



**SCHOOL OF ECONOMICS, BUSINESS ADMINISTRATION AND LEGAL
STUDIES**

MSc in Bioeconomy Law, Regulation and Management

Coursework

**"The European Biofuels Technology Platform (EBTP) and European
Technology and Innovation Platform Bioenergy (ETIP Bioenergy)"**

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Academic year: 2017-2018

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Introduction:

**European Biofuels Technology Platform (EBTP)
and European Technology and Innovation Platform Bioenergy
(ETIP Bioenergy)**

Henry Ford, in 1925, stated: *“The fuel of the future is going to come from fruit like the sumac out by the road, or from apples, weeds, sawdust – almost everything. There is fuel in every bit of vegetable matter that can be fermented”*. In 1897, Rudolf Diesel demonstrated his first engine running on peanut oil.

Nowadays, the fossil fuels are the main actors in our society in the transport, heating, industry and electric generator sectors, but their reserves are extremely limited. Nevertheless, the need was dictated for alternative energy sources, such as biofuels. Biofuels are certain types of fuels like rapeseed oil, ethanol, biodiesel or methane from biogas that are currently available on the market. Additionally, synthetic biofuels and BtL (biomass to liquid) biofuels are under development and more need to be done towards that direction. During the combustion, biofuels release an amount of carbon dioxide without causing any significant damage to the climate. Their carbon dioxide emissions are not completely neutral due to manufacturing flaws but they contribute to the decrease of the Greenhouse gas emissions in transports and relative categories and lead to the slowdown of the climate deterioration. Europe is the “leader of biodiesel”, as it has the world’s largest production of biodiesel. In 2005, Europe produced almost 3 billion litres of biodiesel with an increase from the previous years, about half from Germany alone. Towards that initiative, the need for a change is vital and many platforms emerge in order to prevent the catastrophe.

For this purpose, the European Biofuels Technology Platform (EBTP) was established in 2006, with a mission to contribute to the development of cost - antagonistic and innovative - global level biofuels value chains. Combining the efforts of another platform, the European Industrial Initiative Bioenergy (EIBI), which was created in 2010, the creation of the European Technology and Innovation Platform Bioenergy (ETIP Bioenergy) occurs, the successor organisation, which was launched in 2016. The EBTP's contribution is vital to Europe’s bioenergy industry and acceleration of the sustainable use of bioenergy in the European Union, through procedures and protocols of research, technology and development. ETIP Bioenergy is a forum led by the stakeholders that is acknowledged by the European Commission as main contributor towards innovation, transfer of expertise and competition in European energy field. The aforementioned platform is an independent, self-financing entity that through agendas and promotion of progress and research in this sector, tries to achieve its goals. In order to accomplish its mission, ETIP Bioenergy develops roadmaps in national and European Union level by mobilizing participants - associates to promote agreements, decisions and important information across the member states, transparently.

Members of the platform

The experience from experts and know-how of stakeholders from biomass production, industry, research & technology sector, vehicle manufacturers, fuel circulation, government and NGOs contributes along with the public collaboration of the member states of the European Union, the main members of the EBTP that are responsible for the promotion and appliance of the EU policies. EBTP and since 2016, ETIP Bioenergy, is supported by a Secretariat, in Gulzow, Germany and is managed by a Steering Committee, with the participation and the comments of the European Commission. The chair and vice-chairs are Ingvar Landälv from Lulea University of Technology, Patrik Klintbom from RISE Viktoria and Markku Karlsson from Finnish Forestry Industries Federation. Furthermore, certain Steering Committee members are Volvo and Scania that are vehicle manufacturers, Verbio of biofuel and technology, Bellona, LNEG, Neste, Novozymes Rethink Tomorrow, Rsted, Clariant, E-On, Renewable Heating and Cooling within ETIP, DI Energy, EERA (European Research Alliance), Total, UPM, Europa Bio, Pimot, St1, the Swedish Knowledge Centre for Renewable Transportation Fuels F³ and Safran.

In 2013, the 29th Meeting of the EBTP Steering Committee took place in Belgium with 19 participants. Its agenda included information about biofuels activities around the EU. Other subjects that were discussed were updates on EIBI, the Bio-based Industries public-private partnership, a draft of ERTRAC Roadmap and the Expert Group on Future Transport Fuels. The EU funds projects to that direction such as EU Framework Programme for Research and Innovation, Horizon 2020: ETIP Bioenergy - SABS project, for example. Biofuels and bioenergy members can enrol and have access to key contacts, external and internal reports, and areas of expertise on biofuels. The main activities are executed through four principle Working Groups covering biomass availability, conversion processes, policies, sustainability and end use. Additionally, the ETIP Bioenergy includes a number of Task Forces on specific sectors. This platform is also accessible and open to new members who are willing to join. Every year, more than 3000 newsletters are sent in members and the stakeholders are gathered in ETIP Bioenergy's Plenary Meetings.

