Scaling Up The Circular Economy Through Agricommodity Biomass

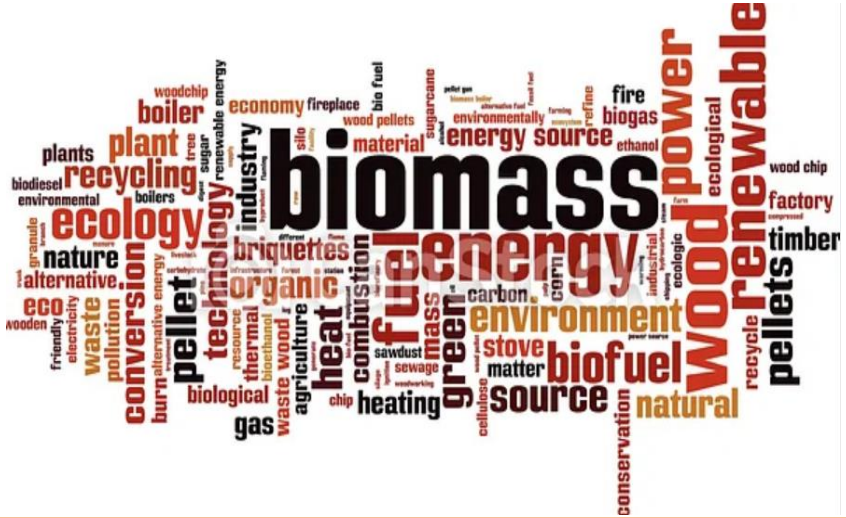
6 November 2023 (Monday)
Aloft Hotel
Kuala Lumpur Sentral

Ts. Dr. Sang Yew Ngin
Undersecretary

BAHAGIAN BIOJISIM DAN BIOBAHAN API (BBA)
KEMENTERIAN PERLADANGAN DAN KOMODITI (KPK)

Outline

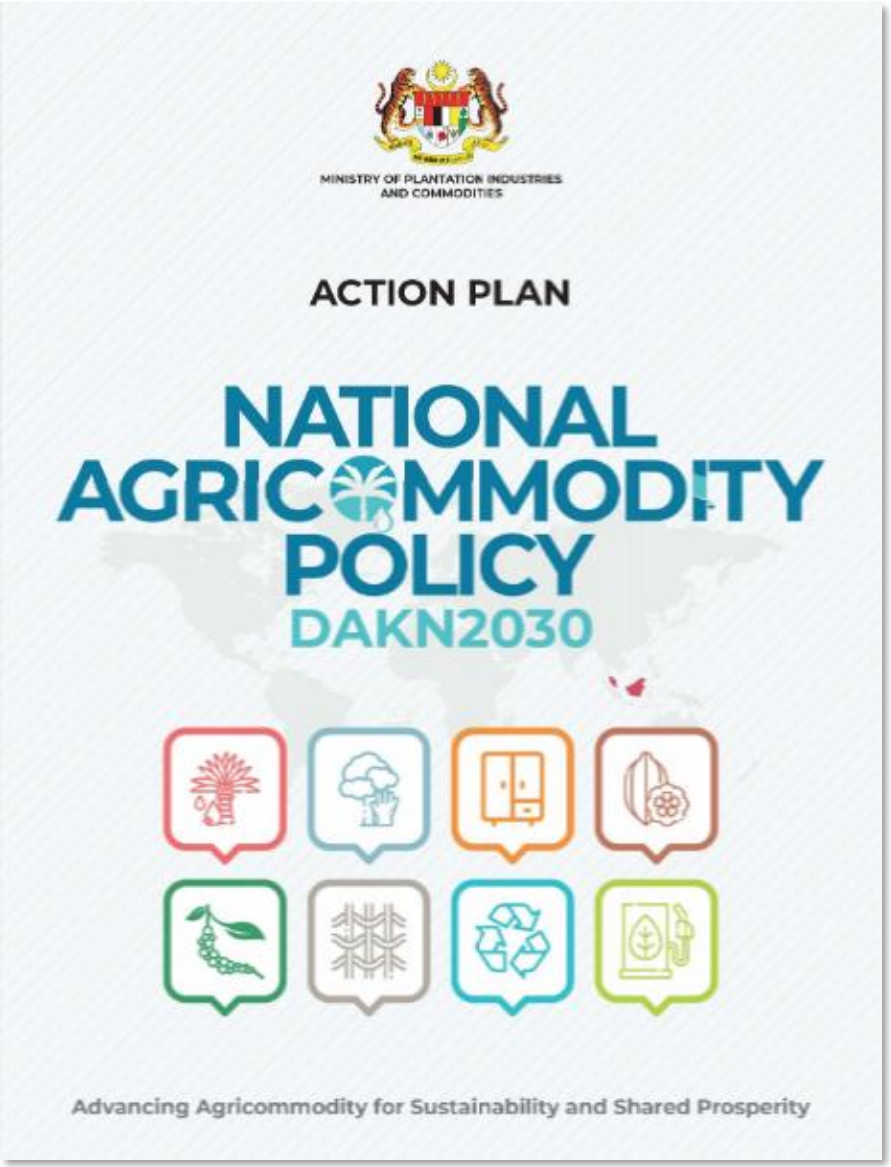
1. 12th Malaysia Plan
2. National Agricommodity Policy DAKN2030
3. National Biomass Action Plan 2023-2030
4. National Energy Transition Roadmap (NETR)
5. Biomass Estimation Baseline and Availability
6. Potential Commercialization Business Model
7. Availability of Government Grants and Financing Schemes



Game Changer

'Chapter 3: Propelling Growth of Strategic and High Impact Industries as well as Micro, Small and Medium Enterprises'

Biomass → high-impact industries to regenerate economic growth.



