

**REPORT ON THE PRESENT STATE OF BIOFUELS IN MALTA
AND MEASURES FOR THEIR PROMOTION
(AN UPDATE)
FEBRUARY 2014**

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1. INTRODUCTION

Mobility is an essential part of everyday life with different modes of transportation providing fast and easy travel to everyone [1]. Mobility therefore enhances the quality of life and is crucial for economic development [1]. It is this essential aspect of transportation that makes it notoriously difficult to induce behavioural changes that reduce GHG emissions from this sector. Apart from an entrenched preferential attitude towards private mobility, switching to cleaner transportation modes is also hindered by the large infrastructural investments required to modernize public transportation, to upgrade the transportation network and to promote the relatively new (and comparatively expensive) renewable fuels [3] and alternative vehicle technologies. These difficulties are exacerbated in small island states like Malta where diseconomies of scale do not permit certain modes of public transportation, such as rail and subways, while topographic conditions do not permit travelling by inland waterways and domestic air transportation. Moreover, the local seasonal patterns characterised by long hot summers and wet winters restrict cycling and walking for long distances.

A number of other factors exacerbate the use of biofuels in the local automotive fuel market. These include the limited availability of raw material to produce both first and second generation biodiesel i.e. arable land to grow energy crops and waste cooking oils and fats, limitations in the existing primary storage infrastructure, quality issues with respect to the produced biodiesel, negative publicity and the strength of competing fossil fuels. The production and sale of bio-ethanol or bio-ETBE is further curtailed by the high summer temperatures which result in greater instability in this type of fuel and the concomitant high level of volatile organic compounds (VoCs) emitted as a result.

The increase in private mobility and use of fossil fuels is reflected in the amount of greenhouse gas (GHG) emitted by the transportation sector. In the EU-27, GHG emissions from this sector have increased by 23% over the past two decades (1990-2009) and have reached 1,211 million tons of CO₂ in 2009 [2]. A similar increasing trend, albeit, at a much steeper slope, has been observed in Malta during the 1990-2007 period, where emissions in this sector have increased by 66% [2], and reaching 0.5 million tons of CO₂ in 2007 [2]. Although the percentage increase in emissions from this sector has been much larger when compared to the EU-27 average, the emissions in absolute terms represent a miniscule share of only three hundredths (0.03%) of GHG emitted by this sector [2].

Nonetheless, keeping the *status quo* is not a sustainable option on an EU and global level and a reversal of this trend would be required to stabilise global temperature within the 2°C rise from pre-industrial levels as established by the UNFCCC in order to avoid irreversible, and possibly catastrophic, changes in the climate system [4]. To this end, the EU is proposing that the long term objective of the Union should be a near complete decarbonisation of all economic sectors. The decarbonisation targets specific to the transportation sector being envisaged are encapsulated in the 2020 package [5] [6] [7], 2030 framework [8] and 2050 roadmap [9] which propose a GHG emissions reduction target of 20% by 2020 below 1990 levels, 40% by 2030 below 1990 levels and 60% by 2050 below 1990 levels¹ respectively.

2. SCOPE OF THIS REPORT

Biodiesel is already sold in the Maltese markets. However, its share in the transportation sector will need to be substantially increased in order to meet the mandatory targets established in the Climate & Energy Package (CEP) for the use of renewable energy sources (RES) in transportation. Failure to do so is estimated to cost around €2.9 million for a one percent shortfall from the target in financial penalties² and until Malta rectifies the situation [10].

In 2007, the Malta Resources Authority (MRA) drafted a report [11] which sought to provide an overview of the biodiesel status in Malta and the envisaged measures to promote its use. This report seeks to provide an update of the 2007 report in view of developments in the legislative framework and on the revised measures being proposed to promote this fuel product in the local market.

3. BACKGROUND

The technical definition of biodiesel is; *“a fuel suitable for use in compression ignition (diesel) engines that is made of fatty acid monoalkyl esters derived from biologically produced oils or fats including vegetable oils, animal fats and microalgal oils”* [12]. When biodiesel is produced from these types of oil using methanol, fatty acid methyl esters (FAME) are produced. Biodiesel fuels can also be produced using other alcohols, for example using ethanol to produce fatty acid ethyl esters, however these types of biodiesel are not covered by MSA EN 14214:2008, which applies only to methyl esters i.e. biodiesel produced using methanol.

¹ The 2050 target includes emissions from the international marine bunkering and international aviation sectors and hence it entails a much larger emissions reduction in absolute terms.

