

**iTAKE Solutions Sdn. Bhd.** a consulting firm registered under Board of Engineers Malaysia (BEM) with registration number 2218-6000-00000-BC-1564, specialized in providing high standard of professional engineering consultancy services focusing on Palm Oil Milling Industry to help our clients to make better decisions and convert them to actions that deliver sustainable, productive, effective, and successful designs.

Our team of very experienced Professional Engineers and Project Managers are not only competent in palm oil milling designs and operations, but passionate in improving designs through many actual construction trials, operation experiments and real time operation experience throughout their career. We vow to be professional in delivering good designs, troubleshooting current obstacles, and providing practical actions and solutions tailored to our clients' unique requirement.



# CAPABILITY STATEMENT

SSM No.: 1217199-M

BEM No.: 2518-6000-00000-BC-1564

## Core Services & Offerings

Engineering Design  
& Tender Management  
In Establishment Of  
New Palm Oil Mill

1

Processes & Efficiency  
Improvement  
Of  
Existing Palm Oil Mills

2

Recovery of Waste  
From Palm Oil Mills &  
Convert to Saleable  
Products

3

Advisory Services  
For Palm Oil Mills  
Operation

4

Leading Project  
Management in Palm  
Oil Mill Upgrading/  
Construction

5

## Special Projects

**Thermal Decomposition Project:**  
Converting EFB to Fertilizer

**Decanter Cake Drying Project:**  
Converting Decanter Cake to Animal Feed

**Nut Polishing Drum Optimization:**  
Improve both KER & OER simultaneously

**Hardox HiAce FFB Carriage:**  
Improve plant efficiency & increase lifespan of FFB carriage

## Past Performance

Throughout these years, iTAKE had successfully completed various type of projects in different Palm Oil Mills

>150	TOTAL PROJECTS COMPLETED
17	REGULATORY COMPLIANCE
70	PERFORMANCE IMPROVEMENT
3	NEW PLANT ESTABLISHMENT

## Missions

One stop center for Palm Oil Mill design, system improvement, retrofitting and problem rectification.

Introduce tested and actual proven solution to Palm Oil Mill to enhance operation efficiency

## Contact us



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## ITAKE SOLUTIONS SDN. BHD.

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### Our Office



## Our Key Personnel



### **Ir. Tian Fung Wang**

Asean Chartered Professional Engineer (ACPE)

P.Eng (Mech), M.I.E.M

2<sup>nd</sup> Grade Steam Engineer

Project Management Professional (PMP)

Registered Energy Manager (REM)

Contact No.: +6012 – 525 0623

Specialization: Plant Engineering Design & Project Management

Tian Fung Wang obtained Bachelor of Mechanical Engineering from University of Malaya in 2004, Master in Business Administration (specialized Finance) from University Putra Malaysia in 2010. He was born in Miri, Sarawak on October 09, 1979. He had managed various types of power plant project in different countries across Asia. He has more than 21 years of experience in Plant Engineering Design and Project Management from his previous employment.

With deep experience in Plant Engineering Design & Project Management at many countries, Tian had established good relation with various technology provider and consultants who are able to provide latest technology update and resolve engineering issue whenever required. Establishing iTAKE Solutions is expected to bring a combination of professionals in the fields and work together providing high standard professional services with the hope of raising the industry standard in Project Management. Currently, Tian is specialized in Project Management and providing innovative waste management solutions.



### **Ir. Tian Foon Howe**

Asean Chartered Professional Engineer (ACPE)

P.Eng (Mech), M.I.E.M

1<sup>st</sup> Grade Steam Engineer

Contact No.: +6019 – 815 8648

Specialization: Palm Oil Mill Constructions & Operation

Tian Foon Howe obtained Bachelor of Mechanical Engineering from University of Malaya in 2006. He was born in Miri, Sarawak on January, 11, 1981. He has more than 19 years of experience in Palm Oil Mill Constructions and Operations. He is currently served as SOPPOA Mills Committee Chairman constantly engage with related authorities to understand the future direction of regulations that shaping country's Palm Oil industry.

He had taking initiative implementing various improvement for Palm Oil Mill in order to optimize Palm Oil Mill operation by reducing wastage and breakdown duration, improving plant reliability, increasing output while maintaining plant safety at high standard. iTAKE Solutions is expected to promote good engineering practice by incorporating all proven successful improvement initiative into current Palm Oil Mill design with the hope to improve efficiency of Palm Oil Mill, reducing CAPEX & OPEX while increasing crude oil output.