Biomass

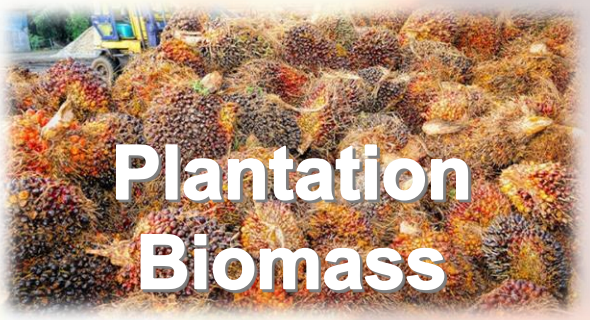
'Chapter 9: Scaling Up The Circular Economy Through Agricommodity Biomass'

Key Issues:

1. *Securing consistent feedstock is challenging*
2. *High barriers to investment deter the development of higher-value products*

MINISTRY OF PLANTATION AND COMMODITIES

NATIONAL BIOMASS ACTION PLAN 2023 - 2030



183.0 mil tones

3.6 mil tonnes

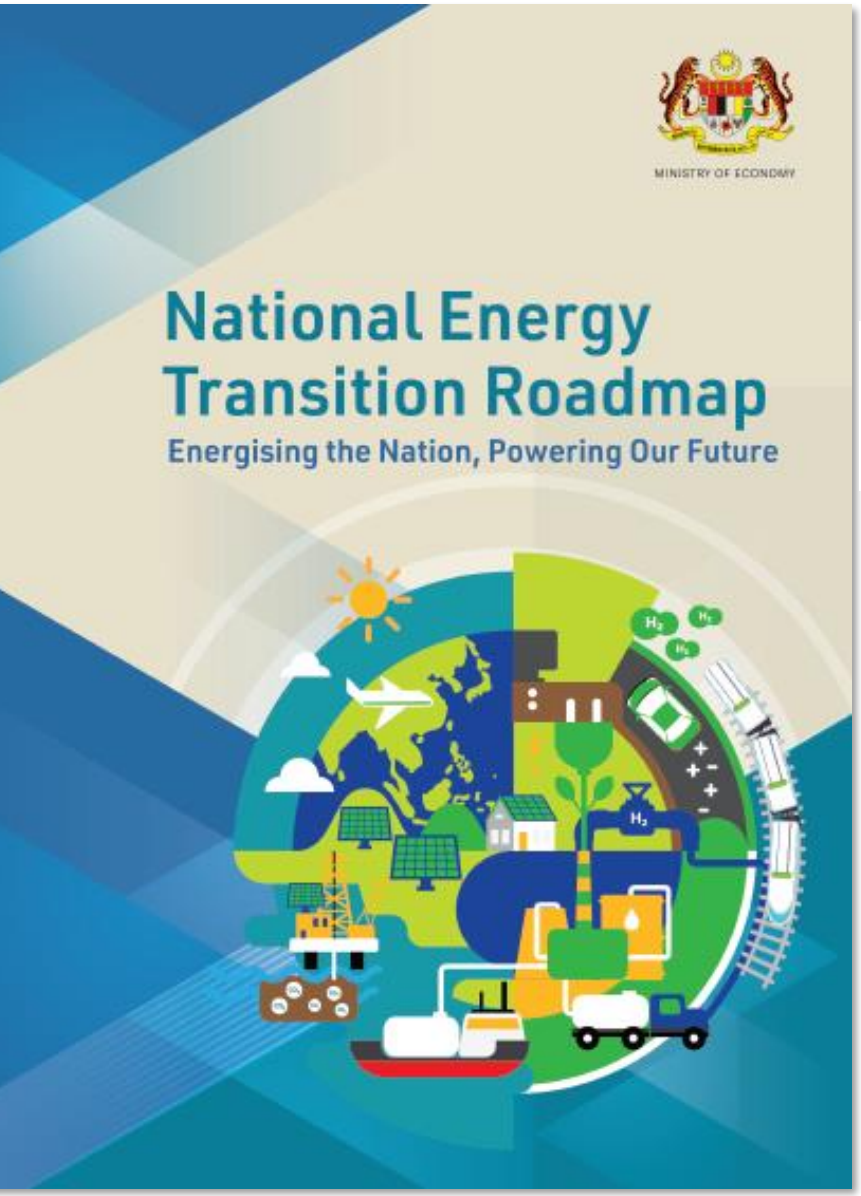
4.2 mil tonnes

10 mil tonnes

0.7 mil tonnes

Total Biomass Estimation

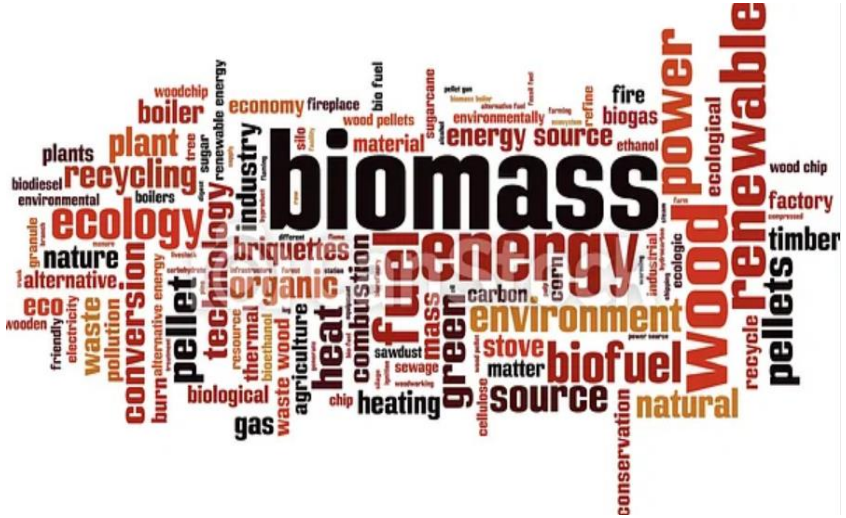
201.5 million tonnes



Section 6: NETR Flagship Catalyst Projects and Initiatives

Energy Transition Levers	Flagship	Modalities	Champion
Bioenergy	Biomass Demand Creation	**Biomass Clustering** Development of biomass clusters with a centralised plant using aggregated feedstock from multiple neighbouring mills. Biomass clustering is expected to improve economies of scale as well as securing larger and more reliable feedstock.	KPK NRECC SEDA
		Biomass Co-firing Co-firing initiative at the existing 2100 MW Tanjung Bin Power Plant by burning biomass along with coal. Biomass sources include empty fruit bunch (EFB) pellets, wood chips, wood pellets, bamboo pellets, coconut husk and rice husk. A pilot phase of co-firing will commence in 2024 with the scale-up potential to a minimum of 15% biomass co-firing capacity by 2027.	KPK Malakoff

Biomass Estimation Baseline and Availability



Palm Oil

Total Dry weight 110.1 million tonnes

Empty Fruit Bunch (EFB)
20.9 million tonnes

Oil Palm Fronds (OPF)
59.6 million tonnes

Palm Mesocarp Fibres (MF)
12.8 million tonnes

Oil Palm Trunk (OPT)
7.2 million tonnes

Palm Kernel Shells (PKS)
5.2 million tonnes

Palm Kernel Cake (PKC)
4.4 million tonnes

(estimation of biomass production per annum)