² If the median scheduled price is assumed in calculating the cooperation agreement potential costs, then Malta's contingent liability would amount to €5.6 million for a one percent shortfall from the renewable energy targets [10].

Biodiesel is a renewable, environmentally friendly biofuel. Its production is relatively unproblematic and can be easily manufactured. In order to be produced, fat and oils are degummed then reacted with alcohol, typically methanol in the presence of methanol and a catalyst to produce glycerin and a methyl ester. The catalyst employed is typically sodium or potassium hydroxide. In its pure form i.e. not blended with petroleum fuel, it is non-toxic, free from sulfur and aromatic compounds. It is primarily a CO₂ neutral fuel, that is, over a complete cycle from vegetable plant cultivation, in which fuel is produced and which takes CO₂ out of the atmosphere, up to combustion-point when CO₂ is released into the atmosphere, the net production of CO₂ on balance is very low. Hence, replacing fossil fuels with biofuels helps in no small way to reduce the release of CO₂ into the atmosphere and therefore reduces the effect on climate change. It is to be noted that EU-produced first-generation biofuels can deliver GHG savings of 40-50% when compared to gasoline and diesel. Moreover, biodiesel is a biodegradable and a renewable fuel, unlike petroleum fuels, that will eventually run out as an available resource at some point in the future [12].

Biodiesel is mainly used as a replacement for petroleum diesel through a blending process. Hence, its utilisation is mainly related to the same uses as diesel. This mainly occurs in the transportation and construction fields to power

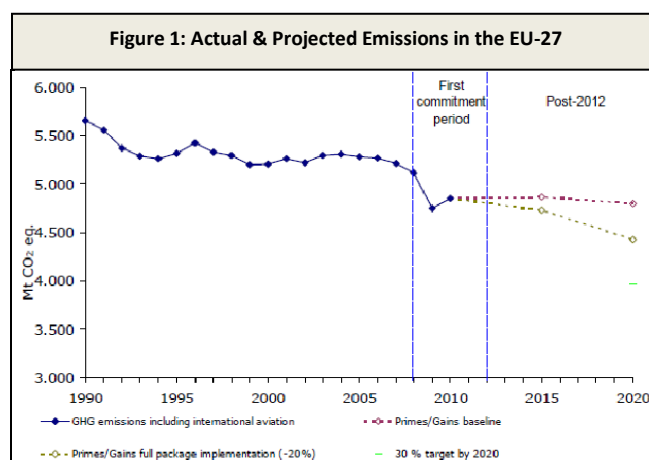
- diesel-engine vehicles;
- boilers for various industrial and commercial uses e.g. hotels, hospitals etc and for power generation;
- marine bunkering.

Presently, there is one company that produces biodiesel from recycled waste cooking oil collected mainly from the hotel industry but also from households. Its use has shown a very encouraging positive trend from the day of its introduction.

4. LEGISLATIVE FRAMEWORK

4.1 LEGISLATION

In June 2009, the EU approved the CEP which establishes binding targets to reduce the GHG emission sources and to enhance pollution sinks³ [5] [6] [7]. All EU member states have been assigned targets according to their capacity and depending on the country's socio-economic and environmental circumstances. Overall, the EU bloc is committed to reduce GHG emissions by 20% by 2020 compared to 1990 levels, to increase RES in final consumption by 20% by 2020 and to increase energy efficiency by 20% by 2020⁴. Figure 1 below, illustrates the envisaged pathway to reduce GHG emissions in the EU by 2020.



Source: European Commission, EEA [13]

Specific to the transportation sector, the CEP sub-target is of a 10% reduction in GHG emissions by 2020 from 1990 levels [5] [7]. This target is expected to be met largely through the promotion of biodiesel and bio-ethanol or bio-ETBE in automotive fuels. There are no energy efficiency targets specific to this sector in the CEP.

The CEP has been given legal force through Directive 2009/28/EC⁵ on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC [6]. This Directive mandates levels of renewable energy use within the European Union. More specifically, it sets the objective of reaching 20% of the EU's energy consumption through renewable energy sources by 2020. This overall target is broken down into mandatory

³ Such as through forest expansion and carbon capture and storage (CCS) technologies

⁴ More commonly referred to as the '20-20-20 targets'

⁵ also known as the "RES Directive"

national targets for the overall share of RES in gross final consumption of energy, as well as a mandatory share of 10% RES in transport for each Member State. The RES Directive lays down a number of rules pertaining to administrative procedures, integration of RES in buildings, training and information, certification of installers, access to the electricity grid for RES, infrastructure development, sustainability criteria for biofuels and “cooperation mechanisms”. Cooperation mechanisms are a new feature whose goal is to allow Member States to achieve a proportion of their target abroad.

