Chapter 4

Potential for Trade

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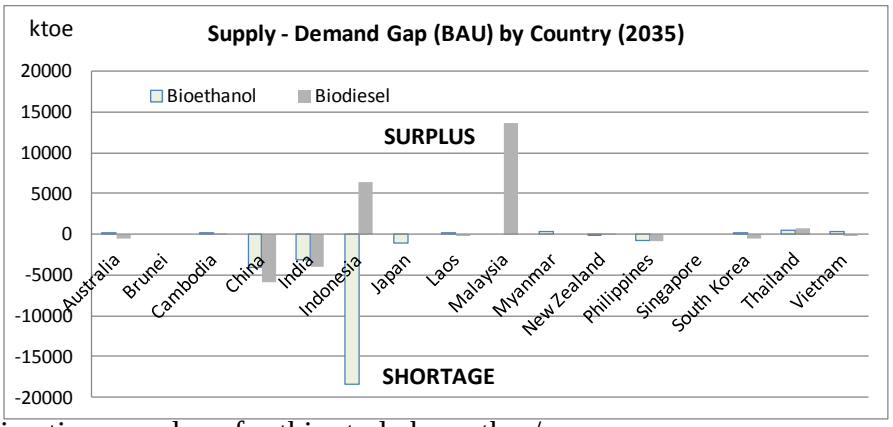
CHAPTER 4
Potential for Trade

Looking at the demand and supply potential of bioethanol and biodiesel by country, it could be observed that countries with large biofuel demand in the future do not necessarily have sufficient potential of supply, and vice versa (Figure 4.1). For example, Indonesia is the country with the largest demand, accounting for more than half of both bioethanol and biodiesel demands, while its supply potential of bioethanol is estimated to be very limited. This results in Indonesia experiencing the largest shortage of bioethanol by 2035. Malaysia, on the other hand, is supposed to be the region's second-largest biodiesel supplier in 2035, with its domestic biodiesel demand projected to be marginal. Consequently, it could have a large surplus of biodiesel in the future. This mismatch of future biofuel demand and supply potential indicates that cross-country biofuel trade is necessary to optimise the region's biofuel utilization. Details on the issues of regional biofuel market integration will be discussed in Chapter 5.

Figure 4.1 Supply–Demand Gap by Country (business-as-usual case)



Source: Estimation was done for this study by author/s.

The above results show gaps between demands and supplies among countries as well as in the region. The gaps can be reduced through the integration of the market. This section addresses the benefits integration in terms of the

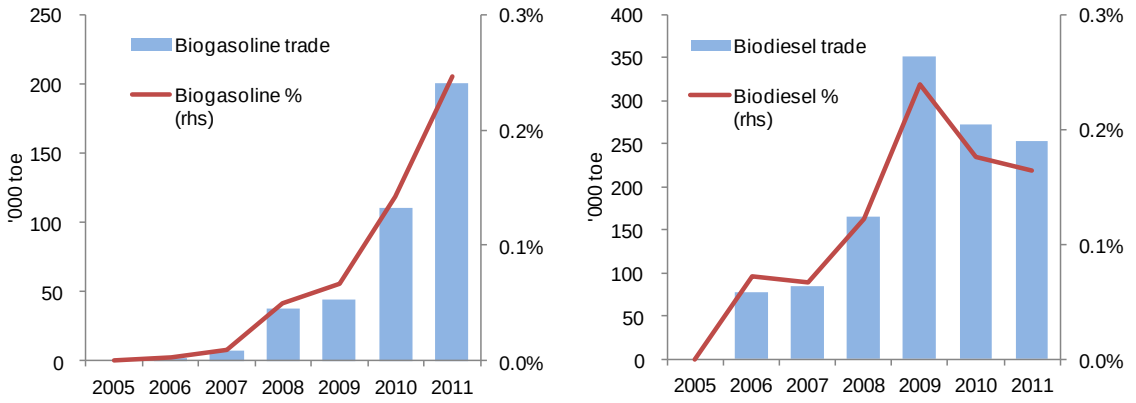
potential expansion of trade. Although the advantage of market integration seems to be clear from the point of regional demand and supply, the reality is much more complex because the prerequisites of market integration must be considered. This includes regional common standards and differences of national interests in biofuels. In this chapter, the complexity is analysed from the perspective of the potential expansion of the biofuel market through integration and the impact of competing objectives upon policies.

