
- the possibly cleaning of the injector tips with B100 if fouled;
- 5% blend may offer protection against fuel quality problems;

The four basic areas of difficulty are:

- biodiesel is not yet widely available to consumers in the Romania for a reasonable price (because of the rising of the raw oil price);
- biodiesel costs the same or more than diesel fuel and almost double comparing with gasoline.
- is a risk of expensive engine repair caused by sub standard biodiesel quality;
- most diesel manufactures in Europe are reticent for blend which is grater than 10% biodiesel:

- the high temperature gel point or cloud point of biodiesel is higher depending on source means that in B10-B100 forms winter gel will limit use in cold winter areas unless we use heating device to heat the fuel;

2.1 Biodiesel in Romania

In Romania according to the date offered by the Ministry of Economy and Finance (MEF) in all the country at level of the past year were five companies which produce biodiesel. In this year the production will rise and is expected a capacity of 285.000 tones with the condition that we have a good production of vegetable oil. The specialists estimate the annul market of biodiesel in Romania between 40 or 50 million of euro generating only by the application since first July of the European Union Directive which foreside that diesel must contain a certain percent of biodiesel rising until 5,75% in 2010.

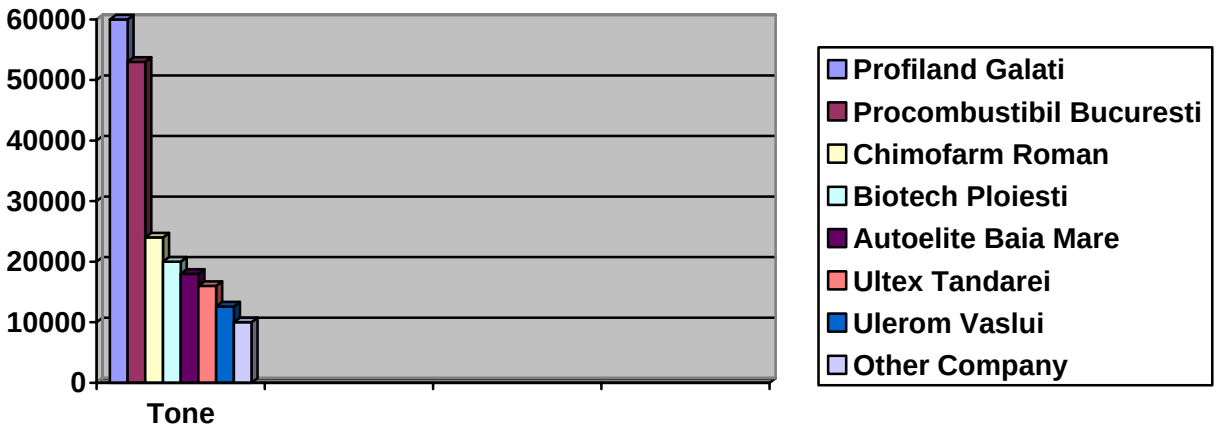

Fig.1.Biodiesel estimate production in 2008

2.2 Biodiesel costs and benefits

Often at the price as diesel or higher unless is make at home. For low income people is no immediate financial benefit, which is the key for his sustainability to choose biodiesel over diesel. Diesel engine does provide lower operation costs and maintenance compared with gasoline engines. Diesel engine costs a lot more than gasoline engine. Even so is a net benefit to switch to biodiesel. In France 70% of all cars sold is diesel now. Repair costs are lower too as we can aspect that engine with biodiesel to work up to 300.000-400.000 km before major engine intervention is needed. Biodiesel runs cleaner than diesel and so is a better fuel for the environment. Biodiesel fuel causes engine to run more quietly with less vibration than petroleum diesel and without diesel oil (biodiesel smell like fry donuts). Biodiesel is non toxic and biodegrades easily 95% in 30 days in soil which means it is unable to contaminate soil, ground water supplies, rivers, lake and marine areas if is used 100% pure form. It does not leave unsightly oil slicks. When burned burns more cleanly, reducing particulate. Biodiesel can increase engine life and reduce maintenance cost if its quality is up to standards. Mechanics like to work with biodiesel as it is much less toxic. We had seen one mention of a problem of increase lubricity being a problem: because it lubricates better is more able to pass by the o-rings of the piston and get into the engine oil. This means that the engine oil is diluted. Some vehicle manufacturers are saying that a more frequent oil change

