

8. IMR REPORT



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Date: 21 March 2024

The Board of Directors
ELRIDGE ENERGY HOLDINGS BERHAD
61-2, Jalan Radin Tengah,
Bandar Baru Sri Petaling,
57000 Kuala Lumpur,
Malaysia.

Dear Sirs/Madam,

Independent Market Research (“IMR”) Report on the Biomass Fuel Industry in Asia Pacific in conjunction with the Proposed Listing of ELRIDGE ENERGY HOLDINGS BERHAD on the ACE Market of Bursa Malaysia Securities Berhad

PROVIDENCE STRATEGIC PARTNERS SDN BHD (“**PROVIDENCE**”) has prepared this IMR report on the Biomass Fuel Industry in Asia Pacific for inclusion in the Prospectus of ELRIDGE ENERGY HOLDINGS BERHAD.

PROVIDENCE has taken prudent measures to ensure reporting accuracy and completeness by adopting an independent and objective view of these industries within the confines of secondary statistics, primary research and evolving industry dynamics.

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For and on behalf of PROVIDENCE:

A handwritten signature in black ink, appearing to read 'Melissa Lim', with a long horizontal flourish extending to the right.

MELISSA LIM
EXECUTIVE DIRECTOR

About PROVIDENCE STRATEGIC PARTNERS SDN BHD:

PROVIDENCE is an independent research and consulting firm based in Petaling Jaya, Selangor, Malaysia. Since our inception in 2017, PROVIDENCE has been involved in the preparation of independent market research reports for capital market exercises. Our reports aim to provide an independent assessment of industry dynamics, encompassing aspects such as industry performance, demand and supply conditions and competitive landscape.

About MELISSA LIM:

Melissa Lim is the Executive Director of PROVIDENCE. She has more than 10 years of experience in market research for capital market exercises. Melissa Lim holds a Bachelor of Commerce (Double major in Marketing and Management) from Murdoch University, Australia.

8. IMR REPORT (cont'd)

Elridge Energy Holdings Berhad and its subsidiary (collectively referred to as “**EEHB Group**” or “**the Group**”) are principally involved in the manufacturing and trading of biomass fuel products, particularly palm kernel shells and wood pellets. In FYE 2023, approximately 95.0% of the Group’s revenue was derived from customers based in international countries (with key markets being Indonesia, Singapore and Japan). Its customers comprise biomass fuel trading companies and end-users such as manufacturers and biomass power plant operators. Customers who are biomass fuel trading companies may either sell biomass fuel products to the countries they are based in or export these products to other international countries.

As such, this IMR report will focus on the biomass fuel industry in Asia Pacific, with specific focus on palm kernel shells and wood pellets as these are the biomass fuel products the Group manufactures and trades. It will also assess key growth drivers from the end-user industries in countries where the Group’s customers are based in, i.e. Indonesia, Singapore and Japan, as well as in Malaysia.

1 THE BIOMASS FUEL INDUSTRY IN ASIA PACIFIC

DEFINITION AND SEGMENTATION

Biomass fuel refers to solid, liquid or gaseous energy sources derived from organic materials, that are burned or combusted to generate heat or electricity. These products are generally environmentally friendly as they are derived from by-products or wastes, thus promoting waste reduction. Further, they are also derived from renewable sources such as plants or organic waste which are infinite and have a lower likelihood of depleting.

Examples of biomass fuel products include:

- (i) **Palm kernel shells** – products derived from unprocessed palm kernel shells, which are shell fractions left after oil is extracted from palm kernels and is a by-product of palm oil milling;
- (ii) **Wood pellets** – products produced from wood residue from logging activities or by-products of wood processing such as sawdust, wood chips and offcuts. Such products may be in uniformly sized pellets or chip form;
- (iii) **Agriculture residue** – products produced from agriculture wastes such as rice husks, wheat husks, corn husks and empty palm fruit bunches;
- (iv) **Energy crops** – products produced from crops that are grown for the production of biomass fuel such as bamboo, corn and sugarcane; and
- (v) **Municipal waste** – produced from waste disposed at municipal waste disposal site such as paper, garden trimmings and food waste.

EEHB Group is principally involved in the manufacturing and trading of biomass fuel products, particularly palm kernel shells and wood pellets. As such, this will be the area of focus in this IMR report.

Palm kernel shells have traditionally been used as biomass fuel in palm oil mills in Southeast Asia. Increasingly, palm kernel shells are being used as biomass fuel in the power generation and manufacturing industries as it is a sustainable source of fuel with lower carbon emissions. As compared to other plant-based biomass fuels, palm kernel shells also have the following key advantages:

- Availability of unprocessed palm kernel shells as oil palm trees are widely planted in Southeast Asia, particularly in Malaysia and Indonesia;
- Contains residual palm oil resulting in relatively higher heating value compared to other plant-based biomass fuel;
- Unprocessed palm kernel shells are uniformly sized, easy to handle and transport.

