

CHAPTER V

SWOT ANALYSIS

This chapter presents the SWOT Analysis. SWOT Analysis is employed to investigate the different aspects of Thai biodiesel industry in terms of advantages, disadvantages, opportunities, and threats. Moreover with TOWS Matrix, it would reveal the strategic objectives that could be used to determine the potential key success factors essential to the industry.

5.1 SWOT Analysis

To strategically evaluate an industry, another popular tool used is SWOT Analysis, or sometimes refers to as TOWS Analysis. SWOT or TOWS Analysis is an acronym which stands for Strengths, Weaknesses, Opportunities, and Threats. It is a tool used to investigation both the internal and external situations of an industry with a goal to discover both the market opportunities and the emerging threats. For the biodiesel industry, both the internal situations; composing of strengths and weaknesses, and the external situations; including opportunities and threats, would be individually explored.

5.1.1 Strengths of Thai's Biodiesel industry

For biodiesel to be considered as one of Thailand renewable energy solutions, the existence of raw material is fundamental. Being one of the agricultural countries, Thailand is capable to grow many oil-producing crops. Hence with this capability, it becomes one of Thailand's strength in opting biodiesel as one of the nation's renewable energies. From the study (5), it revealed that among ten oil-producing crops; palm, sunflower, coconut, soybean, peanut, castor bean, rapeseed, sesame, and cotton, palm's yield ratio (kilogram per rai) as shown in Figure 4.3 is the best in comparison to the other nine crops.

Not only that Thailand has the ability to grow biodiesel's feedstock (palm trees), but also it is familiar with the palm oil processing technology in converting

palm fresh fruit into crude palm oil (CPO) – a raw material used for biodiesel production. This is another key strength for Thai's Biodiesel industry. With customary to palm oil processing technology; in term of oil extraction and crude palm oil refinery, Thai's biodiesel industry could be advancing more rapidly.

Moreover, for decades, biodiesel has always been His Majesty the King's vision to substitute diesel fuel. With reference to His Majesty the King's birthday speech announcing that, "*palm oil seems to be a viable substitute ... and ... may have seen a royal car that runs on biodiesel, 100 percent of which is produced from palm oil. The exhaust smells good and doesn't cause cancer* (39)," biodiesel quickly gains a public interest. For the Thai people, biodiesel becomes well-received.

Similarly, for the Thai government leaded by Ministry of Energy, it declared instantaneously after HM the King's birthday speech to support biodiesel industry through the tax incentives (39). In spite of that, according to Thailand's Board of Investment (BOI), the incentives offered are beyond the tax relief. The incentives offered could be divided into three categories as shown in Figure 5.1:

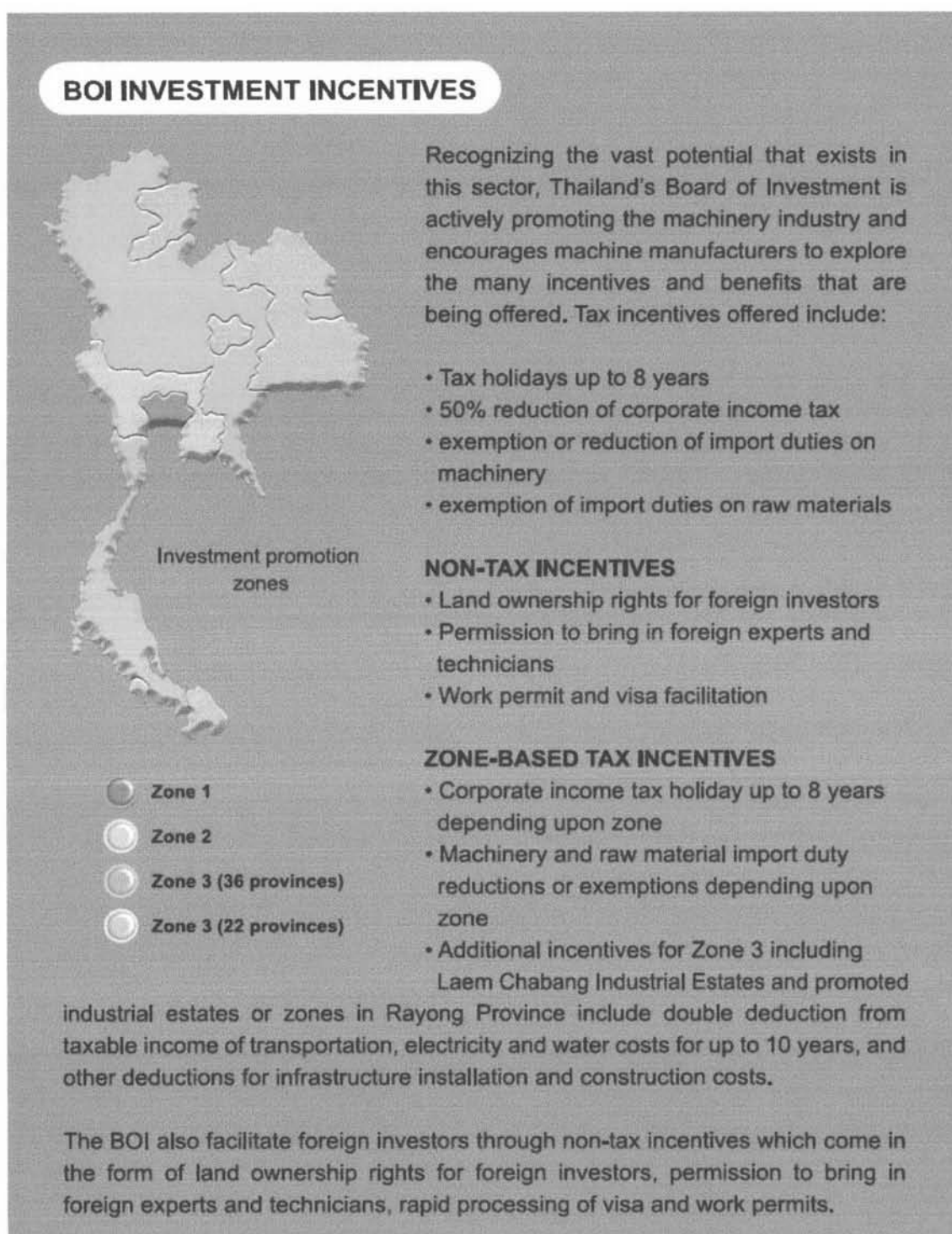


Figure 5.1: BOI incentives for the set-up of any alternative energy production plant

Source: The Board of Investment of Thailand (40)

Additionally, the Thai government led by the Energy Policy and Planning Office; Ministry of Energy, has constructed a biodiesel roadmap as shown in Figure 4.1. According to the roadmap, Thailand has a goal that by 2012 B10 blended fuel would compulsory be distributed throughout Thailand in order to substitute about 8.5 million litres of diesel fuel each day.

5.1.2 Weaknesses of Thai's Biodiesel industry

At this present time, the biodiesel roadmap constructed by the Energy Policy and Planning Office, Ministry of Energy, is perceived to be unrealistic. Despite a government approval of the incentive budget of 1,300 million Baht intended to expand more palm plantation, the government is now confronting with a critical problem of the inability to convince the rubber growers to move into palm trees. With the inapt approach to expand the palm harvest area, the supply of palm fresh fruit becomes insufficient.

As a consequence, this causes many biodiesel investors to hesitate in biodiesel investment. With the shortage of palm fresh fruit, the price of crude palm oil keeps on rising affecting the biodiesel raw material to be unaffordable by the biodiesel producers. Hence, the extracted crude palm oil could be sold solely to food-processing industry; where they could afford higher raw material price in comparison to the biodiesel producers. This holdup the growth of biodiesel industry as biodiesel's raw material is available in an inadequate amount at this moment.