Woody Biomass

Total weight 3.64 million tonnes

Logging Activity Residue
1.49 million tonnes

Rubber Tree Biomass (Branches, twigs, leaves, roots)
0.21 million tonnes

Wood-based Industry Residue
1.94 million tonnes

Sago

Total dry weight 0.34 million tonnes

Sago Palm Frond
53,564 tonnes

Sago Bark
147,302 tonnes

Sago Hampas
147,302 tonnes

Paddy

Total dry weight 3.42 million tonnes

Rice Straw
2.9 million tonnes

Rice Husk
520,179 tonnes

(estimation of biomass production per annum)

Cocoa

Total weight 413 tonnes

Cocoa Bean Shell
49 tonnes

Cocoa Pod Husk
364 tonnes

Banana

Total weight 0.79 million tonnes

Banana Stalk
790,975 tonnes

Durian

Total weight 0.29 million tonnes

Durian Husk
296,048 tonnes

Kenaf

Total weight 3,000 tonnes

Kenaf Shoot
3,000 tonnes

Sweetcorn

Total weight 0.11 million tonnes

Sweet Corn Stalk
113,679 tonnes

Coconut

Total dry weight 0.34 million tonnes

Coconut Husk
271,993 tonnes

Coconut Shell
72,531 tonnes

Pineapple

Total weight 0.23 million tonnes

Pineapple Peel Waste
154,693 tonnes

Pineapple Leaf
75,460 tonnes

(estimation of biomass production per annum)

Sugarcane

Total weight 13,517 tonnes

Sugarcane Top
5,006 tonnes

Sugarcane Bagasse
7,510 tonnes

Sugarcane Press Mud
876 tonnes

Sugarcane Molasses
125 tonnes

(estimation of biomass production per annum)

Poultry

Total weight 4.18 million tonnes

Poultry Manure
4.0 million tonnes

Poultry Waste from Slaughter House
176,103 tonnes

Ruminants

Total weight 4.74 million tonnes

Cattle, Goat, Sheep Manure
4.73 million tonnes

Cattle, Goat, Sheep Waste From slaughter house
15,551 tonnes

(estimation of biomass production per annum)

Swine

Total weight 1.24 million tonnes

Swine Manure
1.16 million tonnes

Swine Waste from Slaughter House
75,634 tonnes

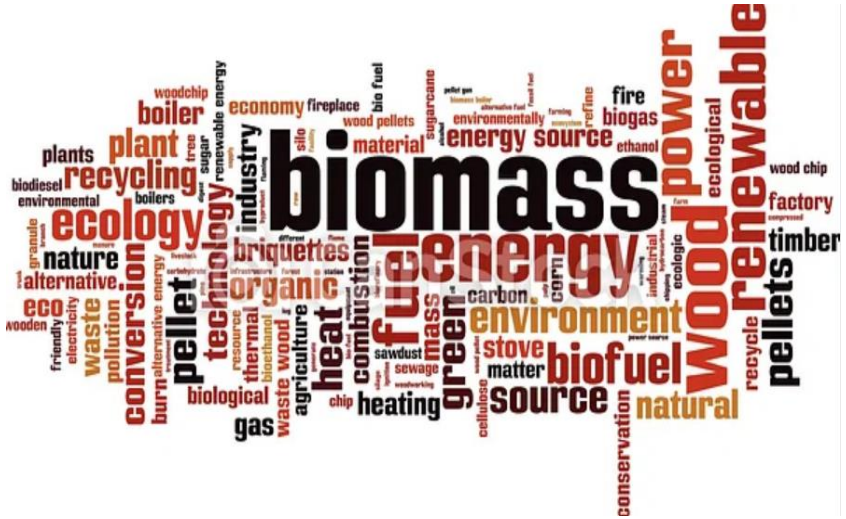
Fishery

Total weight 0.46 tonnes

Fish Off Cut
465,986 tonnes

(estimation of biomass production per annum)

Potential Commercialization Business Model



Wood Pellets

Market Demand

-  **3.9 million ton;**  **4.4 million ton (2022)**
- Revenue: **RM958 million**.

(Source: MIDA Argus Biomass Asia Conference 2023)

EFB Pellets

Market Demand

-  **the power and industrial sector**
- **10 biomass power plants (711.8 MW)** 2023 – 2025;
-  **Co-firing in power plants** and **heat and steam generation** in manufacturing industries.

Grid-Connected Biomass Power Plant

Market Demand

- Feed-in-tariff (**FiT**) mechanism for a **grid-connected biomass power plant**;
- **21 years RE power purchase agreement (REPPA) (RM0.23 - RM0.3687 (RM / KWH))**;
- **70.65 MW biomass power plants** have been installed.

(Source:SEDA Annual Report 2020)

Fuel Switching from Fossil Fuel to Biomass Fuel

Market Demand

- **suitable** for **heavy energy users (Manufacturing Companies)** and practice a **captive power model**;
- **Viable business model** Vs. **High electricity bill**;
- **proven cost-saving solutions**.

OPT Product

Market Demand

- **New OPT furniture (**fibreboard and plywood):
- **Export 2021:**
  - **i. Wood-based fibreboard: RM690 million**
  - **ii. Plywood: RM3.278 billion.**
-  **strong interest**.

Activated Carbon and Reactivated Carbon

Market Demand

- **Coconut shell & Palm Kernel Shell (PKS);**
- **2021 Global Activated Carbon Market = USD 5.7 billion**
- **2026 est. USD 8.9 billion (CAGR of 9.3% from 2021 to 2026)**;
- **Premium products sold overseas or domestic** for various industries.