First, the current status of biofuel trade in Asia is reviewed from the perspective of international demand and supply for liquid fuels. Next, the magnitude of the benefits from integration is estimated quantitatively. Finally, options to expand the trades are discussed.

Trade of Biofuels in Asia: Current Status

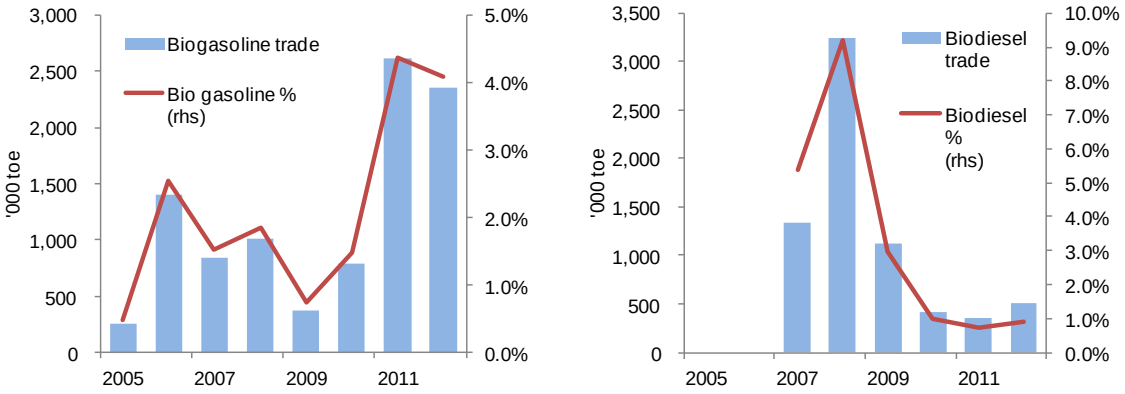
The trade of biofuels in the Asia-Pacific region had not been as active as in other regions, such as in Europe and the Americas. As Figure 4.2 shows, the shares of bio-gasoline (mostly bioethanol, but includes ethyl tertiary butyl ether [ETBE]) and bio-diesel trade over the total traded volume of each product are still at a negligible level, or below 0.3 percent. This percentage is considerably low compared with the US and European shares (Fig. 4.3 and Fig. 4.4).

Figure 4.2 Trades of Bio-Gasoline (Left) and Biodiesel (Right) in Asia



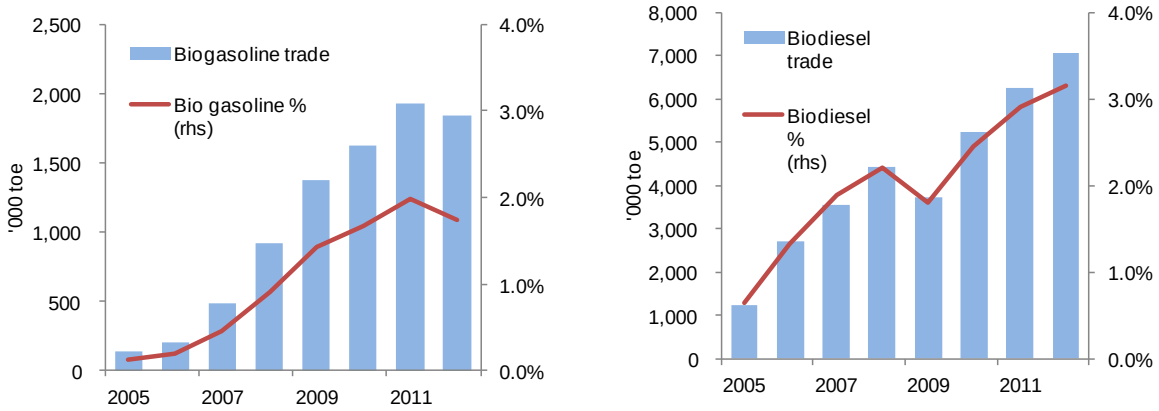
Note: There was no trade before 2005. Trade volume is the sum of export and import.
Source: IEA (2013), Energy Balance of OECD Countries and Energy Balance of non-OECD Countries.