Although some government policies are considering as strengths, yet a few of them are also appeared as the weaknesses. One of the policies that appear to weaken the biodiesel industry is the prohibition of palm oil import. As suggested that Thailand is facing with a shortage of palm oil for biodiesel production due to the inability to expand palm plantation as plan, the prohibition of palm oil import regresses the industry – it puts on hold the investment in biodiesel industry, and as well stop the production of some biodiesel plants due to high production cost out beating the regular diesel's price.

Apart from the insufficient supply of raw material, technology is another questionable issue for Thai's biodiesel industry. With no prior background in biodiesel production technology, Thai biodiesel producers have to import the production technologies that have integrated with the production know-how from abroad. With reference to food processing industry website (41), one of the biodiesel producers (Chumporn Palm Oil Industry Public Company Limited) has spent 496 million Baht purchasing biodiesel production technology from De Smet – the world leader in supplying oils and fats technologies. As a result, to build a biodiesel industry upon the imports of technology, Thailand would be losing many thousands million Baht for the import of technology.

Additionally, without the ability to manufacture the biodiesel technology in-house, the biodiesel producers would also be facing with high factory setting up cost.

Another weakness that Thailand seems to be struggling with is the shortage of biodiesel specialists or skilled personnel. Since biodiesel industry is a new industry in Thailand, the number of specialists or skilled personnel available might not be adequate to supply to this growing industry. As a result, many foreign experts and technicians have been brought in to help setting up the biodiesel factories – causing Thailand to lose substantial amount of money for the provided expertise, as well as increases the factory set-up cost.

5.1.3 Opportunities of Thai's Biodiesel industry

For the last decade, Thai's diesel consumption has increased rapidly. From the prediction of Department of Energy Business, Thailand would be consuming diesel fuel at the rate of 85 million liters per day in 2012 (5) as shown in Figure 5.2; the diesel consumption rate would increase by at least 30%. With the continual increase of diesel fuel consumption, this would open up the opportunity for biodiesel market appreciably.

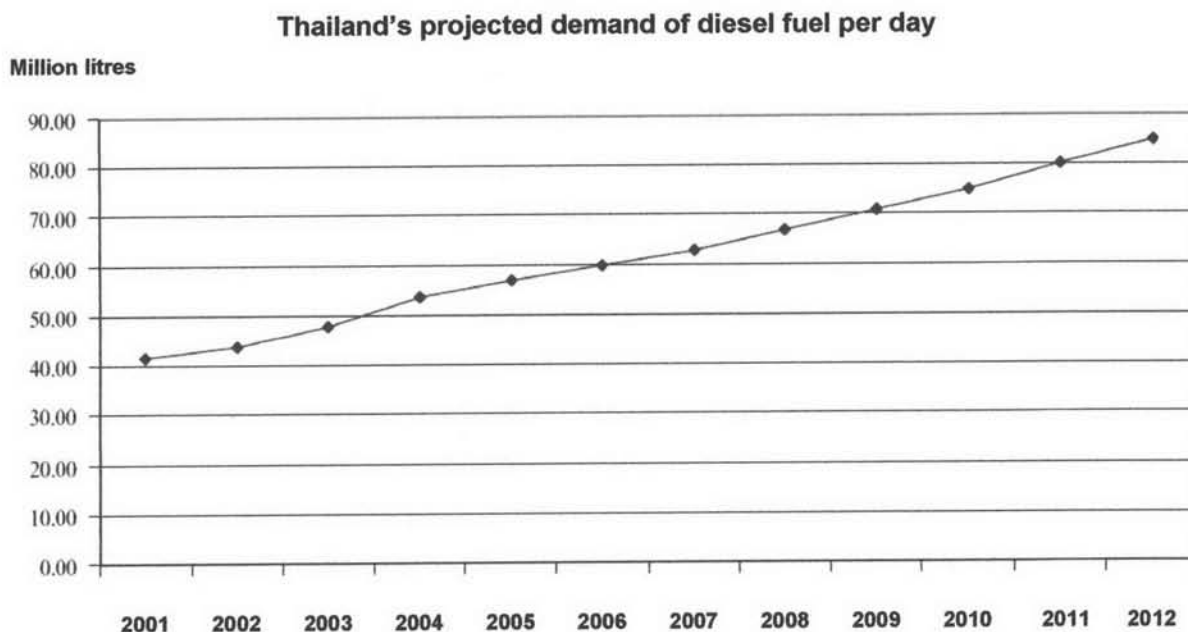


Figure 5.2: Thailand's projected demand of diesel fuel per day

Source: TMB Bank Public Company Limited (5)

Furthermore, according to World Report International Ltd. (42), Thailand is moving towards cleaner and greener fuel; Natural Gas, Biofuels, and Wind power. This means Thailand would be paying more attention towards biodiesel – as one of the clean and green fuels.

