

CHAPTER TWO

REVIEW OF LITERATURE

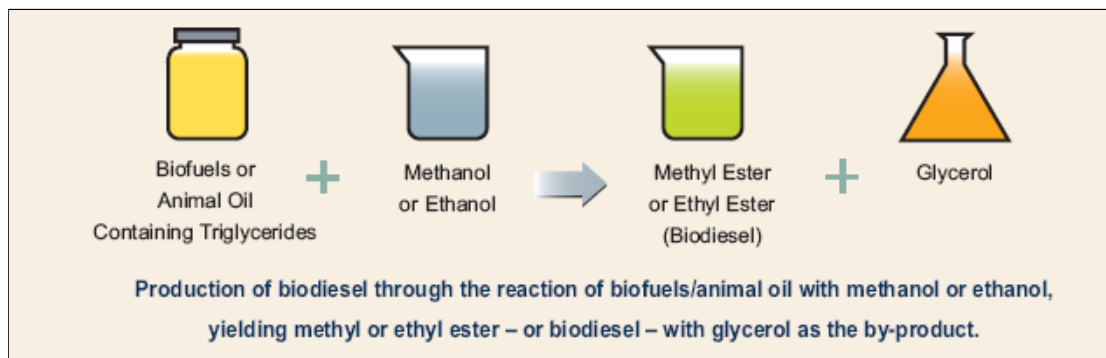
This chapter reviews the literature in three main areas along with a summary: (2.1) fundamental knowledge about biodiesel, (2.2) Concept of Marketing's Tools : 4Ps Marketing Mix , Concept of Total Customer Satisfaction, and Concept of Customer Expectations, and (2.3) Relevant Research.

2.1 FUNDAMENTAL KNOWLEDGE ABOUT BIODIESEL

What is biodiesel?

According to Renewable Energy in Thailand: Ethanol and Biodiesel, The Department of Alternative Energy Development and Efficiency, Ministry of Energy. (2004, p.33, 91-94), **biodiesel is the fuel in the form of esters deriving from the chemical reaction between vegetable oils or animal oils with methanol or ethanol. This chemical reaction is called “transesterification”** as shown in the diagram below.

Figure1. Biodiesel production



From Renewable Energy in Thailand: Ethanol and Biodiesel (p.91) by the Department of Alternative Energy Development and Efficiency, 2004. Bangkok: Plan Printing

According to “Renewable Energy in Thailand: Ethanol and Biodiesel” (Department of Alternative Energy Development and Efficiency, 2004, p.23), biodiesel production process was described as follows:

widely been used, in the U.S.A., soybean oil and used cooking oil, have been produced, while in Malaysia and Singapore, biodiesel feedstock is based on palm oil.

The German and American biodiesel programs have been strongly encouraged by state policies and tax incentives to farmers and biodiesel producers. In the former country, the government coordinated with oil companies and OEMs sought approval for B100 and currently, it is adopted as the EU Standard for car and truck engines without any modifications. Global biodiesel production is now approximately five billion liters per year and will grow to 10 billion liters per year by 2010. In Germany, 1.5 billion liters per year of B100 is sold, in the U.S.A., B20 is widely used with growing demand for 0.9 billion liters per year, whereas other EU countries (Austria, France and UK) are also increasing biodiesel capacity to diversify their energy sources.

Biodiesel Use in Thailand

Piyawan Suksri, Moriizumi, Hondo, and Wake (2008) claimed that biodiesel in Thailand can be divided into two types, **vehicle use, and agricultural machine use**. Vehicle use biodiesel is also separated into two sub-categories, 1) **a mixture of conventional diesel with biodiesel**, and 2) **pure biodiesel (B100)**. A blending ratio of biodiesel blend presently is at two percent and five percent. Thus, they are called B2 and B5, respectively. Pure biodiesel (B100) is also sold in the market, but at very few service stations. In addition, agricultural machine use biodiesel is called **community biodiesel**, since it is basically produced and sold in the community for agricultural machine use only, not for vehicle use.