**Ts. Hiu Fu Shun**

B.E (Hons). E&E Eng.  
Graduate Member, IEM  
Graduate Member, BEM  
Professional Technologist, MBOT

Contact No.: +6016 – 556 6169

Specialization: Palm Oil Mill's Project Management

Holding a degree in Electrical and Electronics Engineering obtained in 2016 from Universiti Malaysia Sabah and recognized as a Professional Technologist (Ts.) by MBOT, his career journey includes valuable experience as a Testing and Commissioning Engineer in Singapore, where he gained extensive international exposure through travel for commissioning and troubleshooting projects. Currently serving as a Project Manager at iTAKE Solutions, a palm oil milling consultancy firm, he has been directly involved in key projects such as the WTK Imbok Palm Oil Mill Upgrading Project in 2022, the Biobest Venture Palm Oil Mill Upgrading in 2023, and the RH Bakong Palm Oil Mill Upgrading in 2024.

In his role, he leverages his strong technical foundation and international experience to ensure the seamless implementation of consultancy solutions and drive efficient and effective project execution. He is dedicated to delivering successful project outcomes within the palm oil milling sector.



**Wong Kee Shing**

B.E (Hons). Mech Eng.  
Graduate Member, IEM  
Graduate Member, BEM

Contact No.: +6014 – 692 8909

Specialization: Palm Oil Mill's Engineering Design

Holding a Bachelor of Mechanical Engineering (Hons) from University of Technology Sarawak in 2024 and a Diploma in Mechanical Engineering in 2020, Wong serves as Design and Project Engineer at iTAKE Solutions. His career includes experience as a M&E Design Engineer, heavy machinery mechanic, product trainer and research assistant, contributing to diverse mechanical design and optimization projects.

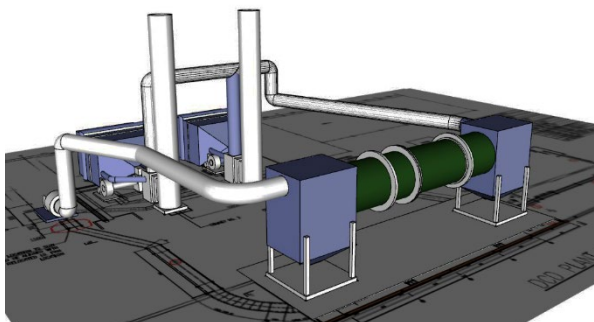
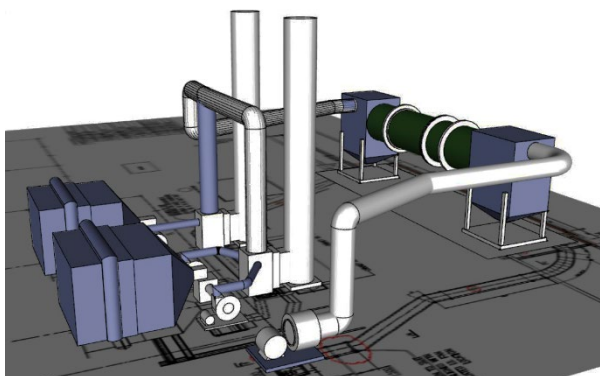
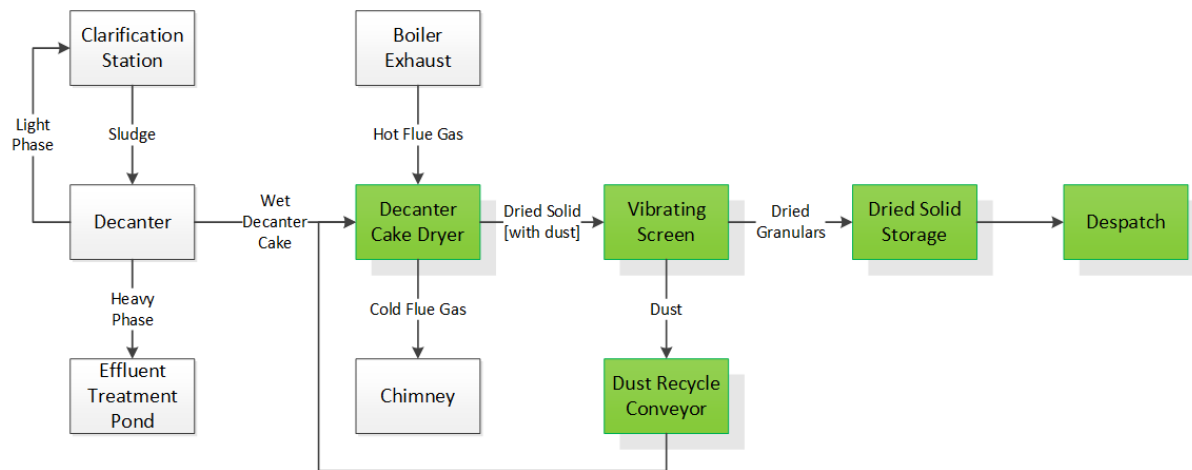
At iTAKE Solutions, he is involved in designing new palm oil mills, covering layout planning, process flow design, and integration of mechanical systems. He also works on upgrading existing mills, focusing on capacity expansion, equipment replacement, and system optimisation to improve efficiency and reliability. His key project contributions include the design of Pakan Palm Oil Mill and Lachau Palm Oil Mill, as well as upgrading projects for Biobest Venture Palm Oil Mill, RH Bakong Palm Oil Mill, Sri Aman Palm Oil Mill, and Jernih Kemboja Palm Oil Mills in Kulai and Segamat.