The RES Directive was transposed into local legislation through Legal Notice 538 of 2010, as amended by Legal Notice 210 of 2012 [14], on the promotion of energy from renewable sources regulation. It aims to provide the legislative framework in order for Malta to adhere with the CEP requirements and achieve the targets stipulated in the RES Directive. Specific to the biofuels sector, Legal Notice 85 of 2012 [15], as amended by Legal Notice 184 of 2012, on the biofuels and bioliquids market regulations, aims to regulate the operations and activities related to the importation, manufacturing and sale of the biofuels and bioliquids in Malta. These regulations are for the safeguarding of the public interest and public safety and require, amongst others, that the quality of the biofuel that is placed on the market is within the specifications stipulated in MSA EN 14214:2008 [16]. This European Standard describes the requirements and test methods for FAME, as listed in Table 3 of Annex 1. Moreover, any biofuel that is supplied in the inland market has to adhere with the sustainability criteria stipulated in Article 17 of the RES Directive [6] and as transposed by Legal Notice 553 of 2010 on the biofuels (sustainability criteria) regulation [17]. It defines two sets of sustainability criteria for biofuels in order for it to be counted towards the mandatory renewable energy targets and in order to be eligible for financial support - GHG emission savings and land-use requirements. On the former, the percentage reduction of GHG emissions generated through the use of a specific biofuel instead of a fossil fuel has to be above a certain threshold. A minimum savings rate of 35% applies initially. With respect to the latter criterion, Article 17 (3)(5) specifies three sub-criteria for the land from which the feedstock for the biofuel originates, namely:

- biofuels shall not be made from raw material obtained from land with high biodiversity value;
- biofuels shall not be made from raw material obtained from land with high carbon stock;
- biofuels shall not be made from raw material obtained from peatland.

The quality parameters of fossil fuels that are supplied in the inland market are regulated by Legal Notice 44 of 2008 [18], and subsequent amendments. The scope of these regulations is to regulate the quality of fuels available in Malta and to transpose Directives 98/70/EC, 2005/33/EC, Directive 2003/17/EC, and Directive 2009/30/EC.

As further detailed in Section 7 below, the main measure that seeks to promote the use of biofuels is through a substitution obligation on importers and wholesalers of fossil fuels. This obligation was introduced in 2011 through an amendment⁶ to Legal Notice 278 of 2007 [19] which obliges the licensed importers and wholesalers of petroleum products to place on the market a minimum amount of biofuel as a percentage of the total energy content of petrol and diesel that is imported or wholesaled.

4.2 IMPLEMENTING BODIES

Traditionally, the MRA was the established regulatory body whose one of its main functions is to promote the use of biofuels in the internal market. More specifically, the MRA Act [20] stipulates that the Authority is to:

- (i) promote, encourage and regulate the harnessing, generation and use of all forms of energy; and
- (ii) encourage the use of alternative sources of energy.

Together with the legal notices outlined in the previous sub-section, the resultant legal framework, including the licensing regime encompassing the production, storage and sale of biofuels and bioliquids, would enable the MRA to:

- guarantee that the biofuel is sourced from sustainable sources;
- guarantee a fair playing field amongst all operators;
- ensure that only good quality biofuel is placed on the market; and
- ensure biofuel is produced and stored according to the most up to date technical standards.

Thus, the Authority is taking as many steps as possible to promote the use of alternative energy as is reasonably possible whilst protecting the interests of consumers making use of these products. One such form of alternative energy is biofuels, and in the context of this report, the use of biodiesel in the transportation sector.

In February 2014, the Sustainable Energy and Water Conservation Unit was established by means of Legal Notice 50 of 2014 [21]. This Unit is entrusted with carry out functions related to the design, implementation, and dissemination of water, conventional energy and alternative energy policy. In the execution of its functions, the Unit shall have the following responsibilities:

⁶ Regulation 33 of LN 278 of 2007.

