Malaysian Oil Palm Industry: Responding to the Sustainability Criteria of Greenhouse Gas Emission Savings under the European Union Renewable Energy Directive

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INTRODUCTION

The Directive 2009/28/EC of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources (Renewable Energy Directive – RED) entered into force on the 20th day following its publication in the *Official Journal of the European Union (EU)* on 5 June 2009. The Directive imposed a mandatory target of a 20% share of energy from renewable sources in overall energy consumption and a mandatory 10% minimum target for the share of biofuels in transport to be achieved by all member states by 2020. The aim of the Directive is to promote the development of energy from renewable sources by providing a legal framework for the business community with the certainty to invest in the renewable energy sector to reduce dependence on imported fossil fuels. The effective date for commencement of implementation of RED by member states was on 5 December 2010.

Biofuels will only be taken into account for measuring the compliance with the requirements of this Directive concerning national targets and renewable energy obligations as well as eligibility for financial support for the consumption of biofuels if they fulfil the sustainability criteria as set out in Articles 17(2) to (6) of the Directive. For example, only biofuel meeting these criteria will be counted towards meeting the 10% target mentioned in the first paragraph. If any member state implement any incentive scheme for biofuels such as tax exemptions, the only biofuels meeting the sustainability criteria will be eligible.

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GREENHOUSE GAS EMISSION SAVINGS

The greenhouse gas (GHG) emission saving from the use of biofuels shall be at least 35% as compared to fossil fuel. In other words, if fossil fuel emits 100 units of GHG, the biofuels must emit 65 units or less. This threshold will increase to at least 50% with effect from 1 January 2017. In addition, from 1 January 2018 for biofuels produced in installations which production started on or after 1 January 2017, GHG emission saving shall be at least 60%. The methodology for the calculation of GHG emission saving is in accordance with Article 19(1). GHG emission from the production and use of transport fuels, namely biofuels shall be calculated as:

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ee}$$

where:

E = total emissions from the use of the fuel.
e_{ec} = emissions from the extraction/ cultivation of raw materials.
e_l = annualised emissions from carbon stock changes caused by land use change.
e_p = emissions from processing.
e_{td} = emissions from transport and distribution.
e_u = emissions from the fuel in use.
e_{sca} = emission saving from soil carbon accumulation via improved agricultural management.
e_{ccs} = emission saving from carbon capture and geological storage.
e_{ccr} = emission saving from carbon capture and replacement.
e_{ee} = emission saving from excess electricity from cogeneration.

In lieu of the actual emission data, the RED allows operators to rely on default values to demonstrate compliance with the 35% GHG emission saving requirement. Unfortunately, while the default value given in RED for rapeseed biodiesel meets the requirement, the default value for palm biodiesel does not (*Table 1*). The methodology of calculation of default values has been vehemently objected to by Malaysia and various representations have been made to Joint Research Centre of the European Commission to revise the figures for the national life cycle assessment study conducted by MPOB.

However, based on the current practices in the Malaysian oil palm industry, the typical values of GHG emission saving of palm oil biodiesel are at least 50% and based on methodology in RED, the default should be 36% (*Table 2*). The data used for the calculations of the GHG emission savings were obtained through consultations with stakeholders of the Malaysian oil palm industry.

Communication from the Commission on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels (2010/C 160/02) was released on 19 June 2010. This communication clarifies that biofuels/bioliquids produced by installations that were in operation on 23 January 2008 are exempted from complying with the GHG saving criterion until 1 April 2013. If at least one of such processing installations used in the production chain was in operation on 23 January 2008 at the latest, the criterion of a minimum 35% GHG saving starts to apply only from 1 April 2013.

In this context, palm oil as feedstock for biofuels production obtained from mills without methane capture process which are already in operation on 23 January 2008 are exempted from the GHG emission saving criterion until 1 April 2013. The exemption provides an opportunity for palm oil millers to adapt their processes by investing in the biogas capture processes before 1 April 2013.