## Our Experience

### New Palm Oil Mill from Ground Zero



## Decanter Drying Plant – Converting Wet Decanter Cake become animal feed / fertilizer.











Decanter cake is a solid waste from palm oil mills. Each 100t/h FFB processed generate around 5% of Decanter Cake. Decanter cake is produced by the decanter in the decanting process of the palm oil mill sludge. Fresh Decanter Cake possesses certain amount of moisture and has a paste like texture. It got its name from the equipment that it is originated from which is decanter centrifuge.

Decanter Cake consider as a minor biomass generated from the extraction process. Thus, it is usually dumped beside the mill. The caution rise when the amount of dumped Decanter Cake accumulates through times which may cause pollution.

Research found that Decanter Cake is suitable to be utilized as fertilizer, soil conditioner or soil amendment. Decanter Cake used as added ingredients in fertilizer making process. Research found that co-composting of palm oil mill by products such as EFB (Empty Fruit Bunches), POME (Palm Oil Mill Effluent), DC (Decanter Cake) and BA (boiler ash) is the best solution for sustainable and zero waste crude palm oil production.

Since Decanter Cake is of organic origin, it possesses several useful nutrients content. Decanter Cake considered being rich in nitrogen (N), phosphorus (P), potassium (K), calcium (Ca) and magnesium (Mg). It is also possessing several micro nutrients or mineral such as copper (Cu), iron (Fe), manganese (Mn) and Zinc (Zn).

Decanter Cake Drying Plant is design with the purpose of converting wet sludge into useful resource. Wet sludge rich of nutrients are feed into a long rotating drum. At the same time, hot flue gas from boiler was channel into the drum. This allow the moisture in wet sludge been evaporated. While the drum is rotating and the moisture was evaporated, the paste form wet sludge was slowly turning into smaller granular form in sphere shape.

During the drying process, some sludge or broken granular will smash and become dust. With the philosophy of conserve resources in mind, we transport this dust or fine particle back to the inlet