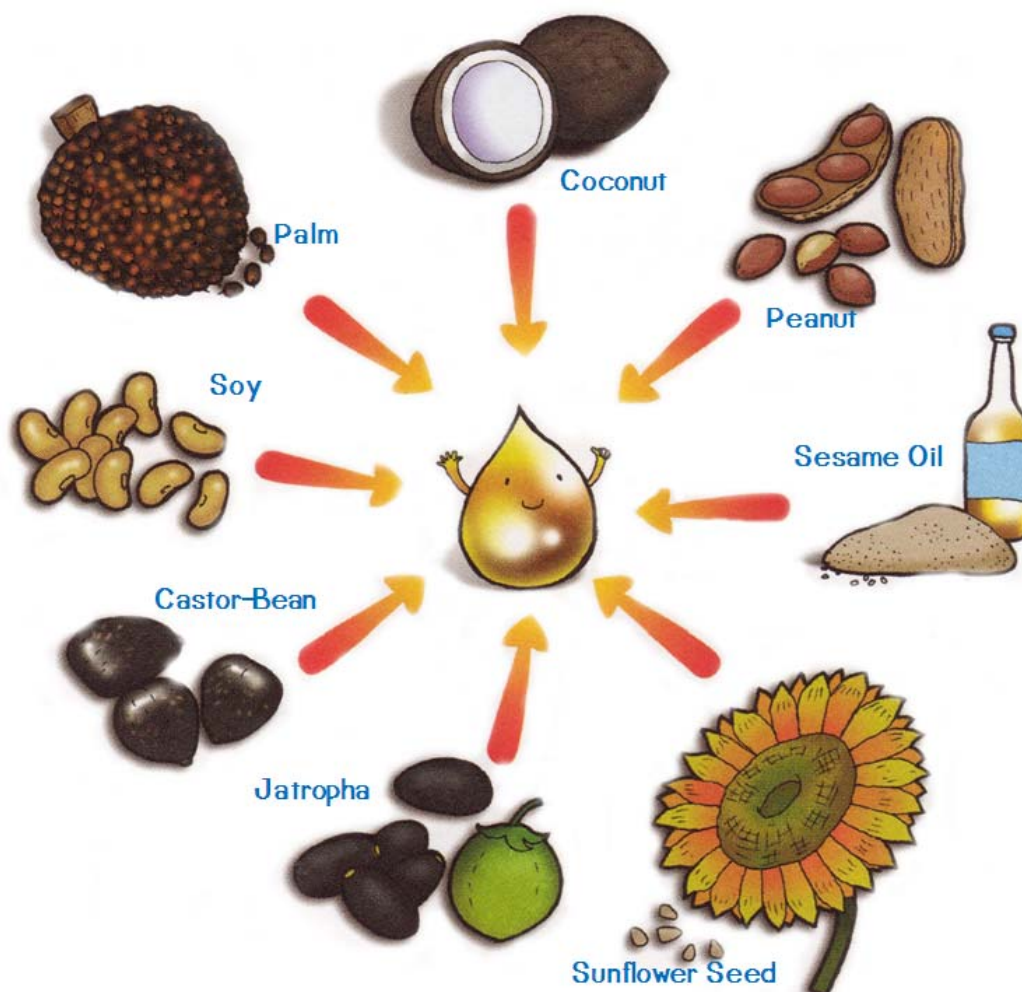
Generally, B100 is 100 percent ‘neat’ biodiesel used to mix with regular diesel for vehicle use, which is derived from palm oil and produced by the biodiesel plants with a proper license. Biodiesel quality must meet the state specifications, the quality that has been proved no adverse effects on vehicle engines. Currently, there are nine biodiesel plants in Bangkok, Ayuthaya, Pathum Thani, Prachinburi, Chachengsao, Samutsakorn, Rayong and Chumporn with a total production capacity of 2,185,800 liters.

Nonetheless, the process of community biodiesel production must meet the specifications separately set for the community biodiesel only, and additionally must be purple, in order to be able to distinguish community biodiesel with other types of diesel.

Biodiesel Feedstock

Piyawan Suksri et al. (2008) stated that feedstock for biodiesel production is animal oils or vegetable oils. Among the six oil crops grown in Thailand, oil palm, coconut, soybean, peanut, sesame and castor as illustrated below. Oil palm had the highest annual yield of 4 million tons, followed by coconut and soybean in 2003. Other crops have far less production. In the global market, Thailand contributed only 3.76 percent of the world's palm oil production in 2006, but ranked as the third largest producer. Malaysia and Indonesia rank as the first and the second producing more than 10 times more palm oil than Thailand, because of their high and regular rainfall all year round.

Figure 3. Biodiesel Feedstock



จาก รู้จักไบโอดีเซลใน 4 ชั่วโมง (พิมพ์ครั้งแรก, น.24) โดย อ้อยใจ ทองเมอ, วิบุรุษ ภูัดวิน และ อุกฤษณ์

สหพัฒน์สมบัติ, 2537. ปทุมธานี: ศูนย์เทคโนโลยีโลหะและวัสดุแห่งชาติ.

The table below displays the summary of Advantages and Disadvantages of Biodiesel when compared to Petro- Diesel:

Advantages and Disadvantages of Biodiesel when compared to Petro Diesel	
Advantages	Disadvantages
• Indigenous and renewable feedstock • Can be used in most diesel engines, especially newer ones • Fewer air pollutants (other than nitrogen oxides) and greenhouse gases • Biodegradable • Non-toxic • Safer to handle	• Use of blends above B5 not yet warranted by OEMs • Lower fuel economy and power (10percent lower for B100, 2percent for B20) • Presently more expensive • More nitrogen oxide emissions • B100 generally not suitable for use in low temperatures • Concerns about B100's impact on engine durability

2.2 THE CONCEPT OF MARKET'S TOOLS: THE MARKETING MIX (4 Ps)

Solomon and Stuart (2000, p. 9) stated that the concept of marketing mix is determined by for the marketers to be the best tool to deliver a good or service for consumers' consideration to make decisions if they will take it.