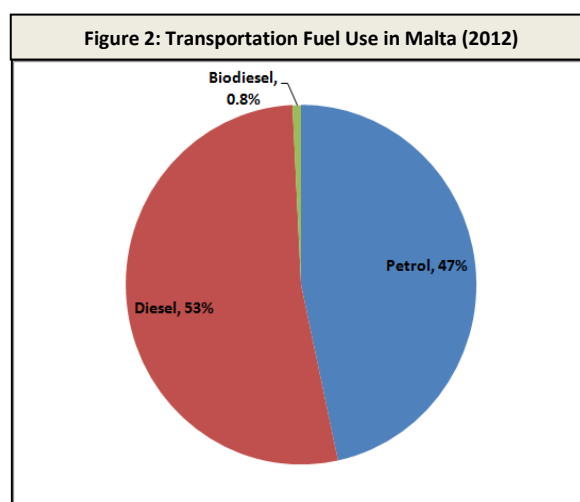
- (i) the design, development and cohesive coordination of conventional and alternative energy policies and measures together with water policy and secure governance across and within Ministries, Departments and government entities;
- (ii) the monitoring, reviewing and updating of conventional energy, alternative energy and water conservation in accordance with European Union and international requirements;
- (iii) leading and coordinating co-funded projects relating to conventional energy, alternative energy and water across Ministries;
- (iv) the design, development and management of a sustained knowledge, education, information and communications framework directed to influence behaviour with regard to alternative energy use;
- (v) the drawing up of legislative proposals in support of national policies as necessary;
- (vi) any other initiative or activity that is complementary and conducive to the fulfilment of the responsibilities of the Unit;
- (vii) the general regulation of its own procedures, provided it does not violate the provisions of any other law.

Thus the Sustainable Energy and Water Conservation Unit is now the entity responsible to draft the required policy, including the National Renewable Energy Action Plan (NREAP), which proposes the measures required to be implemented to reach the CEP target on the use of RES including in the transportation sector, as further detailed in Section 7 below.

5. BIODIESEL USE IN MALTA

Presently, only biodiesel is sold locally given that sale of bio-ethanol or bio-ETBE in their pure form is not technically feasible, as stated above. The largest share of biodiesel is retailed from petroleum filling stations and is therefore used for automotive purposes [22]. This fuel use broadly encompasses the propulsion of passenger vehicles and those vehicles used by economic operators falling within the definition of 'Transportation & Storage Activities' under the Statistical Classification of Economic Activities (NACE) [23]. This classification covers all types of transportation activities, ranging from heavy freight to courier and postal services.

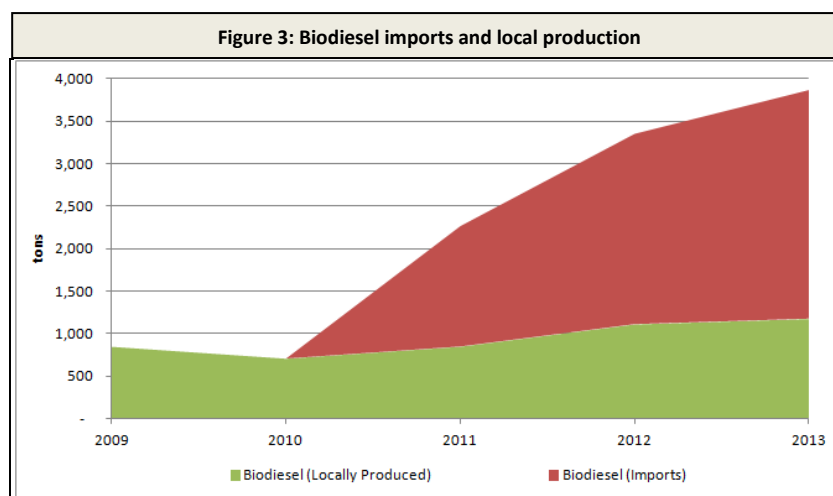
The fuels used in the road transportation sector are diesel, petrol and biodiesel. Up to and until 31st December 2010, the sale of lead replacement petrol (LRP) was still legally permitted but this has been phased out in-line with the requirements of Directive 98/70 [24] on the specification of petrol, diesel and gasoil. As at 2012, the automotive fuel market was almost equally divided between petrol (47%) and diesel (53%), with a very small share (0.8%) pertaining to biodiesel [25], as shown in Figure 2 below.