Bio-Industrial and Bio-Medical products from Rice Straw

Market Demand

- **Food packaging and industrial** products;
- **2018 Global : USD465 billion**
- **2028 est. : USD703 billion**

(Source: Global Market Insights 2018 – 2028)

Animal Feed

Market Demand

- **Converting multiple biomass feedstocks** into **high-value animal feed (**aqua, poultry, cattle, and pet (cat) food;
- **Imported RM6 billion;**
- **Feed consumption :**
  - **i. Ruminant = 250,000 MT**
  - **ii. Fodder = 1.2 million MT**
  - **iii. Poultry and broiler = 5.9 million MT.**

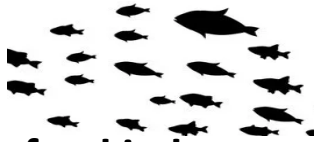
Biofertiliser and Biopesticide

Market Demand

- 2021: value = **RM4.72 billion**
- 2026 est.: 14.3% : **RM9.20 billion**;
- **Total Import Value 2021 = RM4.3 billion**;

Aqua & Animal Feed/Biofertilizer from Fishery Waste

Market Demand



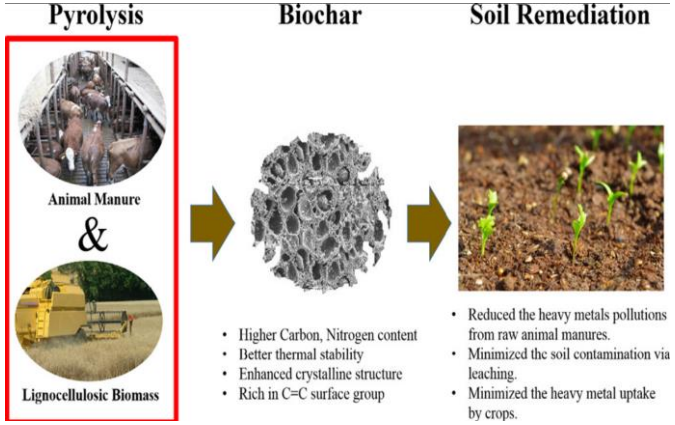
-  → **aqua feed in large quantities**
- **liquid biofertilizer: (Eg.: chilli farming; very effective)**;
- **Indicative pricing for Fisheries By-products: RM0.50 to RM2 /kg**.

Erosion Control Products

Market Demand

→ ***Disaster Management***

- ❖ **Paddy straw, oil palm and coconut fibre Vs. landslides and erosion of river banks.**
- ❖ **Market size : RM450 – RM500 million.**

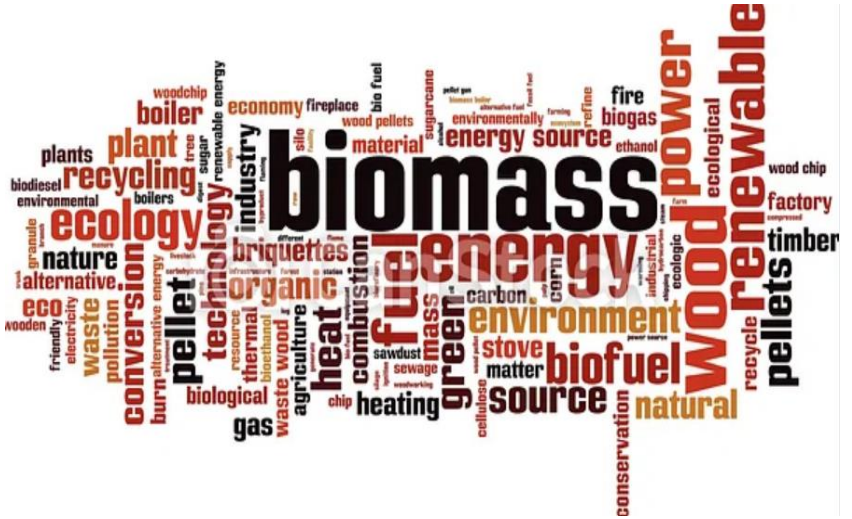


Biochar from Livestock Waste

Market Demand

- ❖ **Soil enhancer is blended and sold as a premium grade biofertilizer (Durian Farming);**
- ❖ **Mature and proven conversion technologies.**

Availability of Government Grants and Financing Schemes



Government Grant

Ministry of Science, Technology and Innovation (MOSTI)

Provides several horizontal R&D&C grants between RM500,000 to RM4 million

2 Main Types of Fund:
1) Technology R&D Fund
2) Community Fund

Malaysian Technology Development Corporation (MTDC)

Strategic investment entity in technology development covering a wide spectrum of business growth; from startup to pre-IPO stage

6 Types of Fund:
1) Halal Tech
2) Start-up
3) Growth
4) Peer-to-Peer
5) Crowdfunding
6) NTIS

Domestic Investment Acceleration Fund

New fund introduced by MIDA: Utilisation of Oil Palm Biomass Non Oil Palm Biomass to Produce Value-Added Products

2 Types of Incentives:
1) Oil Palm Biomass
2) Non-Palm Biomass

Malaysian Rubber Council (MRC) Automation & Green Technology Fund

The fund shall cover green technology projects which includes biomass fuel switching projects

Fund for **Automation** and **Green Technology**

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

Technology R&D Fund – Project Based

1. Applied Innovation Fund

To **increase the participation of innovators** in activities innovative and **technological innovation** approaches to products, processes, systems or new services that have the potential to be commercialized.

2. Technology Development Fund 1 (TeD1)

To develop existing concepts related to **design technologies, processes, or products** that have the **potential to be commercialized** and to stimulate the growth of research and technology development (Government Research Institutes, STI Agencies, Institutions Higher Education, Polytechnics, Community Colleges and industry)

3. Technology Development Fund 2 (TeD2)

To develop existing concepts related **to design form of technology, process or product towards commercialization** to reduce the failure gap (valley of death); (Government Research Institutes, Government STI Agencies, Institutes of Higher Learning, Polytechnics, Colleges Community with industry).

4. Bridging Fund

To reducing the gap of failure (valley of death) between **the pre -phases commercialization to commercialization**; and to increase the level of readiness (readiness) of the products R&D in order to penetrate the market.

5. Strategic Research Fund (SRF)

For the development of Science, Technology, Innovation and Economy (STIE) **covering research, new technologies, processes, innovative or value -added products to existing high -impact technologies / products** for society, economy and national concerns as outlined in DSTIN.