Consequently, if biodiesel production goes well in Thailand, perhaps in the near future the country would not only be reducing the oil import and creating the energy stability in-house, but also it could possibly export the produced biodiesel to the neighboring countries; like Myanmar or Laos, or even to Europe. This would generate substantial income for Thailand.

5.1.4 Threats of Thai's Biodiesel industry

As mentioned earlier in the emerging technology, Natural Gas Vehicles (NGV) is catching up with biodiesel. According to World Report International Ltd. (42), Petroleum Authority of Thailand (PTT) Public Company Limited has stated that

one of fastest growing industries in Thailand is the NGV. At the present, Bangkok has approximately 25,000 NGV-fuelled vehicles. In four years' time, the Thai government expects that the NGV-fuelled vehicles would increase up to 500,000 vehicles. In addition, Petroleum Authority of Thailand (PTT) Public Company Limited also plans to expand NGV-filling stations up from 90 stations (at the present) to 740 stations in 2010. Hence, in a few years' time, the NGV technology might become a threat to the biodiesel business.

Another threat of biodiesel industry that might occur is the emerged of a better cash crop. If someday there exists a new cash crop that provides much better incentives than what palm could provide, then the palm growers might move out of palm trees and move into the new cash crop for a better return. Accordingly, this would drastically affect the biodiesel industry.

Furthermore, as identified in Business Sentiment Index of May 2007 assessment by Bank of Thailand (43), ranking secondly for the constraints in doing business in Thailand, is the uncertainty about the economic condition; as shown on Figure 5.3. With the uncertainty in Thai's economic condition, the investment confidence in biodiesel industry is reduced.

Constraints in doing business (% of Correspondents)			
	Mar 07	Apr 07	May 07
1. Difficulty in price adjustment	56.0	58.0	56.0
2. Uncertainty about economic condition	50.8	50.9	51.2
3. High cost of production	46.9	48.3	50.3
4. High competition from domestic market	45.6	46.3	45.2
5. Low demand from domestic market	36.0	36.5	38.2
6. High competition from foreign market	25.2	26.7	25.7
7. Low demand from foreign market	17.5	18.3	18.7
8. Lack of skill labors	17.1	18.5	18.1
9. Lack of raw materials	13.3	13.3	16.0
10. Lack of information for business planning	11.5	12.6	12.2
11. Financial problem	10.2	12.2	11.5
12. No constraint	12.7	12.0	13.3
13. Others	9.8	10.9	10.4

Source : BOT Survey

Figure 5.3: Business Sentiment Index May 2007 assessment by BOT

Source: Bank of Thailand (43)

Ultimately, it is undeniable that politics does play an important role in every industry. With a political instability situation, it appears as one of the biodiesel industry's threats. With the change of governmental administration, this could possibly affect the policies laid by the former Minister. In that case, the confidence of the investors to further invest in biodiesel industry might be affected. Even, it could possibly stop the production in the worst scenario.