Figure 4.3 Trades of Bio-Gasoline (Left) and Biodiesel (Right) in the US



Note: There was no trade before 2005. Trade volume is the sum of exports and imports.
Source: IEA (2013), Energy Balance of OECD Countries.

Figure 4.4 Trades of Bio-Gasoline (Left) and Biodiesel (Right) in Europe

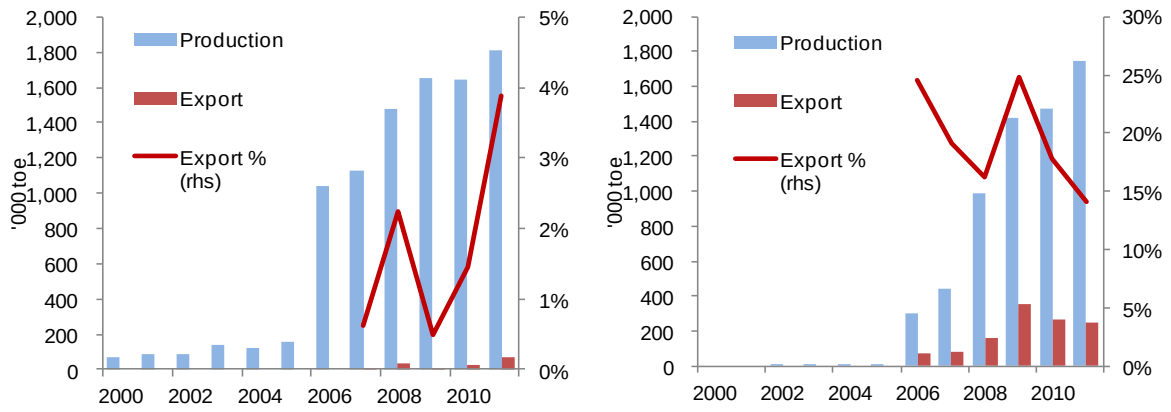


Note: There was no trade before 2005. Trade volume is the sum of export and import.
Source: IEA (2013), Energy Balance of OECD Countries.

The most important factor behind the inactive trade of biofuels is that biofuels trade requires dedicated infrastructure, such as tank, tank truck, pipeline, and tankers. Biofuels trade, therefore, costs much more than ordinary oil product trade, especially for many of the developing countries in Asia. Its specification and terms of trade contract, in addition, are not standardised as in ordinary oil product trade. Its trade tends to be conducted among a limited number of parties and its market is as liquid as the oil product market. At the time of writing this report, the major exporters of biofuels in Asia are Indonesia and Malaysia; in other countries, both production and export capacities have not been well developed.

Another factor is the purpose of biofuels introduction. Biofuels are, in general, produced mainly for domestic use. One of the rationales for producing and utilising costly biofuels is to secure domestic energy supply, replacing imported fuels. This motivation is shared particularly among Asian countries because many of them are net importer of oil. Biofuels are, in this sense, energy produced to be consumed domestically, and trading is not the primary purpose of biofuels production. Figure 4.5 shows that only less than 5 percent of bio-gasoline production in Asia has been exported. Also, it suggests that, although around 20 percent of the total biodiesel production is exported, its volume and share has reached a peak in 2010 and has declined afterward.

Figure 4.5 Export Shares of Bio-gasoline (Left) and Biodiesel (Right) in Asia



Source: IEA, (2013), Energy Balances of OECD Countries 2013 and Energy Balances of non-OECD Countries.

Besides securing domestic energy supply sources, biofuels' contribution to rural and agricultural development is also important. In fact, in Asia, the market for biofuels is linked to both food and energy markets and whether products can be domestically consumed or exported depends not only on the prices of oil products but also on food prices.

There are a number of motivations behind each country's biofuel development efforts. Trade is an area where these different motivations conflict with each other.