Meanwhile, wood pellets are the most commonly used biomass fuel in Asia Pacific as it has traditionally been used as an alternative to fossil fuels such as coal to generate power. Although wood pellets are widely available, there are growing concerns on its sustainability as it may result in deforestation activities. Thus, end-user industries are beginning to source for wood pellets that are certified to verify that the raw materials are sourced from sustainably managed forests, and such certifications include the Programme for the Endorsement of Forest Certification (“**PEFC**”) and Green Label certifications.

The biomass fuel industry value chain begins with the procurement of raw materials from suppliers. For palm kernel shells, this involves procuring unprocessed palm kernel shells from suppliers which include oil palm plantation and milling companies, palm fruits transporters and traders. For wood pellets, this involves procuring wood residue from suppliers which include logging transporters, saw mills and traders. After the raw materials are transported, the manufacturing processes are carried out by biomass fuel manufacturers or contract manufacturers. These manufacturing processes include screening, drying, and

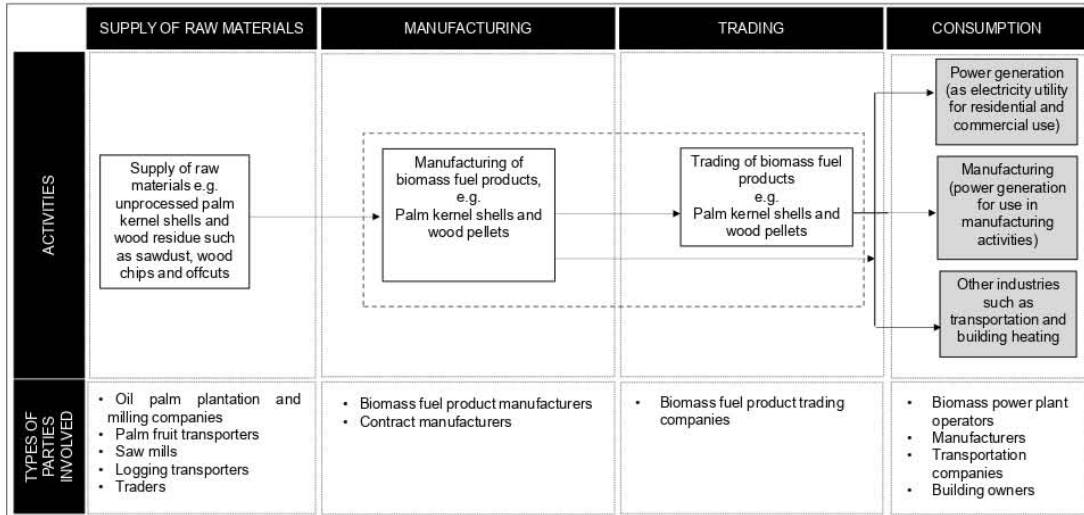
8. IMR REPORT (cont'd)



magnetic, stone and dust removal for palm kernel shells; or chipping, screening, drying, sizing and pelleting for wood pellets.

The finished products may either be sold to biomass fuel product trading companies for onward sale to end-customers, or sold directly to end-customers.

The biomass fuel industry value chain for palm kernel shells and wood pellets is as illustrated below:



Note:

(i) Denotes the segment that EEHB Group is principally involved in

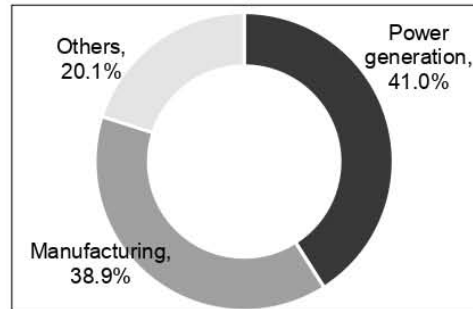
Source: PROVIDENCE

Biomass fuel products are generally used in the following end-user industries:

- Power generation – where biomass power plant operators generate electricity for residential, commercial and industrial usage;
- Manufacturing – where manufacturers generate power for their own usage in their operations; and
- Other industries such as transportation and building heating.

The largest end-user industries for biomass fuel products in Asia Pacific are the power generation and manufacturing industries. In 2023, the power generation industry in Asia Pacific was the largest end-user industry for biomass fuel products, consuming 41.0% of biomass fuel products sold in the region. This was closely followed by the manufacturing industry which consumed 38.9% of the biomass fuel products sold in the region. Other end-user industries collectively consumed the remaining 20.1% of biomass fuel sold in Asia Pacific in the same year.

