BRAZILIAN SUGARCANE INDUSTRY ASSOCIATION

ETHANOL • SUGAR • ELECTRICITY

October 13, 2010

VIA ELECTRONIC MAIL

Ministry of Economy, Trade and Industry (METI)

Reference: *Amendment to the Basic Policies on the Promotion of the Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Source Materials by Energy Suppliers*

Dear Sr.;

The Brazilian Sugarcane Industry Association (UNICA) welcomes the opportunity to provide specific comments on the "*Amendment to the Basic Policies on the Promotion of the Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Source Materials by Energy Suppliers" (*hereafter: *Amendment to the Basic Policies)*. This letter presents our views regarding lifecycle calculations of sugarcane ethanol and includes specific recommendations concerning the adopted values for soil carbon stocks in sugarcane plantations.

Also, attached to this letter, please find three supporting documents that further clarify the comments presented here, with detailed references. They are:

(A) A report on the biomass and soil carbon stock changes in the expansion of sugarcane plantations, prepared for UNICA by NIPE/UNICAMP Professor Isaias C Macedo;

(B) A study on the organic carbon stock in sugarcane cultivation soils, by researchers from the CTC (Center for Sugarcane Technology). This paper has received final approval and will soon be published by an internationally recognized peer reviewed journal;

(C) A technical note on the accounting for electricity surpluses in ethanol plants, prepared for UNICA by NIPE/UNICAMP Professor Isaias C Macedo;

We ask that this letter and all its references be fully considered by the METI and staff prior to final approval of the regulation. The letter is structured as follows: (1) Introduction of UNICA as having a direct and significant interest in this rulemaking; (2) Comments and recommended changes to life cycle assessment inputs and assumptions; and, (3) Conclusions.

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1. INTRODUCTION

The Brazilian Sugarcane Industry Association (UNICA) is the leading trade association for the sugarcane industry in Brazil, representing nearly two-thirds of all sugarcane production and processing in the country. Our 125 member companies are the top producers of sugar, ethanol, renewable electricity and other sugarcane products in Brazil's South-Central region, the heart of the sugarcane industry. Brazil is the world's largest sugarcane-producing country with over half a billion metric tons of cane harvested yearly.

During the last harvesting season (2008-09), Brazil produced over 31 million tons of sugar and about 27.5 billion liters of ethanol. In addition, sugarcane processing mills generate their own power from the cane biomass (bagasse) and are increasingly exporting surplus electricity to the national grid. In 2010 sugarcane mills will have sold 1,050 average MW of electricity (corresponding to more than 2% of the country's annual electricity demand). This is expected to rise to 13,000 MW in 10 years as only 23% of the mills are currently connected to distribution grids.

Thanks to Brazil's innovative use of ethanol in transportation and biomass for electricity cogeneration, sugarcane is now the number one source of renewable energy in Brazil, representing 18% of the country's total energy needs according to official government data[1].

2. LIFE CYCLE ANALYSIS

When calculating the biofuel life cycle analysis (LCA) with the purpose of estimating its "net" contribution to climate change mitigation, questions associated with biomass production, conversion and use of energy are quite consensual, except where by-product evaluations are concerned. Also, when Direct Land Use Change (LUC) emissions are included in the evaluation, it becomes difficult to establish the same precision in calculation due to the lack of strong data bases related to the large variation in soil carbon (equilibrium) stocks depending on soil type, climate and biomass production characteristics (type, management, inputs).

In this section, we cover three main issues that, in our view, are not correctly considered within the proposed "*Method for calculation of lifecycle greenhouse gas emission from ethanol*" (hereafter: *Method for calculation*) and the calculated "*default lifecycle greenhouse gas emissions values for sugarcane ethanol in Brazil*" (hereafter: *default values for sugarcane ethanol*). We also make suggestions to correct those issues.

[1] EPE/MME 2009 *Balanço Energético Nacional 2009 – Resultados Preliminares, Empresa de Pesquisa Energética* (EPE), Ministry of Mines and Energy a, Brasília, DF, 2009.

2.1. DIRECT LAND USE CHANGE

The proposed calculation of the default values for sugarcane ethanol considers the carbon stock values reported by the IPCCC. However, when considering carbon stock changes due to LUC in the sugar cane expansion areas in Brazil, two problems arise from the use of conventional "default" values from IPCC: (a) the semi-perennial nature of sugarcane cultivation, and (b) the type of "pasturelands" involved (a mixture of natural and planted pastures, with a large fraction of degraded areas in both). One of the attached documents to this letter[2] largely details all those issues, while in the letter itself, we focus on soil carbon stocks in sugarcane areas.

According to the experimental results in the attached CTC paper[3] (27 thousand measures, 1.1 million ha), the overall average for soil carbon stock at a depth of 0-25 cm is 41.61 t C/ha. Based on data in that research, the weighted average for sugarcane areas is **47.6 t C / ha at the standard 30 cm depth**; and 71.8 t C / ha at 50 cm. **This value is much closer to *perennial* than to *annual* conditions according to the IPCC based results**.

- *Given* the reliability and extension of the sampling;
- *Recalling* that the paper has already been approved and is about to be published in an internationally recognized, peer reviewed journal and;
- *Considering that* the "Amendment to the Basic Policies" states the following: "*The direct land use change must be calculated by using references published by the Intergovernmental Panel on Climate change (IPCC) or internationally unbiased and neutral data. Other references and/or data that are available by the entity can be used to calculate the Change" (Pg 18, item 2.i.2)*;

We strongly recommend the use of these experimental results, instead of the default values from IPCC baseline, **in the calculation of the "Default lifecycle greenhouse gas emission of biofuels used in Japan",** leading to a revision of the results presented in table 2 (pg 21).