Policy – Vision

The Member States of EU are still excessively dependent on commonly used fossil fuels in order to cover their needs in transport and similar sectors. In fact, European Union imports crude oil. Recently, climate change reports and researches have demonstrated the critical level we have “achieved” due to increasing oil production. The geopolitical dangers of energy suppliers and the level of fuel price due to the conflicts and the lack of stability and prosperity, worsen the situation. Pointing to that direction of decreasing the fossil fuels imports, Member States' dependency and the political and financial impact, the

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Horizon 2020 Programme, which includes measures of European Union to promote and encourage the use of sustainable biofuels, aims in the transportation sector the use of renewable energy sources and the immediate stop of Greenhouse gas emissions.

Unfortunately, there are no provisions for biofuels in the “policy framework for climate and energy from 2020 to 2030”. So, a problem arises concerning the demands for transportation fuels in liquid form, from member states beyond 2030. The EBTP contributed in the Renewable Energy Directive (COM 19) in 2008 that required the European Union members to reach the level of 10% in energy for transports from renewable sources by the year 2020. The aforementioned, combined with the “Fuel Quality Directive” led to a new policy framework “for climate and energy in the period from 2020 to 2030” emphasizing the importance of a change towards biofuels. EBTP commented in 2012 that the vision for a vast use of biofuels in industry correlates with technical, economical and operational cooperation towards sustainable development.

The European Parliament set the rules in 2015, with the “ILUC Directive”, Indirect Land Use Change process that adjusts the method by which a member state may reach the goals that are set. For instance, the 10% target of renewable fuels from "food crops" in transport may be accomplished using alternatives (3%) such as used cooking oil, animal fat and renewable electricity in electric vehicles and rail. More specifically, the European Commission supported the importance of biofuels in order to achieve EU's goals of reducing greenhouse gas levels, but in the same time seems to appear the problem that the biofuel crops replace other vital food agriculture cultivations. In that framework, EC suggested that biofuel production land should substitute other areas, as forests or meadows and that is exactly the definition of ILUC process. However, this directive had some disadvantages, as EBTP commented, which have to do with the uncertainty and scepticism that carbon dioxide (CO₂) levels may rise, due to the decrease of atmospheric carbon dioxide absorbers, which are the grasslands and forests. EBTP reacted to the legislation of that directive and stated that it lacked of ambition in order to deploy advanced biofuels and more had to be done because the “energy efficiency wheel” was not commonly and widely available in commercial level. Thus, an amendment occurred, updating the legislation of the RED (Renewable Energy Directives, see below) and the Fuel Quality Directive, which includes the limitation of renewable energy targets for 2020 to 7% for "food crops", 0,5% for advanced biofuels, the adjustment to 60% less emissions from biofuels than common fossil fuels and the obligation of reports from the fuel providers to EU and EC. Biofuels can also be produced from plants and parts of the plant that now are not taken advantage of and they are considered as waste.

As it is already mentioned, EU has issued many directives that cover the biofuels category, such as the RED I and II (Renewable Energy Directives). EBTP took position on the Rapporteur's amendments of the RED, stating that EU, first of all, should develop a strong - based and long term policy - vision for

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the advanced biofuels industries of Europe after 2020, and secondly, EU should also decide definitively on “ILUC” regulatory uncertainty in advanced biofuels that occurred in 2009. In the eligible feedstocks list should remain the energy crops, which are the plants that are grown with very low cost and maintenance in order to be used as combustion products to generate electricity or heat, for the production of biofuels, as they offer efficient use of land. The EBTP suggested to the EU indicative principles and limitations such as: the insurance of investments through a stable policy framework, consideration of the level of the sustainable production of biofuels, the singularity of the market of fuel in Europe in terms of demand in aviation and shipping, the use of indicators which demonstrate the level of climate impact without geographic restrictions, optimisation of foster land use and complying with WTO (World Trade Organisation) standards.