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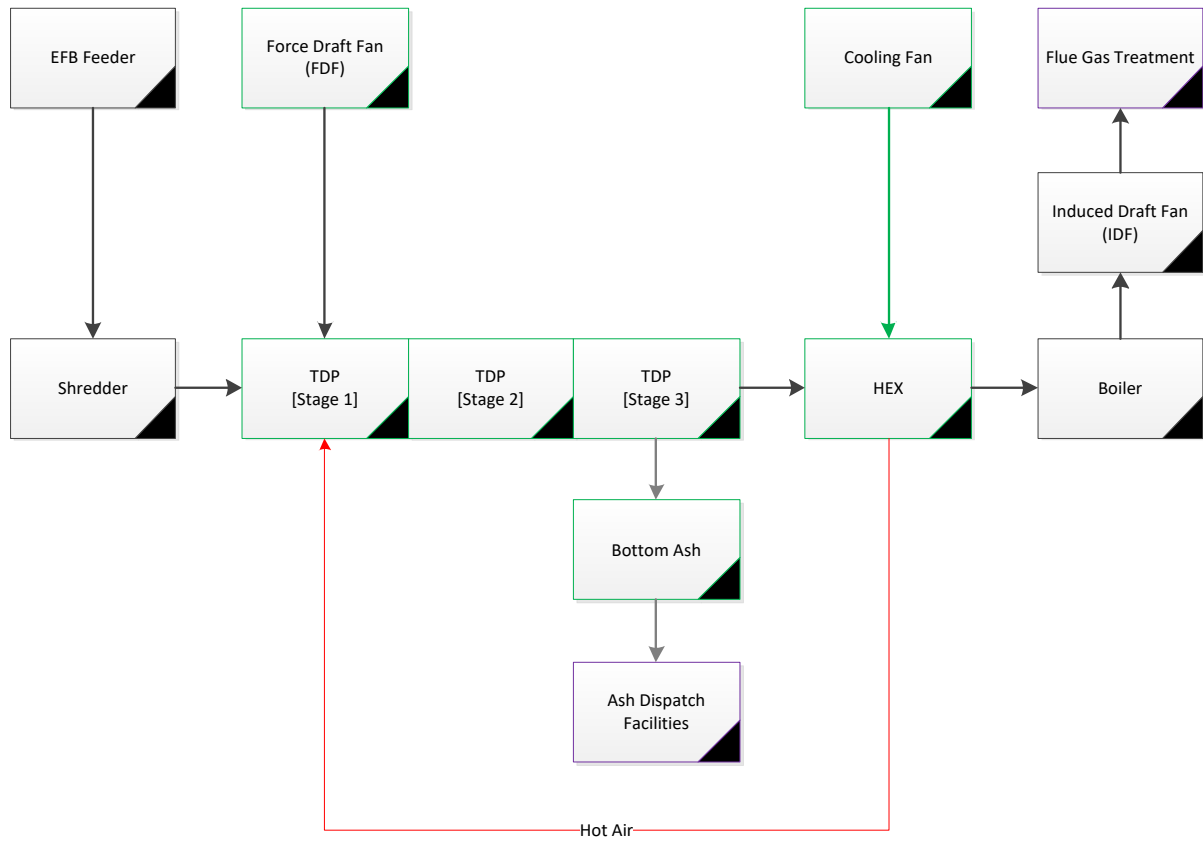
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of rotating drum to combine with newly fed wet sludge. This recovery process will also help in drying up the wet sludge.

The granular form dried decanter cake rich of nutrient can be used as fertilizer or soil conditioner for oil palm estate. iTAKE Solutions Sdn. Bhd. is proud to supply this Decanter Cake Drying Plant with the objective of resolving palm oil mill issue by converting waste into resource.

## Thermal Decomposition Project – Converting EFB (empty fruit bunch) become fertilizer.







Palm Oil Mill is the first process that converting fresh palm fruits (Fresh Fruit Bunch, FFB) into Crude Palm Oil (CPO) that used for refinery process before it producing palm oil products. Empty Fruit Bunch (EFB) is the residual of (Fresh Fruit Bunch) FFB pressing and extraction of palm fruits. Traditionally, EFB was disposed using natural draft incinerator.

Unfortunately, natural draft incinerator that used to dispose EFB was claimed to be polluting environment due to incomplete combustion. Following the issuance of new Clean Air Regulation (CAR 2014) on 23rd Apr 2014, Palm Oil Mill owner are given 5 years grace period in complying the regulation. The grace period had come to an end in 2019. Thus, it is a challenge for Palm Oil Mill operator in EFB disposal as technology treating EFB with reasonable cost had not been found yet.

Accumulation of EFB at palm oil mill is a fire hazard to the plant which may bring down the plant anytime especially during sunny day. Besides, fermented EFB might also cause environmental issue as the oily water from EFB tend to seep into soil and possibly polluting ground water stream. Thermal Decomposition Plant (TDP) Project aim for disposing EFB with proper heat treatment while complying with CAR 2014 which providing win-win situation for both Palm Oil Miller and





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Environmentalists. This project is hope to resolve the pile up of EFB at palm oil mill as there is no alternative disposal method after the enforcement of CAR 2014.