Source: Oil Balance Report (2012). MRA. [25]

Biodiesel has been sold in the local market since as far back as 2003 [26] and was initially retailed as B100 (unblended biodiesel) from the local petroleum filling stations. Thus, the consumer was required to blend the required quantity at the pump. Although, this fuel type proved to be popular, not least because of its cheaper price and green environmental credentials, the relatively old passenger vehicle fleet could not handle this new and more advanced fuel type and this led to a couple of well publicized car breakages and to a concomitant reduction in custom. Moreover, the quality specifications and sustainability criteria specified in the RES Directive required that the biodiesel produced locally should be of a higher standard.

The implementation of the substitution obligation has incentivized the use of biodiesel in the automotive market, however, it did not promote local industry, with sales from locally produced biodiesel remaining roughly constant, as shown in Figure 3 below. The main reasons being the price differential between the imported and locally produced biodiesel, concerns about quality standards of the locally produced biodiesel and issues revolving around limited production capacity and lack of security of supply for the wholesaler.



Source: Oil Balance Reports (2009-2012). MRA. [22]

The use of fossil fuels has been steadily increasing in the local transportation sector, with a related increase in emissions from this sector [27]. This trend has, to a certain extent, counteracted the emissions abated from the phasing out of leaded petrol and high sulphur diesel [27] and this rising trend in fuel use in this sector is expected to continue in the short to medium terms [28]. Given that the substitution obligation mandates incremental **percentage** increase in biodiesel, it is therefore, expected that a concomitant greater share of this fuel type, whether imported or produced locally, will be required in the local automotive fuel market.

6. EMISSIONS FROM THE TRANSPORTATION SECTOR IN MALTA

The second law of thermodynamics states that transformation efficiency from the combustion of any type of fuel cannot be 100% efficient [29] and there will always be some form of losses (or 'externality') from these conversion processes such as heat, light, noise and emissions. The combustion of fossil fuels to propel automotive vehicles is not an exception to this fundamental Law and thus all of the above externalities are present in the combustion of automotive fuel for propulsion purposes.

In the EU-27, the transportation sector constitutes the second largest contributor to GHG emissions, being responsible for 23% of total GHG emissions in 2009 [2]. Within this sector, 71% of emissions were from road transportation modes while the aviation and marine transportation cumulatively accounted for 28% of emissions. Rail and 'other' transportation activities accounted for 1% emissions each. When compared to 1990 levels, the GHG emissions from this sector in the EU-27 have increased by 23% by 2009 [2].

A similar trend has been observed in Malta, where emissions from the transportation sector accounted for 19% of total emissions in 2011 [25]. Within this sector, road transportation accounted for 87.5% of GHG emissions, the marine and aviation modes accounted for 6.6% of emissions and the remaining 5.8% were emitted by off-road vehicles and other transportation modes [25]. Although Malta experienced a steep increase of 66% in emissions from 1990 levels by 2007, as opposed to only 23% in the EU, in absolute terms, these emissions represent only 0.03% of EU average emissions from the transportation sector [2].

Apart from a large chunk of direct CO₂ emissions, the road transportation sector is also a major contributor to other types of air pollution, accounting for approximately 40% of NO_x, 35% of NMVOCs, almost 100% of CO and all exceedances of PM₁₀ concentrations in ambient air [30]. Noise pollution is also an indirect form of pollution and the road transportation sector is one of the major contributors to this 'hidden' source of pollution [31].

The increasing trend in emissions from the transportation sector in Malta is due to a number of factors including an increase in passenger vehicle stock, more frequent use of passenger vehicles [27], an ageing vehicle fleet [27], greater traffic congestion [27] and a steady decline in the use of public transportation use [27] [32]. The detrimental impact on

human health and the natural environment from air pollution, particularly in highly urbanised areas that suffer from frequent exceedances in PMs, and in light of the binding EU targets to limit local emissions from this sector by 5% increase from 2005 levels by 2020, have spurred the local Government to draw up a list of measures to tackle this issue. These measures target both the demand-side and supply-side aspects of the transportation sector and are aimed at inducing a 'modal shift' in favour of public transportation and cleaner vehicle technologies and to promote 'greener' fuel types such as biodiesel, bio-ETBE, autogas and electricity.

7. MEASURES TO PROMOTE THE USE OF BIOFUELS IN MALTA

7.1 FISCAL MEASURES

Prior to the implementation of the substitution obligation, the Government provided fiscal incentives to promote biofuels in the form of an exemption from the payment of excise duty on the biomass content (i.e. the percentage element) under fiscal control where such energy products are made up of, or contain, one or more of the following products [33]:

- products falling within CN Codes 1507 to 1518;
- products falling within CN Codes 3824.90.55 and 3824.90.80 to 3824.90.99 for their components produced from biomass;
- products falling within CN Codes 2207.20.00 and 2905 11 00 which are not of synthetic origin;
- products produced from biomass, including products falling within CN Codes 4401 and 4402;
- products which contain water (CN Codes 2201 and 2851.00.10).