Source: ***https://mastic.mosti.gov.my/sti/incentives/rnd-grants***

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

Community Fund

1. Mainstreaming Grassroots Innovations (MaGRIs)

i. **Prototype Development Scope and Product Development Scope** (Includes prototype/ product improvement, purchase of raw materials, equipment, machines, mold preparation, and product packaging)

ii. **Product Diffusion** (Includes testing, product validation, transportation, and logistics),

iii. **Branding** (Such as Intellectual Property Registration-MyIPO, SIRIM, and business registration),

iv. **Promotion**(Preparation of promotional materials, website development, operation manuals, promotional videos, and offline and online marketing)

2. Malaysia Innovation Fund (MyIS Community)

The scope of funding includes the following:

i. **Raw Material**
ii. **Equipment**
iii. **Project documentation** (such as video recording of the program journey, high-resolution photo and so on)
iv. **Service Expenses**:
- Travel & transportation expenses (not exceeding 3% of the total approved funds and
- Consulting and testing (not exceeding 20% of the total approved funds)

Source: ***https://mastic.mosti.gov.my/sti/incentives/rnd-grants***

MTDC
MALAYSIAN TECHNOLOGY DEVELOPMENT CORPORATION

6 types of fund

1. Halal Technology Development Fund

Hybrid matching funding, consists of Grant and **Convertible Promissory Note (CPN)**, specifically designed to finance and nurture Small and Medium Enterprises (SMEs) **with the application of technology** in halal related products/services for **local market** and **export market**.

2. Business Start-up Fund

To **fund early-stage technology-based companies**. The Fund incorporates elements of **loan and equity**, offering companies **flexible funding via Convertible Promissory Notes (CPN)** and/or Preference Shares.

3. Business Growth Fund

A funding program that **focuses on growing the company** not only on its production output and reach, but also on internal preparedness towards **professionalism, corporate governance, and all the necessary tools** to escalate the company to the next level

4. MTDC-microLEAP Peer-to-Peer

To facilitate **local technology-based companies to obtain financing directly from the mass public**; either individual or organisation via crowdfunding platform. **Enable local technology-based companies to obtain capital through peer-to-peer (P2P) lending** from a relatively large number of investors, using an online platform

5. MTDC-pitchIN Equity Crowdfunding

Equity crowdfunding program aimed to **facilitate fundraising for local technology-based companies through crowdsourcing**. The program will enable local technology-based companies to obtain capital through equity investment from a relatively large number of public investors, using an online platform.

6. National Technology Innovation Sandbox (NTIS) Fund

NTIS serves as a 'safe place' **to allow innovators to test their products, services, business models and delivery mechanisms** in a live environment **with relaxations on all or specific processes and/or regulatory requirements**. In support of the NTIS programme, MTDC offers the NTIS Fund which will finance relevant activities under the programme

Source: https://www.mtdc.com.my/strategic-investments/

MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

Incentives: Utilisation of Oil Palm Biomass to Produce Value-Added Products

		Incentives for new investment and reinvestment*	
Projects	**Processing Division**	**Pioneer Status (PS)**	**Income Tax Allowance (ITA)**
1. Biogas (BioCNG/BioLNG) 2. EFB Processing (Residue oil,PFAD) 3. Bio Chemicals 4. Biofuel (biodiesel, SAF) 5. Bioethanol 6. Food additives	**Chemical & Advanced Material Division**	***New Investment*:** Income tax exemption of 100% of statutory income for a period of 10 years ***Reinvestment*:** Income tax exemption of 70% of statutory income for a period of 5 years	***New Investment*:** 100% of qualifying capital expenditure incurred within a period of 5 years ***Reinvestment*:** 60% of qualifying capital expenditure incurred within a period of 5 years
1. Wood product from Oil palm trunk 2. Animal Feed – PKC, decanter cake 3. Bio composite 4. Pulp & paper 5. Pellet 6. Biochar/activated carbon 7. Bio fertiliser	**Food Technology & Resource Based Industries Division**		
1. Bioplastics 2. Bio-sugar 3. Other enzymatic processes of palm biomass product	**Life Sciences & Medical Technology Division**		

Source: https://www.mida.gov.my/setting-up-content/incentives/

MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

Incentives: Other Incentives for Non-Palm Biomass

		Incentives for new investment	
Projects	**Processing Division** *Depending on end product*	**Pioneer Status (PS)**	**Income Tax Allowance (ITA)**
1. Agricultural Waste or Agricultural by-products : 2. Rice husk 3. Forestry 4. Poultry waste* 5. Etc.* **case to case basis*	**Chemical & Advanced Material Division** **Food Technology & Resource Based Industries Division** **Life Sciences & Medical Technology Division**	Income tax exemption of 70% of statutory income for a period of 5 years	An allowance of 60% of qualifying capital expenditure incurred within a period of 5 years. The allowance is offset against 70% of statutory income for each assessment year

Conditions Imposed

✓ For waste recycling, companies are **not allowed to import waste**

Source: ***https://www.mida.gov.my/setting-up-content/incentives/***

Fund For Automation and Green Technology

About the fund	Scope of Coverage	Additional Criteria
1. To encourage the **rubber product industry to adopt automation and green technology** to enhance the industry's competitiveness 2. To **alleviate labour shortage problem** in the rubber product industry 3. To **promote the adoption of green technology** towards achieving sustainability in the rubber product industry	i. Automation ii. Green technology which comprises: **a) Technology that utilises renewable energy** sources; **b) Wastewater recycling** and/or **rainwater harvesting**.	At least one of the areas as follows: i. Material handling ii. Processing iii. Packaging iv. Inspection and testing v. Other activities which are part of the manufacturing process vi. Solar energy vii. Biomass energy viii. Water treatment *Projects should incorporate elements of Industry 4.0

Source: ***https://www.myrubbercouncil.com/specialfund/***

Financing Schemes

BANK NEGARA MALAYSIA

BANK NEGARA MALAYSIA (BNM)'S FUND
RM1.8 Billion

Provide access to financing at a reasonable cost for SMEs; ***RM800 million High Tech & Green Facility (HTG)*** *and* ***RM 1 billion Low Carbon Transition Facility (LCTF).***

Ongoing Business Needs: 3 sectors
1) All Economic Sectors (AES)
2) Agrofood Facility (AF
3) Micro Enterprises Facility (MEF)

Relief: 4 sectors
1) Special Relief Facility (SRF)
2) Targeted Relief & Recovery Facility (TRRF)
3) PENJANA Tourism Financing (PTF)
4) Disaster Relief Facility (DRF)

Recovery: 4 sectors
1) SME Automation & Digitalization Facility (ADF)
2) High Tech & Green Facility (HTG)
3) Business Recapitalisation Facility (BRF)
4) Low Carbon Transition Facility (LCTF)

Bank Negara Malaysia (BNM)'s Fund for SMEs

- BNM's Fund for SMEs serves to provide access to financing at a reasonable cost for SMEs in all sectors. Recently **BNM has launched an RM800 million High Tech & Green Facility (HTG) and RM 1 billion Low Carbon Transition Facility (LCTF).** MSMEs involved in **biomass circular business models** are eligible to apply for these **soft loan schemes**.