The anaerobic digestion of palm oil mill effluent (POME) at the mills has been identified as relatively the most harmful impact to the environment in terms of global warming and climate change as it generates methane (65%) and

TABLE 1. TYPICAL AND DEFAULT VALUES FOR VEGETABLE OIL BIODIESEL IF PRODUCED WITH NO NET CARBON EMISSIONS FROM LAND USE CHANGE

Biofuel	GHG emission saving (%)	
	Typical	Default
Palm oil biodiesel (process not specified)	36	19
Palm oil biodiesel (process with methane capture at oil mill)	62	56
Rapeseed biodiesel	45	38
Soyabean biodiesel	40	31
Sunflower biodiesel	58	51

TABLE 2. TYPICAL AND DEFAULT VALUES FOR PALM OIL BIODIESEL BASED ON ACTUAL DATA FROM THE MALAYSIAN OIL PALM INDUSTRY WITH NO NET CARBON EMISSIONS FROM LAND USE CHANGE

Biofuel	GHG emission saving (%)	
	Typical	Default
Palm oil biodiesel (process not specified)	50	36
Palm oil biodiesel (process with methane capture at oil mill)	70	64

carbon dioxide (35%). In 2010, methane from POME contributed an estimate of 17.0 million tonnes of carbon dioxide equivalent. Thus, palm oil millers can play an important role in reducing GHG emission and mitigating global warming by installing the biogas capture process equipment. In addition, this ensures that palm oil biodiesel produced in Malaysia meets the sustainability criteria as stipulated in the Directive. MPOB conducted a census on the status of the installation of biogas capture infrastructures of the palm oil mills operating in the country. There are at least 38 palm oil mills with completed biogas capture facility. These numbers are rapidly growing through various governmental efforts and the enthusiastic response from the Malaysian oil palm industry. MPOB continues to encourage the palm oil millers to install biogas capture infrastructures under the Entry Point Project No. 5 of the National Key Economic Area, which targets that all palm oil mills in the country will have biogas capture facilities by 2020.

In addition, MPOB is conducting research and development to enable the total utilisation of the oil palm fruit including the non-oil components for food applications. This is aimed at among others, contributing to compliance with even the more stringent regulatory requirements of <20 ppm biochemical oxygen demand (BOD) of discharge for palm oil mill effluent. Thus methane avoidance can be achieved by elimination of effluent discharge from the mills through utilisation of all potential effluent for novel applications.

There are many initiatives that provide incentives for the production and use of energy from renewable sources. At the international level, the Clean Development Mechanism (CDM) under the Kyoto Protocol is one of the programmes that enables the trading of Certified Emission Reductions (CER) for projects that reduce GHG. A fundamental criterion under the CDM is that the project must meet the additionality requirement, which means that the project does not represent business as usual scenario and it is not feasible if it cannot qualify as a CDM project to obtain returns from CERs. As such, the producer of renewable energy from biogas capture process has the opportunity to generate CER (which is currently traded at €10 to €20 per tonne).

In Malaysia, the government has established the Small Renewable Energy Power (SREP) Programme to assist the small power generation plants producing renewable energy the opportunity to sell their electricity to the utility through the distribution grid system. In addition, the Green Technology Financing Scheme with an allocation of RM 1.5 billion has also been established to provide soft loan for users and producers of green technology which satisfies the criteria which include among others, to reduce GHG emission and promote the use of renewable sources.

Notwithstanding the above, land use change is another important sustainability criterion stipulated under the Article 17(3) of the Directive. The feedstock for the production of biofuels shall not be obtained from land with high biodiversity value, land with high carbon stock and peatland in January 2008. The total oil palm planted area in Malaysia in December 2007 was 4.3 million hectares as compared to 4.85 million hectares by December 2010. As such, close to 90% of palm oil sourced from Malaysia complies with this sustainability criterion of the Directive.

In addition, the impact of biofuels on indirect land use change (ILUC) is currently being assessed for consideration to be included in the Directive. The contention is that there may be emissions from ILUC as a result of the use of biofuels and this may need to be considered in computing GHG emission savings. However, to date, the models for computation of ILUC are not reliable and no decision on its inclusion has been made. Malaysia through MPOB had opposed the proposal to include the ILUC factor for the calculation of GHG as there is no scientifically proven and reliable methodology for computations.

CONCLUSION

With the increasing global focus and trend towards production of sustainable energy from renewable sources, it is pertinent to note that the Malaysian oil palm industry continues to adopt measures towards reducing GHG emission, subsequently reducing impact to the environment. The industry's commitment towards these efforts is commendable, and should enhance the image of palm oil as an environmental-friendly product. In the longer term, these will contribute towards strengthening the exports of palm oil and palm oil products as well as contribute towards economic and social development of the country.

REFERENCES

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