5.1.5 Summary of SWOT Analysis

From the SWOT Analysis, there are altogether 19 identified points as strengths, weaknesses, opportunities, and threats of the Thai's biodiesel industry. Among these nineteen identified points, five points are identified as key strengths; seven points are identified as the weaknesses; three points are identified as the opportunities, and four points are concluded as the threats. For the strengths of Thai's biodiesel industry, it could be summed up into five important aspects of; the existence of raw material locally, the familiarity with the palm oil processing technology, the well-received of biodiesel by the Thai public, the tax incentives granted from the Thai government, and mandatory use of B10 fuel by 2012. The weaknesses, in turn, could

be summarized into seven key attributes composing of the inability to convince the rubber growers to move into palm trees, the insufficient supply of biodiesel's raw material, the high raw material price, the regress of biodiesel industry due to the prohibition of palm oil import, the imported technology for biodiesel production, the high set-up cost, and the shortage of biodiesel specialist and skilled personnel. For the opportunities, it could be encapsulated into 3 key points of the continual increased of diesel fuel consumption, the movement of Thailand towards cleaner and greener fuels and the potentiality to export the produced biodiesel to generate income. Finally, there are in sum four identified threats composing of the catching up of emerging technology like Natural Gas Vehicles (NGV), the emerged of a better cash crop, the unstable economic condition, and last of all, the political situation.

From the information above, it could be composed into a matrix for easy reference as shown in Table 5.1:

Table 5.1: SWOT Analysis summary of Thai's biodiesel industry

<p style="text-align: center;">STRENGTHS</p>	<p style="text-align: center;">OPPORTUNITIES</p>
<p style="text-align: center;">WEAKNESSES</p> <p>W1 – the inability to convince the rubber growers to move into palm trees</p> <p>W2 – the insufficient supply of biodiesel's raw material</p> <p>W3 – high raw material (CPO) price</p> <p>W4 – the regress of biodiesel industry due to the prohibition of palm oil import</p> <p>W5 – imported technology</p> <p>W6 – high set-up investment</p> <p>W7 – shortage of biodiesel specialists or skilled personnel</p>	<p style="text-align: center;">THREATS</p> <p>T1 – the catching up of emerging technology like Natural Gas Vehicles (NGV)</p> <p>T2 – the emerged of a better cash crop</p> <p>T3 – uncertainty about Thai economic condition</p> <p>T4 – an instable political situation</p>

5.2 TOWS Matrix

After the SWOT Analysis has been conducted, the next step is to construct the TOWS Matrix to identify the strategic objectives prior to the determination of the Thai's biodiesel industry key success factors. It is done by identifying the strategic solutions to the four environmental audits of the Weaknesses-Threats (mini-mini), the Weaknesses-Opportunities (mini-maxi), the Strengths-Threats (maxi-mini), and the Strengths- Opportunities (maxi-maxi), of the Thai biodiesel industry.

From the analysis, the result turns out that there are altogether 9 identified strategic solutions from the four environmental audits of the Weaknesses-Threats, the Weaknesses-Opportunities, the Strengths-Threats, and the Strengths-Opportunities; as shown in Figure 5.4.

Table 5.2: Application of the TOWS Matrix to Thai biodiesel industry

	Strengths	Weaknesses
Opportunities	<p>SO:</p> <ul style="list-style-type: none"> - Increase biodiesel production factories to support the growing industry (S4 S5 O1 O2) - Use 'palm oil' as raw material source for biodiesel production (S1 S2 O2 O3) 	<p>WO:</p> <ul style="list-style-type: none"> - Increase palm cultivation area (W2 W3 W4 O2) - Develop technology locally (W5 W6 O1 O3) - Produce more biodiesel specialists (W7 O1 O3)
Threats	<p>ST:</p> <ul style="list-style-type: none"> - Legislate biodiesel incorporation to diesel fuel (S5 T4) - Improve palm processing technology (S1 S2 T2) 	<p>WT:</p> <ul style="list-style-type: none"> - Support R&D of biodiesel production process to increase yield and decrease set-up cost (W5 W6 T3) - Guarantee purchasing price of palm fruits (W1 W2 T3)

The TOWS Matrix reveals in total nine strategic objectives of the Thai's biodiesel industry. These nine identified strategic objectives would be examined individually to uncover the factors that are important in attaining each of the identified strategic objectives, or sometimes refers to as the key success factors in achieving the strategic objective. Table 5.2 below would illustrate the nine strategic objectives and their key success factors in achieving them.