Biomass fuel consumption by end-user industry in 2023



Notes:

(i) Others includes transportation and building heating

(ii) Latest publicly available information is as at 2022

Source: Coherent Market Insights

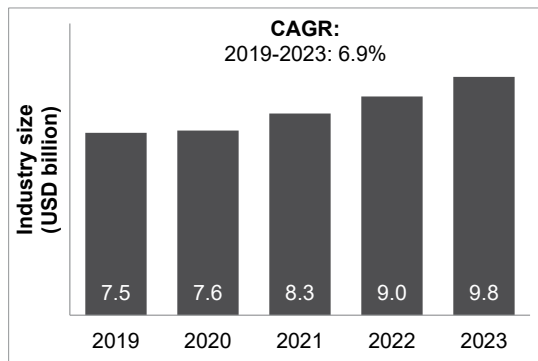
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PROVIDENCE
INDUSTRY PERFORMANCE, SIZE AND GROWTH

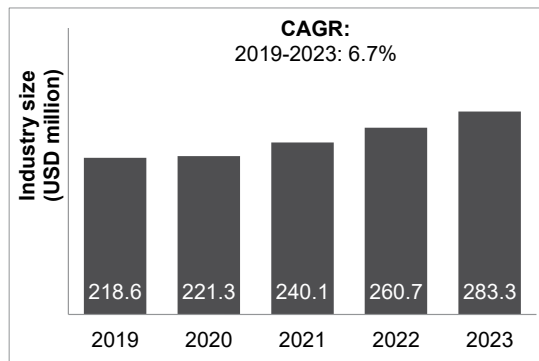
The industry size for palm kernel shells in Asia Pacific, in terms of sales of palm kernel shells in the region, grew from USD218.6 million (RM905.6 million¹) in 2019 to USD283.3 million (RM1.3 billion¹) in 2023 at a compound annual growth rate (“CAGR”) of 6.7%. Meanwhile, the wood pellet industry size in Asia Pacific, in terms of sales of wood pellets, grew from USD7.5 billion (RM31.1 billion¹) in 2019 to USD9.8 billion (RM44.7 billion¹) in 2023 at a CAGR of 6.9%.

Moving forward, the palm kernel shells industry size in Asia Pacific is forecast to grow at a CAGR of 8.9% from an estimated USD308.6 million (RM1.4 billion¹) in 2024 to USD366.1 million (RM1.7 billion¹) in 2026, while the industry size for wood pellets in Asia Pacific is forecast to grow by a further CAGR of 8.6%, from USD10.6 billion (RM48.4 billion¹) in 2024 to USD12.5 billion (RM57.1 billion¹) in 2026.

Wood pellet industry size in Asia Pacific



Palm kernel shell industry size in Asia Pacific



Source: Coherent Market Insights

KEY GROWTH DRIVERS

As EEHB Group is based in Malaysia, this section will assess the key growth driver from the angle of an industry player based in Malaysia. These key growth drivers include:

Growing exports to international markets

Malaysia’s export value of palm kernel shells has been growing from RM277.0 million in 2019 to RM760.0 million in 2023.² Meanwhile, export volume of palm kernel shells has grown from 975,464 metric tonne (“MT”) and 1.5 million MT during the same time period.²

The export value of wood pellets from Malaysia to international markets has also been growing from RM313.3 million in 2019 to RM554.9 million in 2023, in line with a growth in export volume of wood pellets from Malaysia from 614,558 MT in 2019 to 860,283 MT in 2023.³

Japan has been a major market for palm kernel shells exported from Malaysia.² In 2023, Japan imported 1.4 million MT of palm kernel shells from Malaysia, which was valued at RM717.7 million.² This translated to 93.3% and 94.4% of the total export volume and value of palm kernel shells from Malaysia.²

Meanwhile, the top export destinations for wood pellets from Malaysia in 2023 were Netherlands, Japan and South Korea.³ In 2023, Malaysia exported 317,131 MT or RM201.8 million to Netherlands; 258,172 MT or RM171.2 million to Japan; and 219,466 MT or RM131.4 million to South Korea.³

¹ Exchange rates from USD to RM were converted based on average annual exchange rates extracted from published information from Bank Negara Malaysia at:

2019: USD1 = RM4.1427

2022: USD1 = RM4.4005

2023: USD1 = RM4.5653

Exchange rate from USD and RM for 2024 and 2026 were converted based on average annual exchange rate extracted from published information from Bank Negara Malaysia for 2023 at USD1 = RM4.5653

² Source: Malaysian Palm Oil Board (“MPOB”)

³ Source: United Nations Comtrade

8. IMR REPORT (cont'd)



The growth in demand for palm kernel shells and wood pellets is driven by the growth of the end-user industries (i.e. power generation and manufacturing industries). The growth of the end-user industries in selected countries⁴ are as detailed below:

- **Japan**

Japan has consistently been a major export market for palm kernel shells from Malaysia, as depicted from the increasing exports from Malaysia to Japan since 2012 after biomass power generation became eligible for Japan's feed-in-tariff ("FIT") programme. This resulted in an increase in consumption of biomass fuel products from the power generation and manufacturing industries, as seen below:

Consumption of palm kernel shells and wood pellets by power plants and industrial heat boilers in manufacturing plants in Japan

Biomass fuel product	Consumption volume ('000 bone-dry tonne)				CAGR (2019-2022)
	2019	2020	2021	2022	
Imported palm kernel shells	2,011	2,785	3,560	4,142	27.2%
Wood pellets	11,098	12,452	13,706	14,776	10.0%

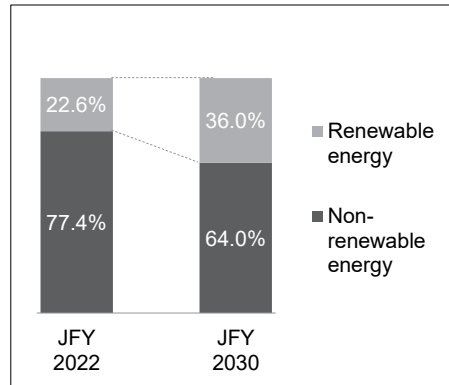
Notes:

- (i) Bone-dry tonne is a unit of weight that is equivalent to 2,000 pounds at 0% moisture content
- (ii) Latest publicly available information is as at 2022

Source: United States Department of Agriculture (Japan Biomass Annual 2023)

The demand for biomass fuel products, including palm kernel shells and wood pellets from Japan is expected to continue to grow in light of the Government of Japan placing priority on renewable energy as a major power source. The Sixth Strategic Energy Plan was released by the Ministry of Economy, Trade and Industry Japan in 2021 with the aim of achieving carbon neutrality by 2050. In 2022, Japan derived 22.6% of electricity generation from renewable energy, and the Government of Japan targets to increase the percentage contribution of renewable energy to its total electricity generation to approximately 36.0% by 2030. Biomass accounted for 33 terrawatt hours ("TWh") or 15.7% of the total renewable share in 2021, and the Government of Japan targets to increase electricity generation from biomass to 13.6% or 47 TWh of total electricity generation by 2030.⁵

Historical and target electricity consumption by source in Japan



Notes:

- (i) Latest publicly available information is as at 2022
- (ii) JFY begins on 1 April and ends on 31 March

Source: The International Energy Agency, the United States Department of Agriculture (Japan Biomass Annual 2023)

In March 2020, the Organization for Cross-regional Coordination of Transmission Operators, Japan (OCCTO) announced the Aggregation of Electricity Supply Plans for Japanese fiscal year ("JFY")⁶ 2022, which illustrated the plans to progressively set up 37 biomass plants with a total capacity of 1,583 megawatt by 2031.⁷ As at December 2022, the Ministry of Economy, Trade and Industry Japan had approved 900 biomass power plants with a total 8.3 gigawatt ("GW") in capacity for FiT.⁵ A total of 586 biomass plants with a total capacity of 4.1 GW were in operation in the year, indicating that potential new biomass power plants that will be set up and in operation in the following years.⁵

In addition, Japan's Green Transformation Basic Policy targets to establish success cases of ammonia or hydrogen co-firing coal plants by 2024. As at the end of 2023, there were 31 co-firing coal plants with biomass fuel.⁸

⁴ Selected countries are based on the major countries EEHB Group sells its products to and intends to deliver its products to
⁵ Source: The United States Department of Agriculture (Japan Biomass Annual 2023). Latest publicly available information is as at 2021

⁶ JFY begins on 1 April and ends on 31 March

⁷ Source: Japan Electric Power Information Centre, Inc

⁸ Source: The Ministry of Economy, Trade and Industry, Japan

8. IMR REPORT (cont'd)

The potential new biomass power plants as well as the Government of Japan's target for renewable energy consumption is expected to increase the demand for palm kernel shells and wood pellets in Japan.

In addition, under the FiT programme, the Ministry of Economy, Trade and Industry Japan plans to enforce the use of palm kernel shells that has been certified by the Roundtable on Sustainable Biomaterials, Green Gold Label and International Sustainability, Carbon Certification (ISCC) or Malaysian Sustainable Palm Oil programs beginning April 2024. This is expected to benefit industry players that have obtained the abovementioned certifications for their palm kernel shells.

Meanwhile, the demand for palm kernel shells and wood pellets is also expected to be driven by the manufacturing industry in Japan, which has maintained an industry size of USD962.8 billion (RM4.0 trillion¹) in 2019 and USD987.2 billion (RM4.3 trillion¹) in 2022.⁹ Moving forward, the demand for biomass fuel products, including palm kernel shells and wood pellets, is expected to be driven by the Emission Reduction Programme which requires regulated manufacturing facilities to submit reports on energy conservation plans and practices to reduce greenhouse gas emissions or improve energy efficiency, as well as the resulting impact on greenhouse gas emissions. Besides this, prefectural governments may also offer rewards, which are typically non-monetary, to promote energy efficiency. Further, Japan's Green Transformation Basic Policy aims to drive economic growth and development through emissions mitigation, which will be achieved through raising JPY150 trillion (RM4.9 trillion¹⁰) of private-public investment over 10 years. One of the areas of focus of this initiative is the decarbonisation of manufacturing processes and installation of industrial heat pumps and co-firing power plants.