List of all financing facilities under the BNM's Fund for SMEs:

Note: (1) As at 31 Dec 2022; (2) Not including additional allocation as announced under Budget 2023; (3) Fully utilised or closed for application.

Financing Schemes

Development Financial Institutions (DFIs)

BPMB Malaysia Development Bank

AGRO BANK

SME BANK

MGTC

SUSTAINABLE DEVELOPMENT FINANCING SCHEME
RM1.0 Billion

Financing ventures that promote and support the United Nation's SDGs with 1.5% interest rate subsidy.

FUND FOR FOOD FINANCING FOR FOOD PRODUCTION

For production of all food commodity either for the purpose of production, processing, cold storage, marketing or services.

TECHNOLOGY TRANSFER FUND

Financing scope: Equipment and/or machinery; Computer hardware, software and IT solutions; Technology support services; and Other intangible assets to enhance productivity and efficiency.

GREEN TECHNOLOGY FINANCING SCHEME (GTFS 4.0)
RM3.0 Billion

Participating financial institutions (PFIs) providing green loan access with 2% interest rate subsidy.

NATIONAL BIOMASS CONFERENCE 2023

6 -7 December 2023
The Everly Putrajaya

Launching of the National Biomass Action Plan 2023 – 2030 & ESG Driven Business Models

- Plantation Biomass
- Woody Biomass
- Livestock Industry Waste
- Agricultural Biomass
- Fisheries Industry Waste

OPENING KEYNOTE ADDRESS
YAB. Dato' Sri Haji Fadillah Bin Haji Yusof
Deputy Prime Minister and Minister of Plantation & Commodities

Jointly Organised by:

Ministry of Plantation & Commodities

mbic Malaysia Biomass Industries Confederation

Diamond Sponsor:

Bio Eneco BIOMASS FUEL ENERGY PRODUCER

Conference Partner:

Uni-Link Smart Venture
Biomass Study Consultant

Silver Sponsors:

PETERSON

NORTHPORT
A Member of MMC Group

CE Technology Bhd

fibromat® EROSION CONTROL | GEOSYNTHETIC

Green Environmental Engineering "TO BUILD A BETTER WORLD"

Primer Capital

TreeHouz

M-PLUS by Martoda

www.biomass.org.my

THANK YOU

BAHAGIAN BIOJISIM DAN BIOBAHAN API (BBA)
KEMENTERIAN PERLADANGAN DAN KOMODITI (KPK)

Workshop on Biomass Energy

BIOMASS FEEDSTOCK SUPPLY CHAIN IN MALAYSIA FOR GLOVE MANUFACTURERS PLANNING IN BIOENERGY VENTURE

Dato' Leong Kin Mun

Dato' Leong Kin Mun

Entrepreneur, Consultant, Board Member, Advisor

Business Models Formulations, Biomass Supply Chain, Feasibility Study, Green Finance Solutions, Economic Studies

- President, Malaysia Biomass Industries Confederation (MBIC)
- Recently has been entrusted by Ministry of Plantation & Commodities to lead the development the consultancy study on National Biomass Action Plan 2023 – 2030 through his consultancy company Uni-Link Smart Venture Sdn Bhd
- Board Member of Malaysian Green Technology & Climate Change Corporation (MGTC), a government agency under the purview of Ministry of Natural Resources, Environment and Climate Change (NRECC)
- Appointed by the Universiti Tenaga Nasional (UNITEN) as the Advisory Panel for the AAIBE Chair of Renewable Energy (2022 -2025) / Industrial Advisory Panel (IAP), Xiamen University Malaysia (2022-2023)
- Appointed as the Co-Chair, Inter-University Industry Network Malaysia Biomass to Fuel & Biomaterials (IUINMB2FM), a university-industry platform on biomass R&D collaboration and commercialization.
- *Historically served as Technical Advisor, European Union (EU) – Malaysia Biomass Sustainable Production Initiative (Biomass-SP) 2010 – 2014*
- *Appointed by Sustainable Energy Development Authority (SEDA) / United Nations Development Programme (UNDP) and European Commission to champion studies on green technology business models, green finance and biomass sustainability*

NATIONAL BIOMASS CONFERENCE 2023

6 -7 December 2023
The Everly Putrajaya

Launching of the National Biomass Action Plan 2023 – 2030 & ESG Driven Business Models

- **Plantation** Biomass
- **Woody** Biomass
- **Livestock Industry** Waste
- **Agricultural** Biomass
- **Fisheries Industry** Waste

OPENING KEYNOTE ADDRESS
YAB. Dato' Sri Haji Fadillah Bin Haji Yusof
Deputy Prime Minister and Minister of Plantation & Commodities

Jointly Organised by:
Ministry of Plantation & Commodities

Malaysia Biomass Industries Confederation

Diamond Sponsor:
Bio Eneco BIOMASS FUEL ENERGY PRODUCER

Conference Partner:
Uni-Link Smart Venture
Biomass Study Consultant

Silver Sponsors:
PETERSON
NORTHPORT
A Member of MMC Group
CE Technology Bhd
fibromat® EROSION CONTROL | GEOSYNTHETIC
Green Environmental Engineering "TO BUILD A BETTER WORLD"
Primer Capital
TreeHouz
M-PLUS by Martoda

www.biomass.org.my

Conference Registration
(Click to Register)
https://forms.gle/6RV5Cx143VeVY2bdA

Conference Registration
(Scan to Register)

Profile of Key Biomass Sector

Oil Palm Biomass

Estimated Availability of Oil Palm Biomass (Dry Weight) based on FFB Production (90.53 million tonnes) in 2022