The idea of TDP Project is to install a special designed furnace to thermal decompose shredded EFB. Ashes form from Thermal Decomposition can be used by estate as fertilizer for palm tree while heat generated from Thermal Decomposition process can be used for pre-drying of EFB and act as pre-heated air for boiler operation.

## Nut Polishing Drum Optimization – Improving KER & OER



The improved NPD design is able to provide three major benefits as follow:

1. Separating broken kernel from the stream such that it will not undergo crashing process in ripple mill. This lead to increase in KER (Kernel Extraction Rate).
2. Broken kernel and shell that separated earlier than nut will reduce the workload of ripper mill where quantity to be crashed is significantly reduced.
3. Since broken kernel can be recovered through improved NPD, pressing station that used to extract oil from oil palm fruit can be operated at higher pressure to achieve better oil extraction. This indirectly increases the OER (Oil Extraction Rate) for palm oil mill.

During oil extraction process, pressing station normally was set to have sufficient pressure to achieve target OER (Oil Extraction Rate). Reducing pressure will reduce broken kernel and indirectly increase KER. Unfortunately, due to lower pressure, OER will also reduce directly. Thus, it is not advisable to increase KER through reduce pressure in pressing station by sacrificing OER. On the opposite, increasing pressure at pressing station will increase OER as more oil can be pressed out from digested palm fruit. However, broken kernel will also increase at the same time. The conventional kernel recovery process will mostly sacrifice this portion of broken kernel when it passes through ripple mill and grind to become powder.

There seems to be a conflict between preference on OER and KER which is first and second highest revenue of a Palm Oil Mill. Thus, under normal circumstance, Palm Oil Mill operator shall strike a balance in setting pressure at pressing station. Normally, the pressure setting was recommended at 4% free kernel rate.

Recovery of kernel from these 4% free kernel will increase KER. Higher kernel recovery from free kernel means higher KER. As per current design, kernels & nuts recovery was done by Nut Polishing Drum (NPD). Some NPD was designed such that kernels & nuts are recovered at the same collection chute which we believed is not following good engineering practices.

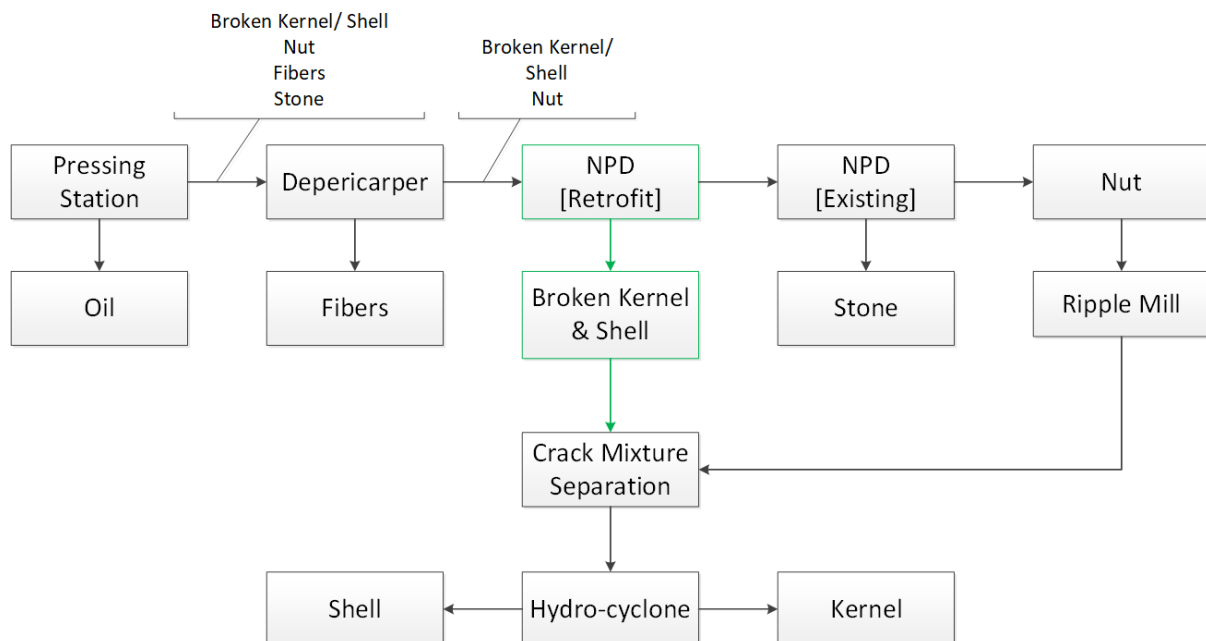
Kernels that recovered with Nuts will need to undergo crushing process to crush the nuts for extracting its kernel within. During Crushing process, more than 90% of kernel will be crushed become powder which cannot be recovered.

