



International bioenergy trade—A review of past developments in the liquid biofuel market

Patrick Lamers^{a,*}, Carlo Hamelinck^b, Martin Junginger^c, André Faaij^c

^a Ecofys Germany, Stralauer Platz 34, 10243 Berlin, Germany

^b Ecofys Netherlands, Kanaalweg 16-A, 3526 KL Utrecht, The Netherlands

^c Copernicus Institute, Utrecht University, Budapestlaan 6, 3584 CD Utrecht, The Netherlands

ARTICLE INFO

Article history:

Received 13 December 2010

Accepted 30 January 2011

Keywords:

International bioenergy trade

Liquid biofuels

Biodiesel

Ethanol

Fuel

Policy

ABSTRACT

Policies aimed to promote biofuels locally had tremendous effects on global market developments across the past decade. This article develops insights into the interaction of these policies and market forces via a comprehensive collection and analysis of international production and trade data. It shows that world biofuel production and trade has grown exponentially: from below 30 PJ in 2000 to 572 PJ in 2009 for biodiesel; from 340 PJ in 2000 to over 1540 PJ in 2009 for fuel ethanol. The EU has dominated world biodiesel, whereas the US and Brazil have led fuel ethanol production. World net biofuel trade reached 120–130 PJ in 2009 and was directed towards the most lucrative markets. For biodiesel, this has been the EU whose imports rose to 92 PJ in 2008 and remained at 70 PJ in 2009. Regarding fuel ethanol, both the US and the EU have been prime destinations for competitively priced exports, the vast majority of which originated in Brazil. International biofuel trade is both supply and demand driven. The demand side was shaped by support policies which generally increased the domestic market value of biofuels. Trade developed wherever these policies/prices were not accompanied by respective measures. It is found that import duties largely influenced trade volumes, whereas trade routes were mainly driven by tariff preferences. Trade regimes appear to have been designed and adapted unilaterally along national interests causing market disruptions, trade inefficiencies and disputes. To avoid these, it is important to explicitly consider international trade implications of national trade policies. A prerequisite is to improve the understanding of the underlying, complex and interwoven links within the market. The current lack of adequate, homogeneous, international reporting of biofuel production and trade statistics could be bridged via internationally standardized custom clarifications. Trade factor interrelations also need to be investigated further.

© 2011 Elsevier Ltd. All rights reserved.

Contents

1. Introduction, problem definition, outline	2656
2. Methodology	2656
3. Policies and trade regimes	2657
3.1. European Union (EU)	2657
3.1.1. Policies	2657
3.1.2. Trade regimes	2657
3.2. United States of America (USA)	2658
3.2.1. Policies	2658
3.2.2. Trade regimes	2659
3.3. Rest of the world	2659
3.3.1. Key policies and markets for biodiesel and vegetable oil production and trade	2659
3.3.2. Key markets for (bio-)ethanol production and trade	2660

* Corresponding author. Tel.: +49 302977357925.

E-mail addresses: pa.lamers@gmail.com, p.lamers@ecofys.com (P. Lamers).

4.	International market developments	2660
4.1.	Biodiesel and vegetable oil	2660
4.1.1.	Vegetable oils	2663
4.2.	(Bio-)Ethanol	2665
5.	Global liquid biofuel trade volumes	2668
5.1.	Biodiesel	2668
5.2.	(Bio-)Ethanol	2669
6.	Results: policies and market factors	2669
7.	Reflections and conclusions	2670
	Appendix A. Appendix	2673
A.1.	Background on global biofuel production data	2673
A.2.	Biofuel tariff and subsidy summary	2675
A.3.	Conversion factors	2675
	References	2675

1. Introduction, problem definition, outline

Numerous governments around the world (primarily in OECD countries) have supported the market introduction of biomass for energy purposes (bioenergy) across the past decade. Domestic bioenergy policies indubitably had a tremendous effect on global markets. Nowadays, more bioenergy than ever before is sourced from abroad and procurement areas – especially of large scale producers and traders – span the globe.