- **Indonesia**

In Indonesia, there is growing demand for electricity due to its large population of 275.8 million in 2022.¹¹ Indonesia's current renewable energy share as at 2022 was estimated at 19.0%¹², with the aim to increase its renewable energy share to 31.0% by 2050.¹³ In order to achieve this without having to make huge modifications to existing power generation facilities, the Government of Indonesia has initiated co-firing using biomass fuel in existing coal power plants. This is currently performed in the 114 coal-fired power plants owned and operated by the state-owned entity Perusahaan Listrik Negara, with plans to expand to plants owned and operated by independent power producers. As Indonesia is the world's largest producer of palm oil, the oil palm industry is able to provide a reliable supply of biomass fuel products such as palm kernel shells and wood pellets, which would support the growing demand for electricity in the country.

Although Indonesia is the world's largest producer of palm oil, its exports to international markets is expected to be impaired by export duties and levies imposed by the Government of Indonesia on exported palm oil and related products, including palm kernel shells. The following table denotes the average export duties and levies imposed on exported palm kernel shells from Indonesia:

Average export duties and levies for palm kernel shells exported from Indonesia

	Average export duty / levy for palm kernel shells (USD per MT)			
	2021	2022	2023	Jan – Mar 2024
Export duty	23.83	10.72	5.54	4.67
Export levy	5.00	2.04	3.00	3.00

Source: Katadataku.com

The export duties and levies are imposed to raise revenue from exports of palm oil and related products from the country in order to fund subsidies to encourage usage of biodiesel in Indonesia and develop the palm oil industry in Indonesia in terms of replanting, research and development and human resources. The export duties and levies imposed would increase prices of palm kernel shells exported from Indonesia, which is expected to adversely impact the competitiveness of palm kernel shells exported from Indonesia. This would thus benefit biomass fuel products exported from other countries such as Malaysia.

⁹ Source: World Bank

¹⁰ Exchange rates from JPY to RM were converted based on average annual exchange rates in 2023 extracted from published information from Bank Negara Malaysia at JPY100 = RM3.2486

¹¹ Source: BPS-Statistics Indonesia. Latest publicly available information is as at 2022

¹² Source: International Energy Agency

¹³ Source: Kementerian Energi dan Sumber Daya Mineral Republik Indonesia

8. IMR REPORT (cont'd)

- **Singapore**

In 2022, total generation capacity of power plants using renewable sources accounted for approximately 17.0% of the country's total generation capacity.¹⁴ The majority of the total generation capacity in Singapore comprised combined cycle gas turbine power plants, i.e. at 82.2% of total generation capacity.¹⁵ On 25 October 2021 the Energy Market Authority (EMA) announced plans to import up to 4GW of low-carbon electricity imports into Singapore (which accounts for 30.0% of Singapore's electricity supply) by 2035, in order to reduce its carbon footprint from power generation.

Apart from the above, Singapore is also a leading trading hub in Southeast Asia with the highest trade transactions recorded in 2022 amongst Southeast Asia countries.¹⁵ Thus, demand for biomass fuel products from customers based in Singapore is also expected to be driven by biomass fuel product trading companies who source palm kernel shells and wood pellets from other countries for export to other international countries.

Growing demand for biomass fuel products from end-user industries in Malaysia

Malaysia has been progressively seeking renewable energy alternatives. Under the Twelfth Malaysia Plan, the Government of Malaysia targets to increase the nation's total installed capacity of renewable energy to 31.0% by 2025, as a commitment to reduce greenhouse gas emissions by up to 45.0% by 2030. In 2022, the installed capacity of renewable energy was 24.5% of the nation's total installed capacity.¹⁶

The Malaysia Renewable Energy Roadmap aims to support Malaysia's commitment to achieving 31.0% renewable energy share in the national capacity mix by 2025 through various strategies including supporting the rollout of biomass, biogas and waste-to-energy capacity, as well as exploring potential opportunities in bio-compressed natural gas and biomass co-firing.