Summary

Biofuels trade in Asia has not been as actively conducted as in the US or Europe. This is partly because biofuel production and consumption is still negligible in the total oil product supply, and because the primary purpose of biofuels introduction in many Asian countries is to enhance self-sufficiency in energy supply. Hence, importing or exporting biofuels is not actively pursued. No drastic change is expected in future biofuels trade. This is because the abovementioned factors will remain the same in the foreseeable future. Biofuels supply potential, where a conflict with food consumption is also taken into account, is also estimated to be relatively limited, as discussed in Chapter 3.

Thus, it becomes a policy challenge to promote a more active trade of biofuels, as a clear biofuel policy formulated by each Asian country will be important in providing a clear policy direction to encourage investment in biofuels to enhance supply capacity, and to provide the infrastructure needed to activate trade. The standardisation of biofuels quality specification will also help to reduce obstacles to the smooth exporting and importing of biofuels.

Potential of the Biofuel Market for Trade

1) Potential of the Biofuel Market for Trade

The above analysis showed that the current trades of biofuels in Asia are still limited. In this section, the potential expansion of the biofuel markets is estimated.

Without trade, the market equilibrium is below both demand and supply. Without trade, the maximum potential of the market of each country becomes smaller than demand and supply. These constraints in the market potentials of bioethanol and biodiesel are calculated as such in the area “Potebtial with Trade” of the graph shown in Figure 4.6 and Figure 4.7 The benefit is the difference between the integrated potential through trade and the constrained potential by border.

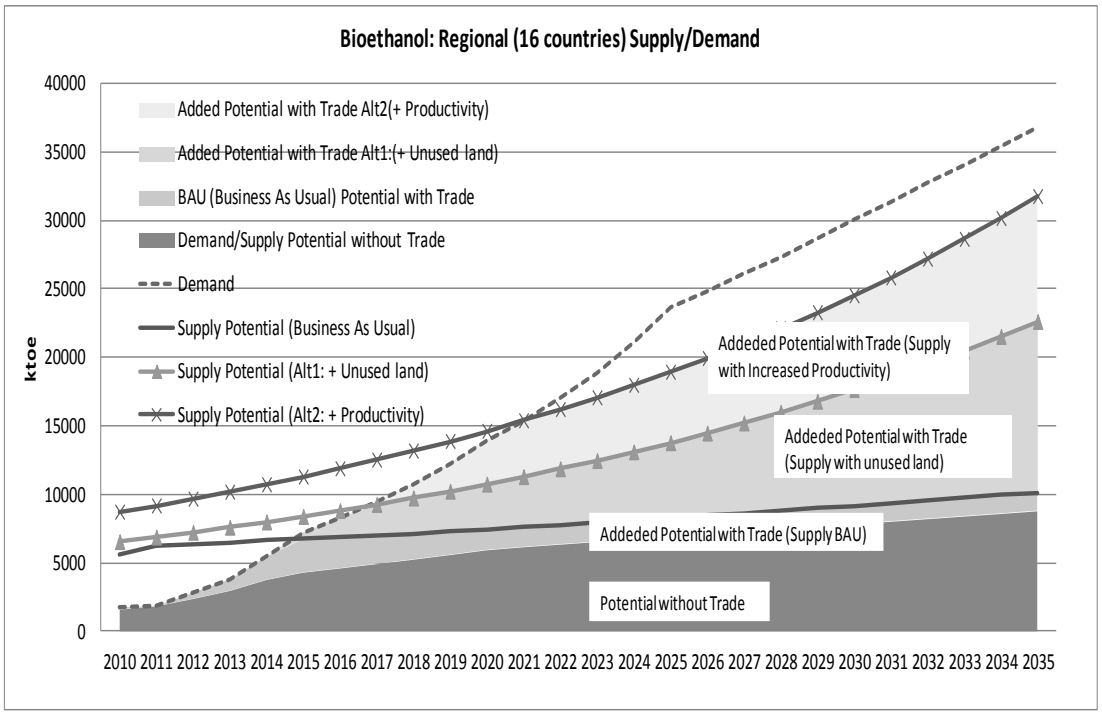
The formula for estimating the gap between markets—with and without borders (without supply constraint)—is as follows:

Sum of the market constrained by the national border
= Σ Min (country demand, country supply)
Market of the sum of the 16 countries
= Min (Σ country demand, Σ country supply)

Figures 4.6 and 4.7 show the increased potential of market integration for the region of the Asia in 16 countries. Trade will be very important to fully realise the regional market potential. In the case of bioethanol without trade, the potential could not reach 10,000 ktoe by 2035. Supply limitation becomes serious with a scenario of business-as-usual (BAU) and shortage will come by 2015 as this case is below the level of the needs of trade. Assuming trade is available, utilisation of unused land ("Alternative 1") could ease the shortage substantially with an added supply of 25,000 ktoe by 2035, although the shortage will come by 2017.Additional supply potential with increased productivity ("Alternative 2") could further contribute to the market potential, with additional 10,000 ktoe by 2035. Still, shortage could come in early 2020s and the shortage could remain as large as 5,000 ktoe until 2035 or later.

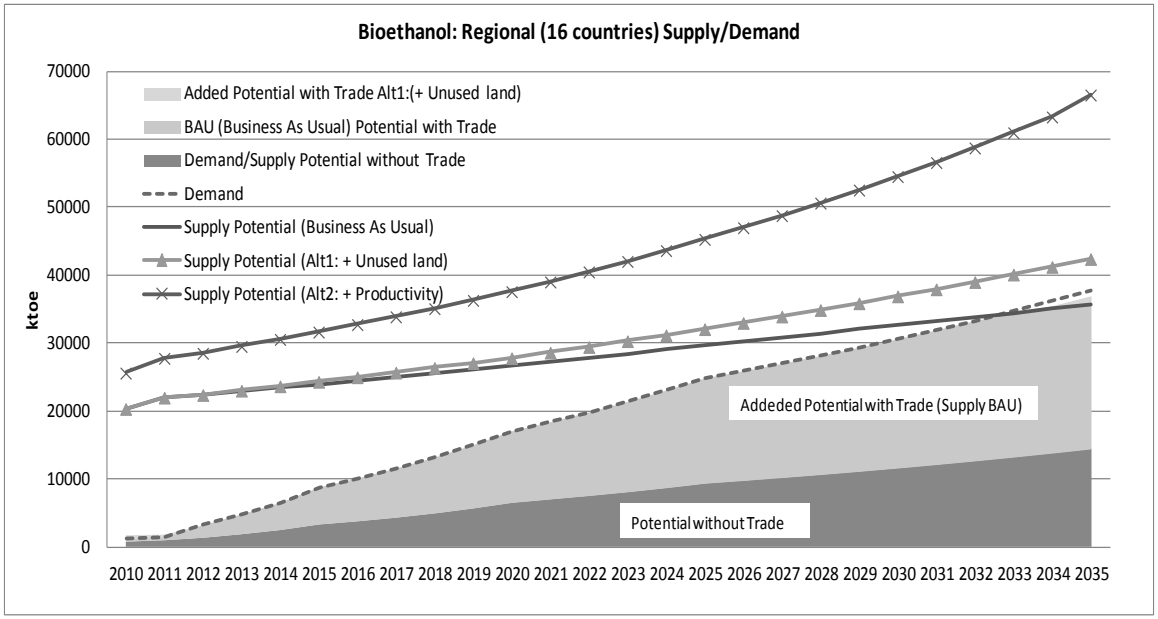
In case of biodiesel without trade, the potential will be below 15,000 ktoe by 2035.
The trade could add the potential of about 20,000 by 2035 in a business-as-usual (BAU) scenario. Shortage could come as early as 2030s without the utilisation of unused land ("Alternative 1").

Figure 4.6 Potentials of Bioethanol Market (in ktoe)



Source: Estimation was done for this study by author/s.

Figure 4.7 Potentials of Biodiesel Market (in ktoe)



Source: Estimation was done for this study by author/s.