These marketing's strategic toolboxes or '*marketing mix*', are used together to create customers' desires for buying the good or product. These tools consist of the product itself, the price of the product, the place where it is sold, and the promotion or the activities introduced to consumers. The essence of the marketing mix is commonly recognized as *the Four P's* for Product, Price, Place and Promotion as shown in **Figure 4**.

Figure 4. The Four P's for Product, Price, Place and Promotion



2.2.1 The Definitions of 4 Ps:

Product: refers to a good, service, place, idea, person – whatever is offered to customers for sale in the exchange including good design or packaging, and its features and related services such as free delivery.

Price: refers to the assignment of value or the price that the consumer must pay in exchange for the offered products. To determine the price for something based on what a product actually cost to develop plus a profit is not that simple.

Place: refers to the product availability to the customer at the desired time and location and also known as the *channels of distribution*, which are the companies that work together to get a product from a producer to a customer.

Promotion: refers to the activities that the marketers conduct to inform consumers or organizations about their products, and to encourage potential consumers to buy the products. These strategies can take many forms, including personal selling, TV/radio advertising, store coupons, billboards, magazine ads, and publicity releases.

2.2.2 Total Customer Satisfaction:

Kotler and Keller (2006, p. 136) described that after the purchase, buyer's satisfaction depends on the offer's performance relating to the buyer's expectations. Thus, *satisfaction* refers to an individual's feelings of enjoyment or disappointment resulting from comparing a product's perceived performance or outcome relating to his or her expectations. If the performance is under expectation, the customer is not satisfied. If it matches the expectations, the customer is satisfied. If it is over expectation, the customer is very satisfied or delighted.

The ultimate goal of most customer-oriented companies in creating high customer satisfaction will not be fruitful if the firms encourage customer satisfaction by lowering its prices or increasing its service, resulting in lower profit. The companies would rather be able to focus operating on the principles that try to deliver a high level of customer satisfaction subject to delivering acceptable levels of satisfaction to the other stakeholders, given its total resources

2.2.3 Customer Expectations:

Kotler and Keller (2006, p. 136) indicated how buyers form their expectations. They do it from past buying experience, friends and associates' advice and comments as well as competitors' information and promises. If the expectations are raised too high, the buyers tend to be disappointed; if they are too low, they cannot attract enough customers. Therefore, some of most prominent firms are raising expectations and delivering performances to match.

2.3 RELEVANT RESEARCH

Terachai Wasanasomsagul (ธีระชัย วาสนาสมสกุล, 2545) conducted a research on *The Consumer Attitude Toward Biodiesel in Chiangmai Province*. Two hundred biodiesel users from five biodiesel stations in Chiangmai Province were investigated through a questionnaire. Most of them were males aged between 34-41 years, and having primary education level. They were wage earners with an average income of 3,001-6,000 Baht per month, and lived in Doi Loh Sub-district, Chiangmai Province. Regarding the respondents' knowledge about biodiesel, they knew that biodiesel helped boost the oil crop prices, whereas they did not know about the number of biodiesel service stations nor their locations in Chiangmai. Concerning the Marketing Mix (4Ps), for the product factor, the prime interest was the quality of biodiesel, for the price factor, the respondents focused on biodiesel price, for the place factor, the maintenance service in the biodiesel service stations was focused on, for the promotion factor, the respondents considered other services such as car wash, air or water filling up were the most important issues. For the measurement of users' biodiesel satisfaction, the study identified the stroking of machine, uncompetitive prices, lack of service stations including poor services were the major problems, in terms of product, price, place and promotion, respectively. Above all, in

terms of quality, the respondents revealed that regular diesel had better quality than that of biodiesel and they would no longer use biodiesel.

Weraphat Suriyanontarin (วีรภัทร สุริยานนทจินทร์, 2550) conducted his thesis on *A Study of Behavior and Problems of Users of Biodiesel in Private Pickup Trucks*. The researcher found that most biodiesel users were males, aged between 30-40, with a bachelor's degree as well as earning 10,000-20,000 Baht per month. The major vehicles driven by respondents were quite new Isuzu DMAX pickup trucks with commonrail injection system. The respondents tended to fill their fuel tanks with 400-800 baht worth of biodiesel at PTT service stations. The reason why they preferred biodiesel to diesel was the fact that it was cheaper than regular diesel which provided the incentive to use it further. Regarding the problems in using biodiesel, there were no significant aspects found, if any, there were at a low level.

In summary, this chapter, review of literature, consisting of (2.1) fundamental knowledge about biodiesel, (2.2) Concept of Marketing's Tools: 4Ps Marketing Mix , Concept of Total Customer Satisfaction, and Concept of Customer Expectations, (2.3) Relevant Research, was presented accordingly. In the next chapter, the methodology of the research will be elaborated.