Technologies – Research – Innovations

A recent study demonstrated the comparison between biofuel and pure diesel using Diesel - RK, a prediction of combustion data tool, which was able to measure accurately the combustion performance level and the emission of a variety of alternative biofuels. This analysis included pure diesel, ethyl ester fish oil (EEFO), Jatropha methyl ester (JME), Rapeseed methyl ester (RME), Soybean methyl ester (SME), Cotton seed oil biodiesel (CSOBD), Linseed methyl ester (LME), Palm stearin biodiesel (PSBD), Micro algae oil methyl ester (MAOME) and Tallow methyl ester (TME). The results provided that in term of cylinder pressure, there are a lot of similarities with pure diesel, whereas they have lesser ignition delay. As far as the performance is concerned, the increase in load of the engine was related with the decrease of fuel consumption, combined with the brake thermal and mechanical efficiency for all biofuels that were tested. Additionally, the smoke and the soot formation were highest in pure diesel and lesser in alternative biofuels. All the above make clear that the biofuels, in any form, have the potentials for a daily use, due to their accurate measured similarities with pure diesel.

ETIP Bioenergy, in 2016 published its Strategic Research and Innovation (SRIA) Agenda, which is updated with the most contemporary evolutions to biofuels sector, such as the significance of biofuels in circular economy and availability of hybrid technology in electric cars. This agenda suggested that the key elements of biofuel have not alternated, like the recommendations from the SRA of 2010 concerning the routes that should be taken. These routes include the upgrade of the conversion process, the mix of the feedstock and end use products.

A brand new technological advancement refers to the concept of Bioenergy and Carbon Storage (BECS or Bio-CCS) that has been suggested as a means of

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producing carbon negative power, removing carbon dioxide from the atmosphere via biomass conversion technologies and storage underground. The release of carbon dioxide into the atmosphere is caused both by extraction and combustion of fossil fuels and by destruction of forests where large amounts of carbon are stored as biomass. Carbon dioxide binding through reforestation, in the form of long-term storage of carbon in plants and trees, offers potential to remove carbon dioxide from the atmosphere. The development of this technology is the result of the efforts of the Zero Emissions Platform with input from the European Biofuels Technology Platform.

As far as advanced biofuels and bioenergy value chains are concerned, ETIP Bioenergy (former EBTP) includes the following:

a. The Biochemical sector:

In the biochemical sector, there is the “Ethanol” and “higher alcohols” from “lignocellulosic” feedstock using biological and chemical procedures, hydrocarbons such as jet fuel and diesel from biomass applying chemical or biological synthesis, and bioenergy carriers that are made by microorganisms or cell cultures using light and carbon dioxide. Relative examples to this direction are bacteria or algae.

b. The Thermochemical sector:

In the thermochemical sector, there is the Biomethane through gasification and also synthetic liquid fuels and hydrocarbons also through gasification, such as gasoline, naphtha, kerosene, diesel fuel, DME (dimethyl ether) and methanol. In thermochemical pathways we also have, high efficiency power and heat generation using thermochemical conversion. Lastly, we have the use of hydrothermal liquefaction, torrefaction and pyrolysis techniques for the intermediate bioenergy carriers.

The ETIP Bioenergy cooperates in technology field with other innovative platforms, such as ETIP and ETP, ETP for Sustainable Chemistry, the “plants for the future” ETP, renewable heating and cooling ETP and other newly founded platforms or programmes.

Initiatives – Projects – Activities – Funding

European Commission recognizes officially ETIP Bioenergy as a formal interlocutor. ETIP Bioenergy’s context includes these main activities:

Firstly, its contribution to the Strategic Energy Technology Plan (SET - Plan) initiatives is one of the main actions. Additionally, elaboration and update of the Strategic Research and Innovation Agenda (SRIA) are also included.

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Assistance to Member States of the EU and the European Commission in setting and orienting their research programs. Report on the activities at national / regional or European industrial level to support the work of Strategic Energy Technologies Information System of EU. Development of expertise - sharing processes that help bringing Research and Innovation results to reality. Finally, one of the main activities is the identification of the technical and non – technical obstacles to the outcome of innovation to the bioenergy market; this is accomplished by directives to mobilize funds, exhibition activities, regulations, education and means of communication.

The European Energy Security Strategy in 2014 was an initiative that pointed the need to decrease fuel imports in the European Union. Recently, the overall capacity of refinery is observed to be decreasing, which is worsening the investment portfolio in biofuels, while in overseas markets there are policies with fewer restrictions. The EBTP “Strategic Research Agenda and Strategy Deployment Document” “SRA / SDD” set the rules in 2007 for the future and tried to set the bar high by providing reliable information and its professional opinion for sustainability of biofuels in the transport sector in Europe.