In this context, 'biomass' means the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.

However, following the entry into force of the substitution obligation, it was felt that the above exemptions were unnecessary given that the biofuel *had* to be placed on the market irrespective of its price vis-à-vis conventional fossil fuels. Hence, these excise duty exemptions were scrapped and presently, all biodiesel being sold locally is taxed at a rate equal to that of diesel.

Notwithstanding, the Authority is knowledgeable of the expected adverse impact on the price of diesel brought about by successively higher quantities of biodiesel required by the substitution obligation, and hence, it carried out an exercise to determine the optimal reduction in excise duty required to levelise the price of pure biodiesel with that of diesel. The aim is to put these two fuels types on the same price and competitive footing. One of the scenarios that was considered assumes an increase of 8.5% in the biodiesel content over-and-above the present mix (of 6.5% on the energy content). This increase would require a reduction in the excise duty rate of €0.038 per litre (from €0.422 per litre to €0.384 per litre) to keep the price of diesel unchanged from the present price (of €1.36 per litre). However, this reduction in excise duty would translate in a decrease in Government revenue of €4.5 million per year [34].

In the meantime, the EU Commission is proposing a revision in the Energy Tax Directive whereby the use of fiscal policy tools to promote the use of biofuels as compared with conventional fossil fuels become mandatory. This is envisaged to be achieved through a revision of the excise duty on petroleum products which bases the tax rate on the emissions and energy content of the fuel rather than on volumetric terms as presently is the case. Hence, those fuels which are the most polluting and which have a low energy content would be taxed at the highest rate. Presently, this proposal is being discussed at Working Party level.

7.2 NATIONAL RENEWABLE ENERGY ACTION PLAN

Article 22 of the RES Directive obliges the Member States to notify the European Commission, by the 30th June of each year, of their respective NREAP. This report sets out the sectoral targets, the technology mix expected to be used, the trajectory that the Member State will follow and the measures and reforms that will be undertaken to overcome the barriers to developing renewable energy. The NREAP also seeks to explain how the Directive is being implemented and the progress towards achieving the required targets.

Moreover, the NREAP sets the share of energy from renewable sources consumed in transport, as well as in the production of electricity and heating, for 2020. These action plans must take into account the effects of other energy efficiency measures on final energy consumption (the higher the reduction in energy consumption, the less energy from renewable sources will be required to meet the target). These plans will also establish procedures for the reform of planning and pricing schemes and access to electricity networks, promoting energy from renewable sources.

The latest version of the NREAP for Malta [35] lists a number of measures for achieving the targets stipulated by the RES Directive. Those measures specific to the promotion of biofuels are the biofuel substitution obligation and the biofuels use in heating and generation. As stated in the previous section, the substitution obligation is a regulatory requirement on the

importers and wholesalers of fossil fuels to place a pre-determined amount of biodiesel in the market. More specifically, the NREAP indicates that the percentage share of biofuel (i.e. biodiesel and bioethanol) as a percentage of the total energy content petroleum fuel placed on the market calculated incrementally starting from 1.5% in 2011 is as shown in the following table:

Table 1: Share of Biofuel	
2011	1.5%
2012	2.5%
2013	3.5%
2014	4.5%
2015	5.5%
2016	6.5%
2017	7.5%
2018	8.5%
2019	9.5%
2020	10.0%

Source: NREAP, 2010 [35]

Apart from the substitution obligation on automotive fuels, the NREAP envisages other RES in the transportation mix, including those produced from electricity and those from waste, residues, non-food cellulosic and lingo-cellulosic material, the latter implying the use of locally produced biodiesel. Table 2 below shows the share of RES by type required in the transportation sector to reach the 2020 target.