This trend is bound to continue. Though potential studies vary in terms of exact amounts (see e.g. [1,2] for a review), given favorable development, it is clear that several hundred EJ per annum of bioenergy could be provided in the future global energy supply. Some regions are estimated to have a bioenergy potential that will exceed their national demand; foremost developing countries, while others are expected to become net importers (see e.g. [3,4]). Thus, an increasing role of bioenergy in the global energy matrix is inevitably intertwined with large-scale international trading activities of bioenergy commodities.

Yet the international bioenergy market and trade developments are still in their infancy and strongly linked to the support and trade policies. Past changes in the policy framework have shown how vulnerable these markets and trade patterns still are. Several studies have thoroughly analyzed the early market stages, initial trade volumes, as well as barriers to trade and solutions to overcome them (see e.g. [5–10]). These studies however have not evaluated how the interaction of these domestic policies steered global trade streams towards different markets, in particular in connection to underlying trade policies and additional market forces, over an extended period of time. To do so, a comprehensive collection and scientific analysis of international trade data is indispensable but also lacking (see Heinimö and Junginger [5] for a first rough estimate). Market data is scattered and, where available, as e.g. via (supra-) national and international institutions (e.g. Eurostat, USDA, UN), organizations (e.g. FO Licht) or associations, estimations vary. This paper aims to provide such analysis. Due to the complexity and differences between the markets of liquid and solid biofuels, this study is split into two (separate yet combined) articles, the first of which deals with liquid biofuels.³

The biofuel market has shown an exponential growth in global production and trade across the past decade. It is strongly linked to other sectors (agriculture in particular) and faces significant market disturbances some of which have led to various inefficiencies in the past. Due to the pace of this market development, a methodological assessment and understanding of the numerous influencing factors is needed to reduce uncertainties and risks for those involved.

³ I.e. within the context of the article, 'biofuels' only refer to liquid biofuels if not otherwise stated.

This would primarily apply to policy makers in terms of e.g. target achievements (including the safeguarding of sustainability standards) and investors.

The assessment is structured along the following research questions:

1. What were the key policies and economic/market forces that have shaped international trade in liquid biofuels within the past decade?
2. How often were liquid biofuel trade routes altered in response to changes in policy and market environments? And, what can be learned from these changes?

The methodological approach to answering these questions is presented in Section 2. Section 3 outlines the chronological development of key policies and trade regimes in the focus regions. Section 4 provides qualitative and quantitative comparisons evaluating and describing trade volumes related to the respective policies and additional economic/market drivers. The section identifies and – where possible – quantifies the impact of policies on international bioenergy trade, on the key commodities, and on trade routes. Based on this analysis, a methodological approach for the calculation of the world net liquid biofuel trade within the past decade is suggested and tested in Section 5. Section 6 combines the key results regarding the policy and market interlinks before the paper closes with a reflection and conclusion. Additional details on underlying data and related assumptions for the analysis are presented in Appendix A.

2. Methodology

The paper starts with a collection of key biofuel and trade policies across major markets. Commodities in focus include biodiesel, vegetable oils, and fuel ethanol. To explain how policies and economic factors impact markets, we then describe the chronological market developments using anecdotal evidence based on previously published scientific work as well as additional literature and insights from policy makers, traders, and industry representatives. The evaluation prioritizes the main aspects, i.e. the main influencing factors per policy and region depending on the traded biofuel volumes. The link between policies and trade flows is further established by highlighting policy changes in key markets and their effects on trade. The paper does not reflect on the effectiveness or efficiency of biofuel policies.

A fundamental part of the analysis is the collection and presentation of robust data on international biofuel production and trade across the past decade. Data was derived and compared between various sources including government statistics [11–23], international organizations [24,25], industry associations [26–42],

Download English Version:

<https://daneshyari.com/en/article/1751122>

Download Persian Version:

<https://daneshyari.com/article/1751122>

[Daneshyari.com](https://daneshyari.com)