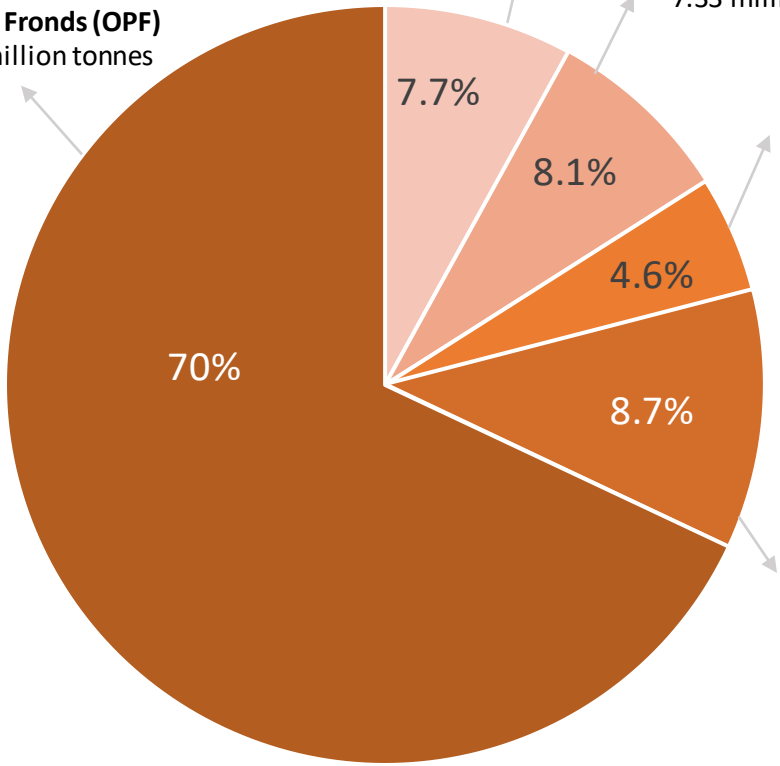
Oil Palm Fronds (OPF)
63.22 million tonnes

Empty Fruit Bunch (EFB)
6.97 million tonnes

Palm Mesocarp Fibres (MF)
7.33 million tonnes

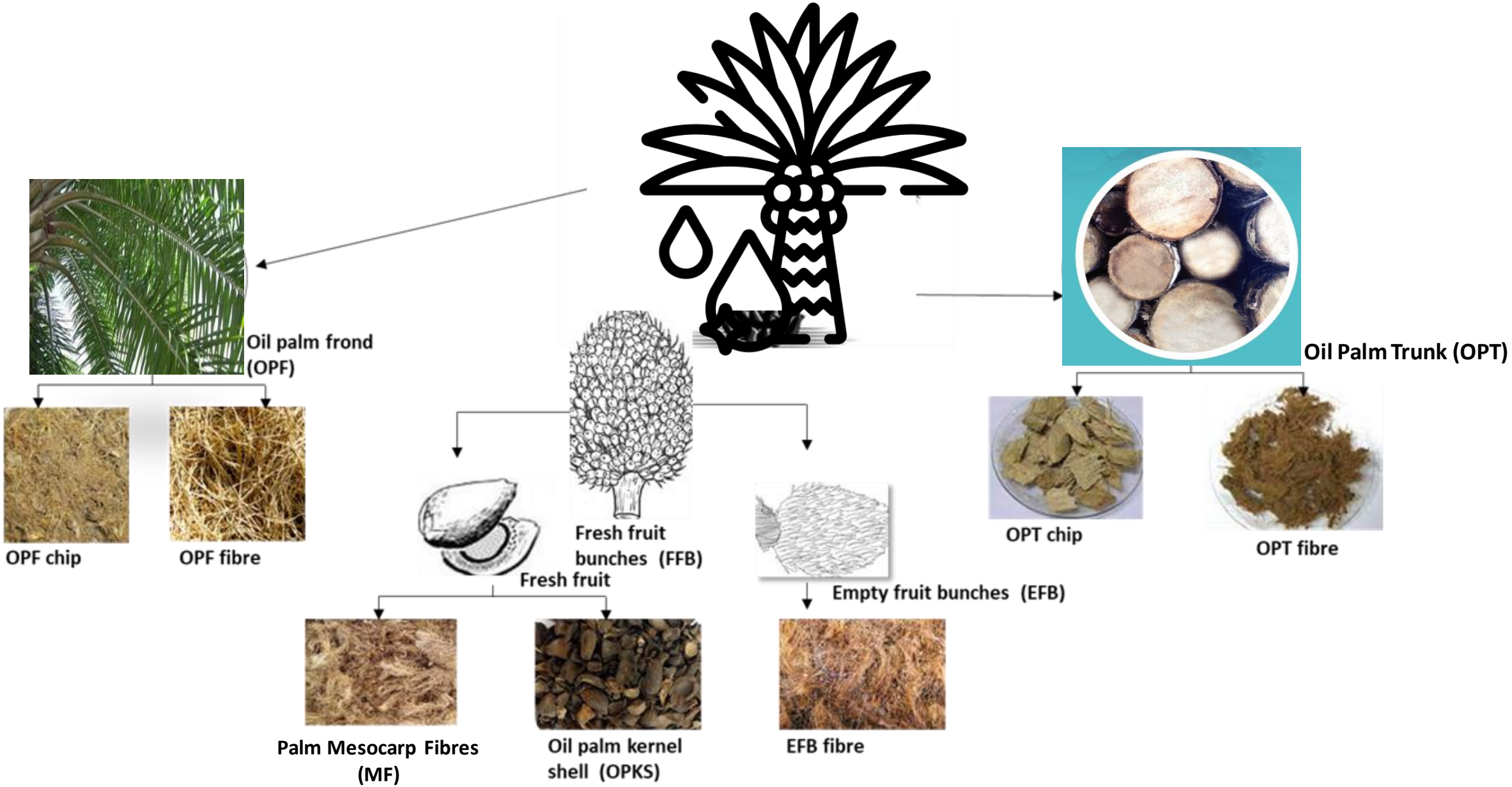
Palm Kernel Shells (PKS)
4.23 million tonnes

Oil Palm Trunk (OPT)
7.91 million tonnes



- **Special Mention:**
  Palm Oil Mill Effluent (POME)
  60.66 million tonnes

Introduction to Oil Palm Biomass



Introduction to Oil Palm Biomass

Biomass	Description	Uses
EFB	Remains of the fresh fruit bunch ("FFB") after the fruit has been removed for processing	Used as fuel for steam production and power generation in palm oil mills; and used as fertiliser and soil conditioning agent
Palm kernel shell	Fibrous shell fractions left subsequent to the removal of palm oil kernel nut after crushing	Used as fuel for steam production and power generation in palm oil mills
Mesocarp fibre	Remains of the palm fruits after palm oil extraction	Used as fuel for steam production and power generation in palm oil mills; and raw material for fibre composites to manufacture furniture, mattress, erosion control material, paper, sofa, and car seat
POME	Oily liquid waste that is a by-product of the palm oil milling process	Used for producing electricity after treatment and process to harness methane from the POME
OPF	Leaf-like part of the oil palm which will be obtained during pruning activity	Used as fuel for steam production and power generation in palm oil mills; fertiliser in oil palm plantations and roughage source for ruminants
OPT	Oil palm tree trunk which will be felled during oil palm replanting every 25 to 30 years	Used as raw material for plywood, medium density fibreboard, particle board and fibre-reinforced plastic composites