Moreover, in Europe there are the following projects sharing ETIP Bioenergy's vision:

-“ADVANCEFUEL”: it is a project funded through programme “Horizon 2020” and its duration is 3 years (2017 - 2020). Its main goal is to render competitive low carbon energy.

-“BioBIGG”: it is specialised in the South Baltic Sea area and biomass (2017 - 2020).

-“BioCannDo”: Bioeconomy Awareness and Discourse Project, focusing in alternative products from agriculture, oceans and forestry (2016 - 2019).

-“BIOSURF”: Biomethane as Sustainable and Renewable Fuel. Its main goal is to render competitive low carbon energy (2015 - 2017).

-“ENERGY BARGE”: Its main objective is to exploit green energy from biomass, applying the Directive of 2009 for renewable energy. It is funded by “Interreg Danube Transnational Programme”, it started in 2017 and it will finalize its works in 2019.

-“greenGain”: this project is funded by the programme “Horizon 2020” and its objective is to support sustainable energy production from biomass, from landscape conservation and maintenance work (2015 - 2017).

-“InnProBio”: it is a forum for Bio-Based Innovation in Public Procurement and it aims to boost the bio - based products in the European market through public attainment (2015 - 2018).

-“ISABEL” project: the Triggering Sustainable Biogas Energy Communities and it is sponsored by the programme “Horizon 2020” of the European Union. Its main objective is to promote, develop and support biogas communities in Europe (2016 - 2018).

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-“RE-SAVE”: the Renewable Energy Sources for Agricultural Vocational Education and it targets European farmers who wish to substitute energy from fossil fuels using renewable energy sources (2015 - 2017).

-“SEEMLA”: the Sustainable exploitation of biomass for bioenergy from marginal lands and its goal is to develop and optimize in special sites cropping techniques.

-“VERAM”: it is the Vision and Roadmap for European Raw Materials with 11 partners from 6 countries (2015 - 2018).

-“ETIP Bioenergy–SABS (Support of Advanced Bioenergy Stakeholders) 2016-2017”: As mentioned above, ETIP Bioenergy expanded its range from not only biofuels but technology advancement, commercialisation, deployment of advanced European biofuels and has developed into a platform to facilitate exchanges and procedures. The target of this project is to encourage and be the liaison of stakeholders from various categories such as political and industrial with the platform. ETIP Bioenergy SABS is highly adjusted to another project, the SET – Plan (European Strategic Energy Technology Plan), which takes initiatives for the decarbonisation in Europe and is a promoter and coordinator of similar European efforts. Some of the main objects of ETIP Bioenergy – SABS are the facilitation to all relative contributions to SET – Plan's strategy on cost reduction technology and production of eco-friendly and renewable energy. Another objective is to define principles, visions, research and innovation, funding and programs by setting the standards for stakeholders' cooperation.

In order to achieve its visions, the technical and technological obstacles should be surpassed by delivering state of the art innovation in the energy field. Offering its expertise in scientific counselling to the European Commission and the main actors, the Member States have to redefine their programs towards this project's direction in biofuels sector.

ETIP Bioenergy – SABS is directed and guided by the Agency for Renewable Resources (FNR: Fachagentur Nachwachsende Rohstoffe) and its duration is set from 01.09.2016 to 31.08.2018. The aforementioned project was also funded by the "Horizon 2020 Framework Programme" of the EU for research, technological development and demonstration under Grant Agreement No 727509.

ETIP Bioenergy is an independent entity and has its own financial resources (self - financing). However, there is an emerging commitment of members for investments in bioenergy and advanced biofuels, making a few first steps towards that direction. In order to increase contributors, ETIP Bioenergy should exhibit and promote the initiatives and modern technology applied such as pilot projects, original announcements and advertisements in industrial or societal level. Additionally, a long term research project should endure all efforts to bioenergy. So, in this sector, of bioeconomy and biofuels, many new local places for work would be created, as there is an estimation of 200.000 new jobs, applying sustainability friendly criteria. The EU funds projects such as EU

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Framework Programme for Research and Innovation, Horizon 2020: ETIP Bioenergy - SABS project, as it was already mentioned, aims to facilitate collaboration of research, technological development among member in Europe. Also the European Commission has launched a public consultation on EU funds in the area of investment, research & innovation, for the post-2020 Multiannual Financial Framework and the next generation of financial programmes that will receive funding.