schedule would be necessary. Biodiesel has detergent and solvent effects that cleans the fuel system and may resolve some injector problems due to fouling. Despite lower energy of biodiesel the engines converted to biodiesel has better than expected power and therefore less than expected fuel consumption because the used older engine runs more efficiently after biodiesel was use because of the cleaning effects. However, this effect especially on older fuel system means that initially when high percent biodiesel blendes are used, existing deposits are mobilized and can plug the filter. This can cause, only initial, more than one filter or a plugged fuel system for the unawares. If people can make biodiesel themselves and can get a supply of cheap used vegetable oil then they could reap a large benefit, perhaps 60% cost of fuel savings depending on the price of methanol. Making biodiesel is no too difficult but there are risks to health and life that can be managed. Some instructions on how to make are few and short safety instructions. Some 2000-3000 euro models are coming on the market with claims that can make the quality up to standard but the market en Romania is still on the beginning.

2.3 Fuel quality

The fuel quality is variable as supply chains are new small and not routine. Problem appears with biodiesel contaminated particularly with glycerin, low Ph (acidic), methanol contaminated effects, high gel point and water contamination. These are the same problems for someone who makes biodiesel at home.

The consequences for a diesel motor of getting glycerin contaminated biodiesel are serious as the problem only shows up after months or years. Normally a diesel engine will operate without major repairs for about 400.000-500.000 km. Deposits caused by contamination by glycerin will cause injector tip coking and deposits in the combustion chambers. Problems will show up in 2-3 years in of contaminated fuel use but much faster if we drive in city, short trips, and are in cold places without a winterizing fuel system. Engine repair is expensive. Injector replacement or repair is less but much more then a spark plug change. Engine damage for substandard fuel is a risk of a cost that would outweigh fuel costs or savings in many cases.

Methanol is the most common reactant for making biodiesel. Even in commercial standard biodiesel is sufficient methanol to soften the rubber. For older vehicles pre 1992-1995, the rubber gaskets and hoses of the fuel system will soften or degrade than leak. This effect is not seen for a few months or a year when fuelling with 100% biodiesel or two or more years on 20% biodiesel. It is not costly to replace With Viton or other resistant gaskets which make this problem to be solved.

2.4 Manufacturer warrantees

In Romania is use a little percent of biodiesel (2-10%) as manufacturers are concerned about the quality of biodiesel for sale. They have reason to be worried as diesel passenger's cars had difficulty in the last few decades because of the pure quality of diesel on the market. Buying directly from a major brand has much fewer problems but even they have a bad batch sometime. New standards are to be in place in 2008-2010 as the market will extend. This is particularly important for older diesels which were built for higher sulphure diesel and require higher lubricity. Older vehicles do not have the warranty problem but very few of them are direct injection let alone turbo.

2.5 Gel point or cloud point of biodiesel

The consequences for 25-100% biodiesel fuel blends are high gel point during the winter. Solutions are pour point enhancers/gel point reducers and a winterized fuel system. Winterized fuel system cost up to 400-800 euro. The second problem is that biodiesel has higher molecular mass and different chemical behaviors. Although when burning burns more cleanly, is the problem that in Romania is a period of 2-3 months were temperature drop below freezing. Unless biodiesel is preheated by a winterized line fuel system, the droplets formed are large and result in a less than optimum burn. Less than optimum burns results in engine deposits. Damage to injector pumps can also be a problem some break down when challenged by highly viscous cold oil fuels. Cold starts (below-15) are a problem if we cannot or did not plug in the engine heather or have the fuel enhanced or winterized. A quick fix is to poor hot water on the block till is warm enough to make the diesel flow or pour in a fuel deicer. For an optimum utilization also can add:

1- A high quality trucker style filter system to vehicle the ones that takes out water and small particles. This should increase engine life including injector life.

2- Possible addition a glow plug heater for pre injection pump reservoir so that the injector pump is not damaged by gelled diesel or biodiesel. This might be good especially for short trips in very cold places.