In December 2023, the National Biomass Action Plan 2023-2030 announced initiatives including co-firing power generation plants to combust a combination of coal and biomass fuel products. In addition, biomass hubs will be established in 20 locations nationwide to increase efficiency of the national biomass supply chain. Through the National Energy Transition Roadmap, the Government of Malaysia also intends to develop biomass clusters with a centralised plant with easy access to multiple neighbouring mills to improve economies of scale and have reliable access to larger quantities of biomass fuel products. In addition, a biomass co-firing initiative at the existing Tanjung Bin Power Plant, Johor will start to burn biomass alongside with coal, wherein the pilot project is expected to commence in 2024 and the plant is scheduled to reach a 15.0% biomass co-firing capacity by 2027.

Further, the Government of Malaysia also continues to support green businesses with the reinstatement of the Green Technology Financing Scheme 4.0 up to RM1.0 billion until 31 December 2025. The Green Technology Financing Scheme 4.0 will continue to provide 60.0% to 80.0% government guarantee on the cost of the green component financed by participating financial institutions, and a rebate of 1.5% per annum on interest or profit rate.

Availability of raw materials for manufacturing biomass fuel products in Malaysia

Malaysia is rich in natural forestry resources and has a robust agricultural sector due to fertile soil and tropical climate. The availability of organic materials, which are waste products from the timber and agricultural sectors, provides raw materials, such as wood residue and unprocessed palm kernel shells, for the manufacturing of biomass fuel products.

The oil palm industry is the largest agricultural industry in the country, contributing an estimated RM36.2 billion to the national GDP in 2023.¹⁷ The total planted area for oil palm in Malaysia was 5.7 million hectares in 2023, of which 90.8% is mature.¹⁸ There were 446 palm oil mills in Malaysia in 2023.¹⁸ As Malaysia is the second largest producer of palm oil in the world, the oil palm industry in Malaysia is able to provide a reliable supply of unprocessed palm kernel shells, as they are the by-products of the oil palm industry. Palm kernel production in Malaysia was measured at 4.6 million MT in 2023, which indicates the vast availability of unprocessed palm kernel shells to produce palm kernel shells.¹⁸

¹⁴ Source: Energy Market Authority. Latest publicly available information is as at 2022

¹⁵ Source: United Nations Comtrade

¹⁶ Source: Ministry of Natural Resources, Environment and Climate Change Malaysia (Malaysia's Sustainable Energy Development Prospectus)

¹⁷ Source: Department of Statistics Malaysia

¹⁸ Source: MPOB

8. IMR REPORT (cont'd)

On the other hand, Malaysia has vast land area of rain forests and is a major producer of timber products. In 2021, Malaysia's production of major timber products included logs (5.6 million cubic metres), sawn timber (1.9 million cubic metres) and plywood (1.6 million cubic metres).¹⁹ By-products of the timber industry include wood residue, which may be used as raw materials in wood pellet manufacturing.

The consistent availability of unprocessed palm kernel shells and wood residue from the palm oil and timber industries indicates the potential for the development of the industry for palm kernel shells and wood pellets in Malaysia.

INDUSTRY DYNAMICS

As EEHB Group is principally involved in the manufacturing and trading of biomass fuel products, this chapter aims to assess the supply conditions, risks and challenges and relevant laws and regulations affecting a biomass fuel manufacturer and trader.

Supply Conditions**Availability of raw materials**

Unprocessed palm kernel shells and wood residue are raw materials used in the manufacturing of biomass fuel products. Malaysia has a reliable supply of unprocessed palm kernel shells and wood residue. This is because these raw materials are by-products of the oil palm industry and timber industry, and Malaysia is one of the largest oil palm producers globally and is rich in forest resources (as indicated above in the **Key Growth Drivers** section).

Industry Risks and Challenges**Competition from other industry players**

The biomass fuel industry in Asia Pacific is fragmented, with numerous players that manufacture and/or trade palm kernel shells and wood pellets in the region. These industry players compete on the basis of price and ability to meet specifications and volume required by the customer. Industry players may also resort to competitive strategies such as taking on orders with lower profit margin in order to capture and/or retain market share.

Although there is no common price reference for palm kernel shells and wood pellets, the selling prices for palm kernel shells and wood pellets vary from customer to customer as it is dependent on factors such as the specifications of the palm kernel shells or wood pellets required by the customer (such as moisture levels, calorific value as well as ash, sulphur, sodium, potassium and chlorine volume, impurities and durability), the order volume required by the customer, the price of unprocessed PKS and wood residue and foreign exchange rate fluctuations. Industry players must have the experience and know-how to competitively price their biomass fuel products.