Table 5.3: Nine strategic objectives and their key success factors in achieving them

Strategic objectives	Key Success Factor to achieve the objective
1. Increase biodiesel production factories to support the growing industry	Raw material upsurge & Technology development
2. Use 'palm oil' as raw material source for biodiesel production	Raw material upsurge
3. Increase palm cultivation area	Government policy
4. Develop technology locally	Technology development
5. Produce more biodiesel specialists	Human resource development
6. Legislate biodiesel incorporation to diesel fuel	Government policy
7. Improve palm processing technology	Production process development & Technology development
8. Support R&D of biodiesel production process to increase yield and decrease set-up cost	Production process development
9. Guarantee purchasing price of palm fruits	Government policy

5.3 Potential Thai's biodiesel industry critical success factors

Of the identified nine strategic solutions showing in Table 5.2, it uncovers five potential key success factors of the Thai's biodiesel industry. These five potential key success factors of Thai's biodiesel industry include:

- Government policy

Of the nine strategic objectives, government policy is the most identified factors in attaining three out of the nine strategic objectives. Primarily for the industry to get hold of sufficient raw material (palm oil), one of the ways is to expand the palm cultivation area. This could be achieved by imposing the government policy to guarantee the price of raw material price; like what the government does for the rubber plants. With such policy, it is believed that many cultivators would be interested in growing more palm trees and expanding the palm cultivating area. As well, the guaranteed price of palm fruits has also been identified as one of the strategic objectives that require the government policy to support in order to be fulfilled. Moreover, considering the Thai political situation, the stability of Thai politics is relatively low. With the change of one government administration to another often means the change in the policies lay down, hence biodiesel is at risk of being neglected. As a result, Thai government should legislate the use of B5 or B10 fuel to increase the solidity of the policy issued.

- Technology development

Another potential key success factor of the Thai's biodiesel industry is the technology. Technology affects the Thai biodiesel industry notably in many areas. From the nine strategic objectives revealed by TOWS Matrix, technology has an impact on three of them in term of increase biodiesel production factories, develop local technology, and improve of palm processing technology. This basically means that with biodiesel technology is being manufactured locally and could achieve satisfying efficiency, the number of biodiesel production plants would increase

consequently. Hence, technology development and improvement would help the Thai's biodiesel industry to strengthen appreciably as more and more biodiesel factories are setting up to support the growing of demand of this alternative energy.

- Raw material upsurge

Besides the government policy and the technology, raw material is another potential key success factor of Thai's biodiesel industry. Of the nine strategic objectives, raw material is an important factor to the two strategic objectives of increase biodiesel production factories and use 'palm oil' as raw material source for biodiesel production. As biodiesel has been chosen as one of the Thai's alternative energies for having the local produce, raw material (palm oil) becomes the backbone of the Thai's biodiesel industry. Especially when the demand of biodiesel is high and the number of biodiesel production factories is escalating, raw material becomes vital. Hence, to support the Thai's biodiesel industry particularly in term of capacities expansion, raw material is one of the crucial factors that could not be disregarded.

- Production process development

In order to maximize yield and minimize set-up cost, both the biodiesel production process and palm oil extraction process must be improved and further research and develop. At the moment, Thailand is depending on the production know-how of the imported technology; which costs expensively. As a result, it raises both the set-up cost and the production cost of biodiesel. Therefore, to reduce the risk of financial failure of the newly set-up biodiesel factory, the improved of biodiesel and palm oil production process must be carried out; such as from using single-stage biodiesel production process to double-stage biodiesel production process. Thus, it appears that production process development is another key success factor for the Thai's biodiesel industry.

- Human resource development

Lastly, another potential key success factor identified in supporting the Thai's biodiesel industry is the human resource development. From nine strategic objectives, it reveals that the creation and the build-up of biodiesel specialists is one of the strategies identified for the Thai's biodiesel industry. Despite the climbing demand of biodiesel fuel and the growing numbers of the biodiesel production factories, biodiesel specialists and skilled personnel tend to be a lack of. To support this growing industry and reduce the current biodiesel human resource shortage situation, both the public and private sectors must be collaborated side by side.