Criticism – Remarks

A 2012 research demonstrated that biofuels for transports were applied in only a small percentage of 4,5%, showing that more are needed to be applied in order to achieve some of its targets. In general, the common drawbacks of biofuel for sustainable development are the following:

A certain area and larger water pressure are required for biofuel feedstocks in order to be cultivated and used as a biomass production unit and its increase will result in more engaged resources and space for this sustainable production activity. The amount of water needed for the production of that kind of crops varies considerably. In general they require far less water than intensive row crops. However, areas that have low rainfall levels will be less productive. Additionally, the biomass needs special storage and equipment and its cost is increased, rendering it less cost - competitive. The augmented prices of maize, for instance, will immediately affect the global surge in biofuel production and distribution. In order to produce 100 litres of ethanol, 240 kilograms of corn kernel are required, which is the food requirement of a person per year, and so, a debate occurs between the choice of more biofuel and more food. According to the World Bank, the reduction of Greenhouse gas emissions in Brazil due to ethanol is almost triple in comparison with United States of America and Europe.

After all, to be considered sustainable, biofuels must achieve greenhouse gas savings of at least 35% in comparison to fossil fuels. This savings requirement rises to 50% in 2017. In 2018, it rises again to 60% but only for new production plants. All life cycle emissions are taken into account when calculating greenhouse gas savings. This includes emissions from cultivation, processing, and transport.

Furthermore, nowadays engines and motors are not fully compatible with biofuel and in terms of durability and stability; we have the adverse outcomes that discourage industries to invest in sustainable development and innovation.

Another point that received criticism was that the framework for market based sustainability standards, application and the level of contribution to the production of biofuels, are quite limited. Despite the pressure from a part of

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consumers and public policies, market conversion will be very difficult to surpass 25% in the near future. The majority of energy certificates are being awarded for standards that are industry – led or in name only with attraction to a small number of operators. Moreover some NGOs that operate within this sector sometimes lack independence in terms of suspension of energy certificates.

Lastly, aviation is relying entirely on liquid fuels and even there is the momentum for a change and a more electrical aircraft, the propulsion system will still rely on these liquid fuels for a long time.

Suggestions - Conclusion

While the global energy demand is increasing, industry should be pressured more from market and legal guidelines to apply a more sustainable concept to product and manufacture design, such as Sustainable product and service development (SPSD) method. Education may be the key to accumulate the environment - friendly energy initiatives fuels from the first steps, in order to easily avoid common and harmful to the environment fossil energy. The energy based to photosynthesis and renewable energy sources are crucial to solve the energy problem but it should be cost – effective. This crisis could be also averted through global cooperation and share of expertise, because biofuels alone are not able to fulfil the global demands and more methods and techniques need to be invented. The technology advancement in these sectors and the large scale production are critical for the well being and the future of this planet. Additionally, the Governments should apply incentivisation programmes and marketing techniques for biofuel production in order to render it "eco – user - friendly" by promoting or reducing tax for waste - based feedstocks like poultry waste, cattle waste, kitchen waste, used cooking oils and other. Another factor that needs to be highlighted is the responsibility and discipline of actors and the cooperation in global scale, in sectors such as land planning to reconcile policy targets and societal urges.

Europe should follow the example of India, one of the top demanding countries in the energy sector. More specifically, India, with a high growth rate, in order to overcome the country's fuel needs, developed alternate fuel from renewable biomass and various indigenous techniques for bioethanol and dedicated more research to improve biofuels. According to a recent World Bank review, "a case by case analysis" should take place in order to evaluate land and cropping use patterns. And also, it is necessary that biofuel production policies and sectors should collaborate, such as economics, agricultural and rural development, as well as energy management companies. The biofuels have the potential to enhance the national energy security but their benefits are limited for smallholder farmers. Individual countries and the European Union should

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dictate sound schemes to ensure the enlargement and promotion of this eco – friendly technology. In many developed countries, specific legislation and high protective tariffs are imposed in biofuel producers, actions that lead to the support and promotion of bioenergy.

Alexander Muller from the Food and Agriculture Organisation of the United Nations stated: “*The gradual move away from oil has begun. Over the next 15 to 20 years we may see biofuels providing a full 25% of the world’s energy needs*”.

ETIP Bioenergy with its predecessors made a positive impact in Europe and in the whole world. Its initiatives and objectives are undeniable, but it has made only small steps and more measures need to be taken pointing to the direction of saving and “repairing” our planet, from the extensive exploitation caused by human activity.

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