As indicated in the export value per MT for palm kernel shells and wood pellets below, the average value per MT differs according to the country and on a year-on-year basis:

Malaysia's export value per MT for palm kernel shells and wood pellets

	Average export value per MT for palm kernel shells (RM)					Average export value per MT for wood pellets (RM)					
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	
Japan	290	371	387	424	529						
Thailand	211	302	315	397	357						
						Netherlands	-	-	-	950	635
						Japan	506	512	517	687	663
						South Korea	464	421	459	650	599

Note:

- (i) The average export value per MT is only indicative and may differ from the actual prices of palm kernel shells and wood pellets

Source: MPOB, United Nations Comtrade

Product substitution risks

Biomass fuel products, including palm kernel shells and wood pellets, can be substituted by other forms of energy. At present, non-renewable energy sources derived from coal, crude oil or natural gas are

¹⁹ Source: Malaysian Timber Industry Board

8. IMR REPORT (cont'd)



relatively more commonly used. The use or uptake of biomass fuel products to generate energy, particularly in the manufacturing industry, may be impacted if there are unfavourable changes in government initiatives to encourage adoption of renewable energy such as a cutback in subsidies or removal of tax exemptions. Further, in the event that the prices of non-renewable energy sources become substantially lower than prices of biomass fuel products such that it does not make sense to generate biomass energy, this could potentially impact demand for biomass fuel products such as palm kernel shells and wood pellets. The prices of key non-renewable energy sources, i.e. coal, crude oil and natural gas in 2019 and 2023 are as follows:

Energy source	Average annual prices					
	Crude oil		Coal		Natural gas	
	USD per barrel	RM per barrel ¹	USD per MT	RM per MT ¹	USD per one million British thermal units	RM per one million British thermal units ¹
2019	64.03	265.26	77.89	322.67	2.57	10.65
2023	82.62	377.19	172.78	788.79	2.54	11.60

Note:

- (i) ¹Exchange rates from USD to RM were converted based on average annual exchange rates extracted from published information from Bank Negara Malaysia at:
 2019: USD1 = RM4.1427
 2023: USD1 = RM4.5653

Source: World Bank

Biomass fuel products may also be substituted by other forms of renewable energy such as solar or hydro. Although these energy sources are typically not able to be used as fuel for industrial boilers that generate energy in manufacturing facilities, or as alternative fuel in biomass power plants or co-firing coal plants, any changes in government policies that solely favour the use of other renewable energy sources could lead to less usage of biomass fuel products. Further, any shift in preferences to other forms of biomass fuel products that would lower demand for PKS and wood pellets or deem these products as obsolete.

Relevant Laws and Regulations

Wood pellet manufacturers and/or traders have to comply to the Malaysian Timber Industry Board (Incorporation) Act 1973, which states that no person shall carry on any activity as an exporter, importer, supplier, grader, processor, trader, operator or a jetty operator for the supply and export of wood waste, woodchip and wood flake without a licence issued by the Malaysian Timber Industry Board.

Palm kernel shell manufacturers do not require a licence to manufacture, trade and/or export palm kernel shells, other than the typical manufacturing and business licences.

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PROVIDENCE has identified 14 industry players, including EEHB Group on the basis that:

- (i) They are involved in the manufacturing of palm kernel shells and/or wood pellets;
- (ii) They are based in Malaysia; and
- (iii) They have a revenue of RM1.0 million and above, based on their latest audited FYE.

These industry players are^(a):

Company name	Palm kernel shells	Wood pellets	Latest audited FYE	Revenue (RM '000)	Gross profit ("GP") (RM '000)	Profit/Loss After Tax ("PAT/LAT") (RM '000)	GP margin ^(b) (%)	PAT margin ^(c) (%)
BTM Biomass Products Sdn Bhd ^(d)	-	✓	31 December 2022	4,066 ^(e)	(1,031) ^(f)	(1,101) ^(f)	-	-
Daya Synergy Borneo Sdn Bhd	✓	-	30 June 2022	4,948 ^(g)	(3,097)	(3,477)	-	-
EEHB Group	✓	✓	31 December 2023	335,251^(g)	45,969	23,565	13.7	7.0
Green Pellet (Sarawak) Sdn Bhd	-	✓	31 December 2022	19,658 ^(g)	3,069	(5,524)	15.6	-
Kyoto Oil & Grains (M) Sdn Bhd	✓	-	31 December 2022	8,208 ^(g)	1,294	993	15.8	12.1
Living Nature Sdn Bhd	-	✓	31 December 2021 ^(h)	32,609 ^(g)	1,089	(299)	3.3	-
Maya Wood Pellets Sdn Bhd	-	✓	31 March 2023	24,006 ^(g)	3,789	883	15.8	3.7
Mesjaya Abadi Sdn Bhd	-	✓	31 December 2022	8,366 ^(g)	1,541	211	18.4	2.5
Rainbow Pellet Sdn Bhd	-	✓	31 December 2022	161,537 ^(e)	68,088 ^(f)	44,181 ^(f)	42.2 ⁽ⁱ⁾	27.4 ⁽ⁱ⁾
Taiyo Biomass Sdn Bhd	✓	-	30 September 2022	66,814 ^(g)	4,946	818	7.4	1.2
Tanjong Manis Resources Sdn Bhd	✓	-	31 December 2022	5,566 ^(e)	2,085 ^(f)	972 ^(f)	37.5 ⁽ⁱ⁾	17.5 ⁽ⁱ⁾
Techniray Sdn Bhd	-	✓	31 December 2022	1,957 ^(g)	(138)	(462)	-	-
Top Energy Sdn Bhd	-	✓	30 September 2022	5,322 ^(g)	567	408	10.7	7.7
TreeOne MegaPellet Sdn Bhd	-	✓	30 June 2023	16,403 ^(e)	499 ^(f)	(7,635) ^(f)	3.0 ⁽ⁱ⁾	-