2) Policies for market integration

The factors of trade barriers are mentioned in the previous section. Among many factors, this study highlights the importance of each country's national interest. Even if common standards for biofuels are established in the region,

the integration of the market still depends on the intention of each individual country (whether the country wants to open the market or not). In the case of biofuels, a government's intention of having a market integration with foreign countries is shaped by the drivers and objectives of biofuel promotion in that country. In Asia, the objectives for the utilisation of biofuels include (1) energy security, (2) trade balance, (3) economic development, (4) rural development, (5) agricultural development (job and income for farmers), and (6) climate change mitigation.[1]

The priorities of the drivers and objectives to promote biofuel production and consumption may vary from country to country depending on the individual country's endowment of energy resources and social and economic development circumstances. For oil-importing countries like the Philippines and Thailand, energy security, trade balance, and economy are the critical drivers behind the government's support for biofuel utilisation. For energy-producing countries like Indonesia and Malaysia, the objectives of developing the rural areas and the domestic agricultural industries become critically important.

The integration of the markets, therefore, has to meet the various interests of different countries. For example, one critical element is the economic value of biofuels. If biofuels cannot compete with other fuels, such as gasoline and mineral diesel, trades across national borders would be difficult. Moreover, the integration of the market can have a negative impact on one objective and a positive impact on another and the degree of the impacts may differ by country depending on the extent of the market integration. Like in the Philippines, biofuels are perceived as alternatives to oil products and the Philippines' *Biofuel Act of 2006* was intended to promote local production to reduce import of oil in the future. On the other hand, the less populated Malaysia has huge potential for biodiesel export but its domestic demand is limited, while the government of Malaysia is promoting both export and domestic consumption.

What is, therefore, the optimal level of market integration to fulfill the interests of different countries to the maximum? This is, in fact, the subject of the framework on regional trade resulting from negotiations among countries.

[1] Adrian and Elspeth (2009).

The method of market integration is export and import. Most countries can achieve the objectives mentioned above through export. However, the export potential is limited to only a few countries. Therefore, this imbalance will make market integration very difficult even if there are regional benefits. The issue lies in the conflict of national and regional interests.

How can we bridge the gap between national and regional benefit? The key is on the collective benefit. One example was shown in the agenda of the Second East Asia Summit of 2007 hosted by the Philippines. The summit was a response to the increasing crude oil price. One of the purposes of the summit was to see the feasibility of replacing imported oil and oil products with regional biomass and biofuels. The message is clear that the key is the price. If biofuels could be produced at lower cost than those of oil products from the Middle East, the oil-importing countries will have a strong incentive to import biofuels although this may not directly contribute to industry development or job creation.

In the light of the collective interests of ASEAN countries and their historical responses to energy prices, the most practical action for cooperation is to reduce the cost of biofuel production. The above analysis showed the huge potential of market creation by regional market integration and the need for a cooperative effort in improving productivity.

In summary, the role of trade is very important in expanding the market of biofuels. As noted in the introduction, liquid fuels could be the major energy source in Asia. Here, the collective benefits of expanding biofuels use are not only regional energy security, but also the mitigation of global warming.[2] The stake of collective benefits from the trade is large. However, the current development of biofuel trades is still limited, compared with the potential. The prospects of limited trade could continue. There are two primary reasons, which can be shared in developing Asia. One reason is that biofuels are expected to contribute to the rural and agricultural development through domestic production. In fact, in Asia, the market of biofuels is linked to both food and energy markets and the products can be domestically consumed or exported, depending on not only the prices of oil products but also on food

[2] 2 Degree Scenario or so called 2DS scenario in the transport sector in the *World Energy Outlook* (IEA, 2013c).

prices. Another is the concern for energy security, especially for oil-importing countries. Therefore, national biofuel policies of many Asian countries are oriented to promote the domestic production of food–biofuel compatible feedstocks for both markets of energy and agriculture, which make it challenging to be fully open in the future.

The limitation in trade could bring different future prospects of shortage or surplus of biofuels by country, depending on the profile of the policies and agricultural characteristics of each country. The ambitious demand by the ASEAN, especially by Indonesia, implies that some ASEAN countries (most likely to include Indonesia) may face a shortage earlier, whereas some countries (most likely to include Malaysia) can sustain the surplus longer than the cases of fully integrated market assumption.