Table 2: Share of RES in Transport											
ktoe	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected final consumption of energy from RES in transport	3.0	3.4	3.8	4.3	4.7	5.2	5.7	6.9	8.1	9.4	13.5
Expected additional part RES Electricity in road transport	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.6	0.7
Expected additional part consumption of biofuels from waste, residues, non-food cellulosic and lingo-cellulosic material in transport	1.2	1.3	1.3	1.3	1.3	1.3	1.3	2.0	2.7	3.2	3.2
Expected RES contribution to transport for the RES-T target	4.2	4.6	5.1	5.6	6.1	6.7	7.3	9.4	11.5	13.4	17.7

Source: NREAP, 2010 [35]

As can be seen from the table above, the NREAP envisages that the Country will attain the 2020 target for RES in transportation through a diversification in the mix of fuels used in the automotive market, the largest share being from the imposition of the substitution obligation on automotive fuels. More specifically the NREAP envisages that during the first three years, the proposed trajectory will be reached through an increased use in biodiesel, with the remaining years seeing the introduction and gradual increasing use of bio-ETBE.

Notwithstanding, the Sustainable Energy and Water Conservation Unit is currently in the process of revising the NREAP, including those measures that pertain to the promotion of biofuels in the transportation sector. An updated report is expected to be presented to the EU Commission in June of this year in-line with the requirements of Article 22. Moreover, the Sustainable Energy and Water Conservation Unit is developing a further strategy for the years 2013-2020 with the aim of preparing the framework for how the country should react to advancement in the biofuel sector, including more stringent sourcing of biofuels, fluctuations in price and higher feasibility of second-generation biofuels [35].

In terms of promoting local production of biofuel, local lobbies and biodiesel producers, have often stated that locally produced biofuel also creates a number of secondary benefits, such as requiring the collection of waste stream products, job creation and local investment. In view of these facts, they state that indigenous production of biofuel should be positively discriminated against that of imported biofuel. The MRA acknowledges the importance of such a resource and will give due consideration in promoting locally produced biofuel, especially given the fact that biofuels deriving from waste, residues, non-food cellulosic material, and lingo-cellulosic material and second generation biodiesels count twice towards the RES in transport target.

8. REFERENCES

- [1] European Commission, "White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system," European Commission, Luxembourg, 2011.
- [2] European Commission, "EU Energy in Figures - Statistical pocket book," European Commission, Luxembourg, 2012.
- [3] Platts McGraw Hill Financial, *Biofuelscan*, Various.
- [4] M.L. Parry et al, "Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," Intergovernmental Panel on Climate Change, Cambridge, 2007.
- [5] European Council, "Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community," Official Journal of the European Union, Brussels, 2009.
- [6] European Council, "Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC," Official Journal of the European Union, Brussels, 2009.
- [7] European Council, "Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020," Official Journal of the European Union, Brussels, 2009.
- [8] European Commission, "Green Paper: A 2030 framework for climate and energy policies," European Commission, Brussels, 2013.
- [9] European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A Roadmap for moving to a competitive low carbon economy in 2050.," European Commission, Brussels, 2011.
- [10] National Audit Office, "Malta's Renewable Energy Contingent Liability," Valletta, June 2010.
- [11] Malta Resources Authority, "Report on the Present State of Biodiesel in Malta and Measures for its Promotion," Unpublished, Marsa, 2007.
- [12] Biofuels Systems Group Ltd, "Biodiesel Information," Biofuels Systems Group Ltd, [Online]. Available: <http://www.biofuelsystems.com/biodiesel-information.html>. [Accessed February 2014].
- [13] European Commission, "Progress Towards Achieving The Kyoto Objectives required under Article 5 of Decision 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol," European Commission, Brussels, 2011.
- [14] Government of Malta, *L.N.538 of 2010 on the promotion of energy from renewable sources regulation*, Valletta, 2010.
- [15] Government of Malta, *L.N.85 of 2012 on the biofuels and bioliquids market regulations*, Valletta, 2012.
- [16] European Committee for Standardization, *Automotive fuels - Fatty acid methyl esters (FAME) for diesel*, Brussels, November 2008.