Notes:

- (i) ^a The list is not exhaustive. It contains information based on publicly disclosed information as at 21 March 2024 and excludes exempt private companies

8. IMR REPORT (cont'd)

- (ii) ^b GP margin is computed based on GP over revenue
- (iii) ^c PAT / LAT margin is computed based on PAT/ LAT over revenue
- (iv) ^d BTM Biomass Products Sdn Bhd is a subsidiary of BTM Resources Berhad, a public listed company
- (v) ^e Based on segmental financial information of the company's biomass fuel products business
- (vi) ^f Based on total consolidated financial information as segmental financial information of the company's biomass fuel products business is not publicly available
- (vii) ^g Revenues may be derived from business activities other than the company's biomass fuel products business
- (ix) ^h Latest available information
- (x) ⁱ GP/PAT margin is based on consolidated GP/PAT over segmental revenue as the segmental GP/PAT is not publicly available

Source: Companies Commission of Malaysia, various company websites, PROVIDENCE

As palm kernel shell and wood pellet manufacturers require capital expenditure to set up a manufacturing facility and working capital to purchase raw materials, the barriers to entry faced by industry players involved in the manufacturing of palm kernel shells and/or wood pellets is moderately high. Meanwhile, the barriers to entry for palm kernel shell and wood pellet traders is low.

The competitiveness of a palm kernel shell and wood pellet manufacturer is dependent on its manufacturing capability and technical expertise in manufacturing of palm kernel shells and wood pellets based on the specifications required by the customer in terms of moisture levels, calorific value as well as ash, sulphur, sodium, potassium and chlorine volume, impurities content and durability. Further, in light of the requirement from the Ministry of Economy, Trade and Industry Japan that palm kernel shells used under the FiT programme in Japan to be certified by the Roundtable on Sustainable Biomaterials, Green Gold Label and International Sustainability, Carbon Certification (ISCC) or Malaysian Sustainable Palm Oil programs beginning April 2024, and growing concerns on the sustainability of the sources of wood pellets, industry players that have obtained sustainability certifications such as the Green Gold Label, PEFC and Green Label certifications for their palm kernel shells and wood pellets would also be able to enhance its competitiveness. Other critical success factors applicable to manufacturers and/or traders of palm kernel shells and wood pellets include the capability and experience to manufacture palm kernel shells and wood pellets, a network of customer to sell products to and a network of suppliers to source raw materials from.

MARKET SHARE

Based on the revenue generated by EEHB Group from the manufacturing and sale of palm kernel shells of RM144.4 million for the FYE 31 December 2022 and the total palm kernel shell industry size in Asia Pacific of USD260.7 million (RM1.1 billion¹) in 2022, EEHB Group garnered an industry revenue share of approximately 13.1% in 2022. EEHB Group's industry revenue share for wood pellets in Asia Pacific was minimal in 2022.

EEHB Group's industry revenue share for palm kernel shells was approximately 22.3% in 2023, with a revenue of RM290.2 million for the FYE 31 December 2023 from the manufacturing and sale of palm kernel shell segment and a palm kernel shell industry size in Asia Pacific of USD283.3 million (RM1.3 billion¹) in 2023. Meanwhile, EEHB Group's industry revenue share for wood pellets was approximately 0.1%, with a revenue of RM45.1 million for the FYE 31 December 2023 from the manufacturing and trading of wood pellet segment, and a wood pellet industry size in Asia Pacific of USD9.8 billion (RM44.7 billion¹) in 2023.

2 PROSPECTS AND OUTLOOK OF THE EEHB GROUP

Moving forward, the palm kernel shells industry size in Asia Pacific is forecast to grow at a CAGR of 8.9% while the wood pellets industry size in Asia Pacific is forecast to grow by a further CAGR of 8.6%, between 2024 and 2026. As a palm kernel shell and wood pellet manufacturer and/or trader, EEHB Group stands to benefit from this growth which is driven by:

- Growing exports to international markets which will be mainly supported by government initiatives to drive the use of renewable energy, including biomass, in the countries in which EEHB Group's customers are based in or intends to deliver its products to;
- Growing demand from end-user industries in Malaysia that is driven by government initiatives to drive the use of renewable energy, including biomass; and
- Availability of raw materials for manufacturing biomass fuel products in Malaysia.