In order to resolve the above issue, upgraded NPD shall have two extraction channels which can extract kernels and nuts separately. The efficiency of kernels extraction at NPD is strongly depends on its drum screen (Kernel Extraction Screen) design. Kernel in NPD that not extracted at separated channel is a loss to the Palm Oil Mill which will affect its KER.

Various researches and tests on Kernel Extraction Screen design have been done and the optimum design of the screen was found which can extract kernel effectively at NPD. The best thing is the improvement can be done on existing NPD with little modification which takes less than a day.

Based on our experience, Return of Investment for this design improvement is very impressive. For reference:

- If current NPD is not equipped with Kernels Extraction Screen, KER (Kernel Extraction Rate) expected from this improvement is guarantee in providing ROI (Return of Investment) within 12 months.
- If current NPD is equipped with Kernels Extraction Screen which is old design, KER (Kernel Extraction Rate) expected from this improvement is guarantee in providing ROI (Return of Investment) within 18 months.



## FFB Carriage Design Optimization

15 Tons Hardox HiAce – Lightweight FFB Cage



iTAKE Solutions Sdn Bhd worked with specialized Hardox supplier provide customize design on the FFB carriage to suit Palm Oil Mill's existing or new sterilization system. FFB carriage fabricated with Hardox material provide several benefits such as Corrosion Resistance, Reduce Deformation, High Impact Resistance, Increase Service Life, Reduce Tare Weight.



## PROJECTS REFERENCE LIST

No.	Project Name	Owner	Years
1	MJM Palm Oil Mill Fire Fighting	MJM (Palm Oil Mill) Sdn Bhd	2016
2	BBC Palm Oil Mill Fire Fighting	BBC Palm Oil Sdn Bhd	2016
3	PSS Palm Oil Mill Fire Fighting	PSS Oil Mill Sdn Bhd	2017
4	FelcraJaya POM Fire Fighting	Sri Aman Palm Oil Mill	2017
5	Igan Palm Oil Mill Fire Fighting	Igan Oil Mill	2017
6	Alambumi Drying Plant	Alambumi Palm Oil Mill Sdn Bhd	2017
7	Hass Palm Oil Mill Fire Fighting	Hass Palm Oil Mill	2018
8	MJM Long Fibre Plant Fire Fighting	MJM (Palm Oil Mill) Sdn Bhd	2018
9	Kukusang Plywood Mill Fire Fighting	Kukusang Ply Wood Ltd.	2018
10	TBS Palm Oil Mill Fire Fighting	TBS Oil Mill Sdn Bhd	2018
11	Suajaya Palm Oil Mill Fire Fighting	Suajaya Oil Mill	2018
12	Unique Palm Oil Mill Fire Fighting	Unique Palm Oil Mill	2018
13	Belaga Palm Oil Mill Fire Fighting	Belaga Palm Oil Mill	2018
14	Dara Palm Oil Mill Fire Fighting	Dara Lam Soon Palm Oil Mill	2018
15	Palmgroup Palm Oil Mill Fire Fighting	Palmgroup Palm Oil Mill	2019
16	Decanter Cake Drying Plant	Manis Oil Mill Sdn Bhd	2019
17	SPKS Electrostatic Precipitator	Syarikat Perusahaan Kelapa Sawit Sdn Bhd	2019
18	Plastic Recycling Plant Ventilation System	Kanma Plastic Material Sdn Bhd	2020
19	Jelalong POM Fire Fighting	Timor Enterprises Sdn Bhd	2020
20	Lana POM Fire Fighting	Timor Enterprises Sdn Bhd	2020
21	DD Biogas Effluent Sludge Drying	DD Palm Oil Mill Sdn Bhd	2020
22	MJM Kecipil Ram Project	MJM (Palm Oil Mill) Sdn Bhd	2020
23	Borneo Agro Resources POM Fire Fighting	Borneo Agro-Resource Sdn Bhd	2020
24	Balingian POM Fire Fighting	Balingian Palm Oil Mill Sdn Bhd	2021
25	United Teamtrade POM Fire Fighting	United Teamtrade Sdn Bhd	2022
26	Royce Pharma As Built Survey	Royce Pharma Manufacturing Sdn Bhd	2022
27	SPAD Niah POM ESP	SPAD Niah Palm Oil Mill	2022
28	Budi Nasib POM Fire Fighting	Budi Nasib Sdn Bhd	2022
29	Igan POM ESP	Igan Oil Mill Sdn Bhd	2022
30	PSS POM ESP	PSS Oil Mill	2022
31	DPS POM ESP	Delta Pelita Sebakong Sdn Bhd	2022