- [17] Government of Malta, *L.N. 553 of 2010 on the biofuels (sustainability criteria) regulations*, Valletta, 2010.
- [18] Government of Malta, *L.N. 44 of 2008 on the quality of fuels regulations*, Valletta, 2008.
- [19] Government of Malta, *L.N. 278 of 2007 on the petroleum for the inland (wholesale) fuel market, bottling of LPG and primary storage facilities regulations*, Valletta, 2007.
- [20] Government of Malta, *Malta Resources Authority Act*, Valletta, 2000.
- [21] Government of Malta, *L.N.50 of 2014 on the Sustainable Energy and Water Conservation Unit*, Valletta, February 2014.
- [22] Malta Resources Authority, *Oil Balance Reports 2009-2012*, Marsa: Unpublished, 2014.
- [23] Eurostat, "NACE Rev. 2. Statistical Classification of Economic Activities in the European Community," Eurostat, Luxembourg, 2008.
- [24] European Council, *Directive 2009/30/EC amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC*, Brussels: Official Journal of the European Union, 2009.
- [25] Malta Resources Authority, *Oil Balance Report*, Marsa: Unpublished, 2012.
- [26] Ministry for Resources and Infrastructure, "Report on the application of Directive 2003/30/EC (promotion of the use of biofuels or other renewable fuels for transport) in accordance with Article 4(1)," Valletta, 2005.
- [27] National Statistics Office, "Transport Statistics 2012," NSO, Malta, 2012.
- [28] European Commission, "Commission Staff Working Paper. Impact Assessment Accompanying the document A Roadmap for moving to a competitive low carbon economy in 2050," European Commission, Brussels, 2011.
- [29] K.E.Boulding, "The Economics of the Coming Spaceship Earth," *Environmental Quality in a Growing Economy*, Vols. H. Jarrett (ed.), Environmental Quality in a Growing Economy Baltimore, MD: Resources for the Future/Johns Hopkins University Press.1966, pp. pp. 3-14, 1966.
- [30] Malta Resources Authority, "Malta's Biennial Report on Policies and Measures and Projected Greenhouse Gas Emissions," Malta Resources Authority, Malta, 2011.
- [31] Malta Environment and Planning Authority, "The Noise Directive: Implementation of Directive 2002/49/EC in Malta," MEPA, Malta, 2011.
- [32] Ministry for Infrastructure, Transport and Communications, "Public Transport in Malta. A vision for Public Transport which fulfils public interest in the context of environmental sustainability," Ministry for Infrastructure, Transport and Communications, Malta, 2008.
- [33] Government of Malta, *Excise Duty Tax Act*, Valletta, 1995.
- [34] Malta Resources Authority, "Biodiesel scenarios and impact on excise duty revenues," Unpublished, Marsa, 2013.
- [35] Ministry for Resources and Rural Affairs, "Malta's National Renewable Energy Action Plan as required by Article 4(2) of Directive 2009/28/EC," Ministry for Resources and Rural Affairs, Malta, 2010.

9. ANNEX 1

Table 3: Specifications of Biodiesel as per MSA EN 14214:2008				
Property	Units	lower limit	upper limit	Test-Method
Ester content	% (m/m)	96,5	-	EN 14103
Density at 15°C	kg/m ³	860	900	EN ISO 3675 / EN ISO 12185 / EN12185.
Viscosity at 40°C	mm ² /s	3,5	5,0	EN ISO 3104 / EN 14105
Flash point	°C	> 101	-	EN ISO 2719 / EN ISO 3679.
Sulfur content	mg/kg	-	10	- EN ISO 20846 / EN ISO 20884.
Carbon residue remnant (at 10% distillation remnant)	% (m/m)	-	0,3	EN ISO 10370
Cetane number	-	51,0	-	EN ISO 5165
Sulfated ash content	% (m/m)	-	0,02	ISO 3987
Water content	mg/kg	-	500	EN ISO 12937
Total contamination	mg/kg	-	24	EN 12662
Copper band corrosion (3 hours at 50 °C)	rating	Class 1	Class 1	EN ISO 2160
Oxidation stability, 110°C	hours	6	-	EN 15751 / EN 14112
Acid value	mg KOH/g	-	0,5	EN 14104
Iodine value	-	-	120	EN 14111
Linolenic Acid Methylene ester	% (m/m)	-	12	EN 14103
Polyunsaturated (>= 4 Double bonds) Methylene ester	% (m/m)	-	1	EN 14103
Methanol content	% (m/m)	-	0,2	EN 14110
Monoglyceride content	% (m/m)	-	0,8	EN 14105
Diglyceride content	% (m/m)	-	0,2	EN 14105
Triglyceride content	% (m/m)	-	0,2	EN 14105
Free Glycerine	% (m/m)	-	0,02	EN 14105 / EN 14106
Total Glycerine	% (m/m)	-	0,25	EN 14105
Group I metals (Na+K)	mg/kg	-	5	EN 14108 / EN 14109 / EN 14538
Group II metals (Ca+Mg)	mg/kg	-	5	EN 14538
Phosphorus content	mg/kg	-	4	EN14107