3 BIODIESEL RESURCES AND LOGISTIC

Biodiesel resources systems should be optimized in order to match the quality characteristic of the existing or the future feedstock's to meet the requirements of the technologies and the end products. Furthermore, an integrated approach requires that in some cases the residues agriculture or other sectors, which are appropriate for energy applications, should be considerate as fuel not as waste. Their final conversion in biodiesel should be facilitating. Agriculture and forest derived materials must be processed on a decentralized basis to avoid uneconomic costs. An option to be considerate is pre-processing difficult to handle biomass and transporting the processed form. This is more efficient both in terms of energy value per transport unit and reduced costs. Due to the bulky nature of biomass, road transportation is expensive relative to the value of the product and affects carbon and energy balances. Ideally feedstock will be sourced close to end uses. Logistic techniques should be improved along with adjusting the supply area and resource management according to the size of the plant. Existing logistic for perennial energy crops is currently inadequate to meet the feedstock performances target. Large scale trials should be performed in order to design appropriate logistic systems from field to the conversion facilities. Existing equipment should be improved and tailored to meet the need to harvesting bulky quantities of residues as well as energy crops in a sustainable and costs effective manner.

4. SUSTAINABILITY

Mechanisms need to be put in place in order to ensure that the whole chain of biomass and biofuels production is sustainable. This requires options for efficient and sustainable crops and involves the promotion of both the primary and residual forms of agricultural. Whilst

biomass production and energy exploitation is favorable in terms of global GHG emissions, care should be taken when planning at local level. The production of energy crops should comply with the existing regulation. Land strategies have to introduce a number of crops according to regional characteristic and needs. Thus, the entire value chain needs to be evaluated for biofuels using a well to wheels analysis. This requires optimization of the geographical location of production facilities and the origin of the feedstock. Production and feedstock supplies need to be assessed globally, taking account of the different growing conditions (climate) and labor costs.

5. COST COMPETITIVENESS

A key factor in deployment of biodiesel is cost competitiveness or cost effectiveness. This does not only to the production of biodiesel itself but also to other associated costs, such investments in new vehicles or alternative logistic systems. Cost reduction will be achieved by using advanced technology through and economy-of scale effect and a better integration into a fuel supply chain.

6. BIODIESEL TRENDS

Large scale deployment of biodiesel can be expected by 2010-2030. It is nevertheless necessary to identify the intermediate steps and likely timeline for development of new options required for a strong biodiesel industry and significant use of biodiesel in Romania. As represented by the scheme in the Fig. 2 we predicted as series of three main phases in future biodiesel industry.

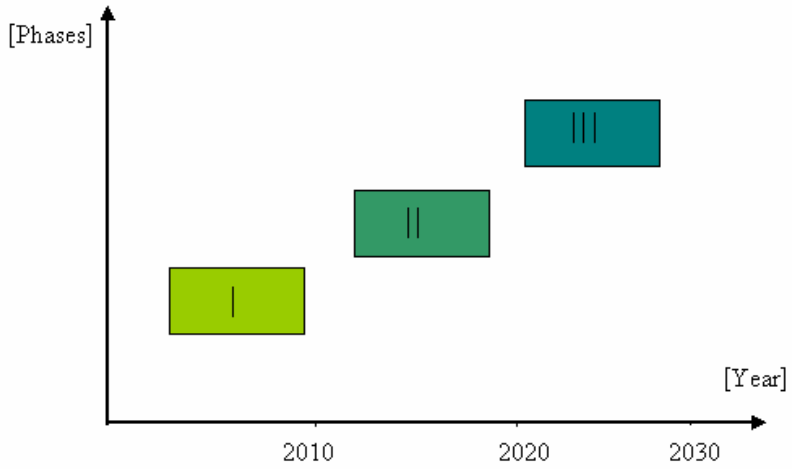

Fig.2. Forecast 2010-2030

Phase I short term:
- improving existent technology;
- introduction of second generation of biofuels (from lignocelluloses biomass);

Phase II medium term:
- development of option for energy crops and sustainable agriculture;
- deployment of second generation of biofuels;

Phase III long term:
- deployment of integrated biorefining complexes;

7. CONCLUSION

Biodiesel as fuel in Romania can be an alternative to petroleum diesel in certain condition, in which the government offers the full support and the price of raw vegetable oil riche a level were is competitive on the market. Thought the analysis that we make we show that the success of biodiesel in our country depends of many factors, oil production, taxes and regulations, real market and people perception. Our prediction gives some indications on the expected trends in Romania in which biodiesel and biofuel market will grow considerable in the next fallowing years.

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