32	Southwind POM ESP	Southwind Plantation Sdn Bhd	2022
33	Batu Niah POM ESP	Batu Niah Palm Oil Mill Sdn Bhd	2022
34	WTK Oil Mill Upgrading	WTK Oil Mill Sdn Bhd	2022
35	PK Fertilizers Plant Fire Fighting	PK Fertilizers (Sarawak) Sdn Bhd	2023
36	Biobest Venture Palm Oil Mill Upgrading	Biobest Venture Sdn Bhd	2023
37	25m Access Road	Kim Loong Mills (Sarawak) Sdn Bhd	2023
38	FFB Collection Center	Golden Tree United SB	2023
39	EFB Press Station including Oil Room Piping Route Rectification	Primaluck (M) Sendirian Berhad	2024
40	Drone Mapping Service	Bole Engineering Sdn Bhd	2024
41	Palm Tree Density Report (Area Covered 400Ha)	Golden Sigan Plantation Sdn Bhd	2024
42	RH Bakong Upgrading	RH Plantation Sdn Bhd	2024
43	Kuantan Trading POM Fire Fighting	Kuantan Trading Oil Mill Sdn Bhd	2024
44	Pakan POM	Pakan Palm Oil Mill Sdn Bhd (Formerly known as Carus Eco Oil Sdn Bhd)	2024
45	Site Living Quarters	Ching Yong Mining Engineering Sdn Bhd	2024
46	FFB Collection Center	GPH Construction Sdn Bhd	2024
47	Moving Floor System	Green Mark Projects Sdn Bhd	2024
48	60TPH Machinery Layout Plan (Thailand)	Mastech City Engineering (M) Sdn Bhd	2025
49	90TPH Machinery Layout Plan (Thailand)	Mastech City Engineering (M) Sdn Bhd	2025
50	Design & Build 90TPH Palm Oil Mill (Segamat)	Jernih Kemboja Sdn Bhd	2025
51	Design & Build 90TPH Palm Oil Mill (Kulai)	Jernih Kemboja Sdn Bhd	2025
52	Etara Lahad Datu Warehouse	Kejuruteraan Letrik Etara (M) Sdn Bhd	2025
53	DOE & DOSH Submission for Imported Boiler	Multiple C Paper Pulp Mill Sdn Bhd	2025
54	Lachau Palm Oil Mill	Kim Loong Mills (Sarawak) Sdn Bhd	2025
55	Oil Bunker Bintulu	YLL Group	2025
56	FFB Collection Center Upgrading	GPH Construction Sdn Bhd	2025

## SPECIAL PROJECT EXPERIENCE

Thailand, Phuket 700 Ton Per Day Waste to Energy Project

Scope: Project Management from ground zero to stable operation





China, Xi'an 300 Ton Per Day Waste to Fertilizer Project:

Scope: Technical Consultancy





Malaysia, Negeri Sembilan 100 Ton Per Day Hazardous Waste to Energy Project

Scope: Project Management from ground zero to full load operation





Indonesia, Surabaya 750 Ton Per Day Waste to Energy Project

Scope: Technical Advisory & Project Management from ground zero to Mechanical Completion





Malaysia, Johor 400 Ton Per Day Hazardous Waste Treatment Project

Scope: Technical Advisory & Project Management from Concept to Operating Plant