2.2. COMPUTATION OF AVOIDED EMISSIONS FROM BIOELECTRICITY SOLD TO THE GRID

Since 2002, there have been considerable changes in the production of sugarcane ethanol in Brazil. There has been increased interest in the use of surplus electricity from cane processing mills, to complement the national electricity supply during the dry season. **The overall energy surplus selling average was 10.5 kWh/t cane in 2008[4]** (compared to only a few kWh/t cane in

[2] MACEDO, I. (2010) "Biomass and Soil Carbon stock changes in the expansion of sugarcane plantation in Brazil Center South Region". Report to UNICA.
[3] Donzelli and al. (2010). "Organic carbon stock in sugarcane cultivation soils in the mid-south region of Brazil". *To be published.*
[4] EPE/MME 2009 *Balanço Energético Nacional 2009 – Resultados Preliminares, Empresa de Pesquisa Energética* (EPE), Ministry of Mines and Energy a, Brasília, DF, 2009.

2002); and the average for mills already connected to the grid and selling power was 28 kWh/t cane. Some mills are already selling more than 60 kWh/t cane.

Emissions avoided by bagasse-generated energy today are well represented by the emission factor for the Operation Margin (OM). Various methodologies have been used to complete this assessment (simple or adjusted OM; dispatch data analysis; average OM) but the use of dispatch data is the most recommended. The emission factor may then be calculated as the weighted average of the emission factors for power generation units supplying 10% (of total dispatched energy) at the lowest priority dispatch (calculated each hour).

Since the additional excess bagasse is being used to avoid greenhouse gas emissions (from the national electricity grid), the avoided emissions shall be considered as a "reduction". It would represent a classical use for the displacement method.

Therefore, **10.5 kWh / t cane –** with 80 L ethanol / t cane; 21.3 MJ (eth) / L ethanol; substituting for electricity generated (margin) by Natural Gas (at 40% thermal efficiency; releasing 560 kg CO2e / MWh) – **saves 3.5 g CO2e / MJ ethanol**.

- *Considering* the clarity and robustness of the information presented above;
- *Also considering* that the "Amendment to the Basic Policies" affirms that "*When greenhouse emissions can be avoided by using wastes and/or residues … the emissions avoided can be considered as 'reduction'" (pg17, item 2.3)".*

We strongly recommend that an electricity reduction credit of 3.5 g CO2e/MJ should be accounted for. It means that 3.5 g CO2e should be deducted from the default value for ethanol produced from sugarcane in Brazil (Pg 21, Table 1)

2.3. ALLOCATION TO BYPRODUCTS

We consider that the option presented above (computation of avoided emissions from bioelectricity sold to the grid), is the correct methodology to take into consideration the excess electricity that is sold to the national grid by Brazilian sugarcane mills. However, even if that proposal is not considered, the current "default value for sugarcane ethanol" presented in Page 21 (table 1) still needs to be revised and modified.

The "Method for calculation of greenhouse gas emission" included in the "Amendment to the Basic Policies" states that:

- *"By products are defined as those that use energy or materials and are sold to another entity(s)" (Pg 19, item vi.2).*
- *"Part of the greenhouse gas emissions can be allocated when a byproduct is produced (Pg17, item 2.2,.and it also affirms that*

It is, therefore, logical to conclude that bioelectricity (that is produced from bagasse and is "sold to another entity") should be classified as a "by-product". In that case, it is also logical to conclude (as the emissions in the entire process are a result of the production of both ethanol and bioelectricity) that part of the greenhouse gas emissions in the process should be allocated to bioeletricty and, therefore, deducted from the ethanol default value.

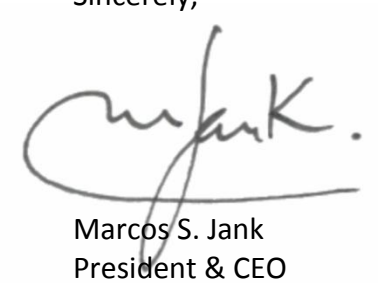
If the proposed 3.5 g CO2e/MJ bioelectricity credit is not taken into account, **we strongly recommend that part of the emission attributed to ethanol should be attributed to electricity and deducted from the ethanol default value**.

3. CONCLUSION

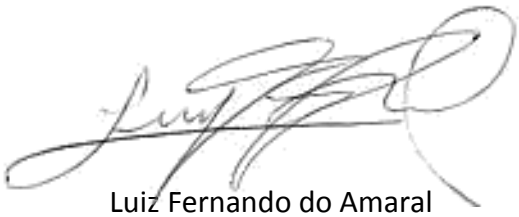
We commend METI for its assessment of the lifecycle emissions associated with the production of sugarcane ethanol. However, we believe the analysis assessment requires a comprehensive update with more accurate and realistic data from current experience and anticipated trends in Brazil.

We hope this letter will contribute to improving the proposed "*Amendment to the Basic Policies on the Promotion of the Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Source Materials by Energy Suppliers*" and remain at your disposal to answer any questions you or your colleagues may have.

Sincerely,



Marcos S. Jank
President & CEO



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