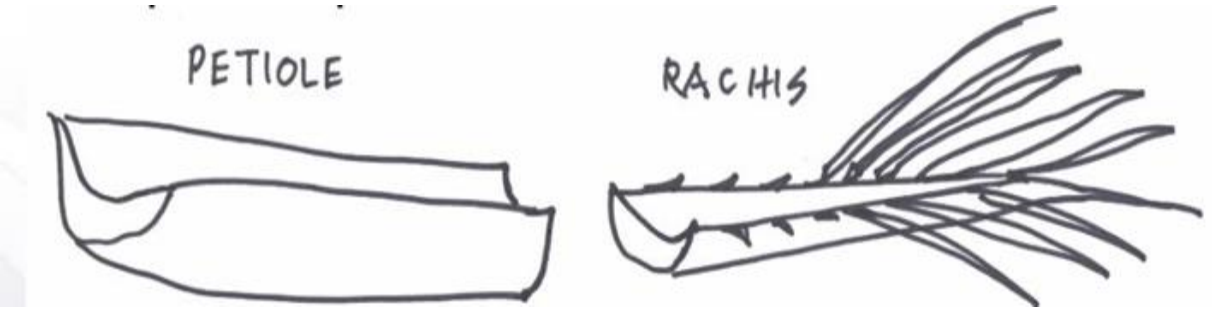
Introduction to Oil Palm Biomass

Empty Fruit Bunch (EFB)

- A solid residue that accounts for 22% of the fresh fruit weight; produced abundantly after oil extraction at palm oil mills.
- EFB provides huge resources for conversion into value-added products, as the EFB is inexhaustible, renewable, biodegradable, recyclable.
- Utilized for the production of bio-agriculture products, bio-energy, wood products, eco-products, as well as bio-based chemicals.

Introduction to Oil Palm Biomass

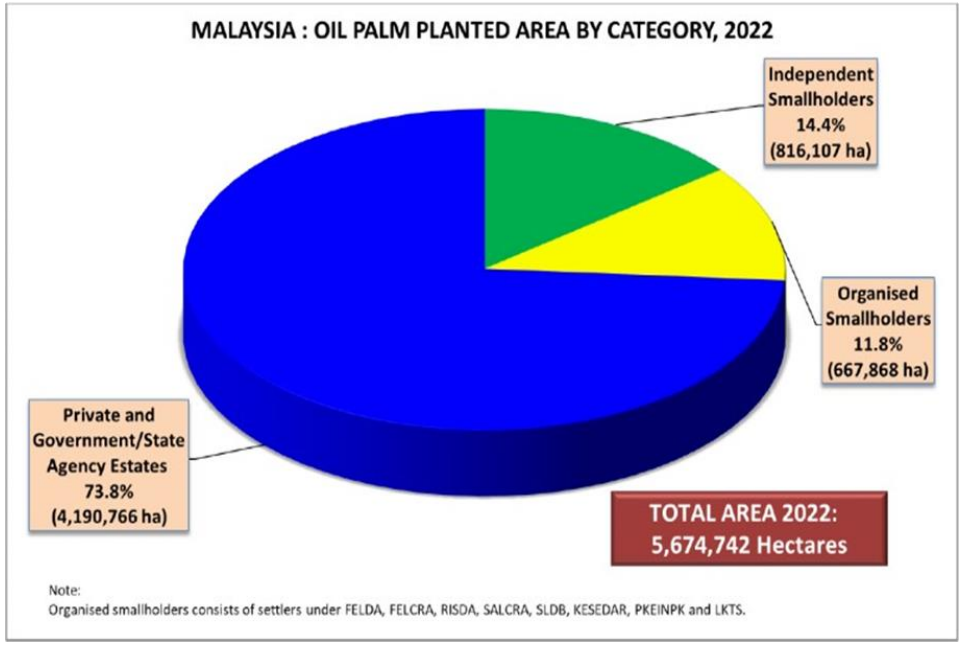
Oil Palm Frond (OPF)



- Available during pruning and replanting, but larger amounts are available during pruning
- The whole OPF consists of the petiole and the leaflets
- OPF from mature trees produce larger volumes of fibres per frond
- OPF consists of around 62% of fibres and 38% of parenchyma tissues

Introduction to Oil Palm Biomass

Oil Palm Trunk (OPT)



- ✓ Available during replanting activities
- ✓ Being a monocotyledon, there is a great variation of moisture content at different parts of the trunk, between 100 and 500 %
- ✓ Density varies between 200-600 kg/m3 (Average = 370 kg/m3)
- ✓ Replanting is carried out on average every 25 years, with up to 134-136 palms trees replanted per hectare
- ✓ OPT contains a high content of non-fibrous or parenchyma tissues (45.87%)
- ✓ OPT has a high content of silica

Introduction to Oil Palm Biomass

Palm Mesocarp Fibers (MF)

- Also known as Palm Pressed Fibre (PPF), is a by-product produced from the extraction of oil palm FFB in palm oil mills.
- Contains 5 – 7% residual oil (dry weight basis)
- Conventionally, PPMF is burnt as a fuel to produce steam and electricity for mill operations.
- The residual oil or known as Palm Pressed Fibre Oil (PPFO) contains 1200 – 2500 ppm carotenes and 1200 – 2000 ppm Vitamin E.

Introduction to Oil Palm Biomass

Palm Kernel Shell (PKS)

- The shell fractions left after the nuts have been extracted from the crushing operation in the palm oil mill.
- PKS are commonly used as solid fuel in palm oil mill steam boilers to power turbines that generate electricity (co-generation).
- In 2020, Malaysia exported almost 1 million MT of PKS to the world, 2022 exported 1.25 million MT to overseas. The major market is Japan.
- Moisture content 20-25%, fixed C 20-22%, ash content 1-3%, volatile matter 68-70%

Palm Oil Mills Distribution (2022)

State	No. of Mill Operation
✓ Johor	63
Kedah	6
Kelantan	10
Negeri Sembilan	14
Melaka	3
✓ Pahang	69
✓ Perak	44
Pulau Pinang	2
Selangor	15
Terengganu	12
Peninsular Malaysia	238
✓ Sabah	129
✓ Sarawak	84
Sabah & Sarawak	213
MALAYSIA	**451**

Current Utilisation of Woody Biomass

Source : KPK

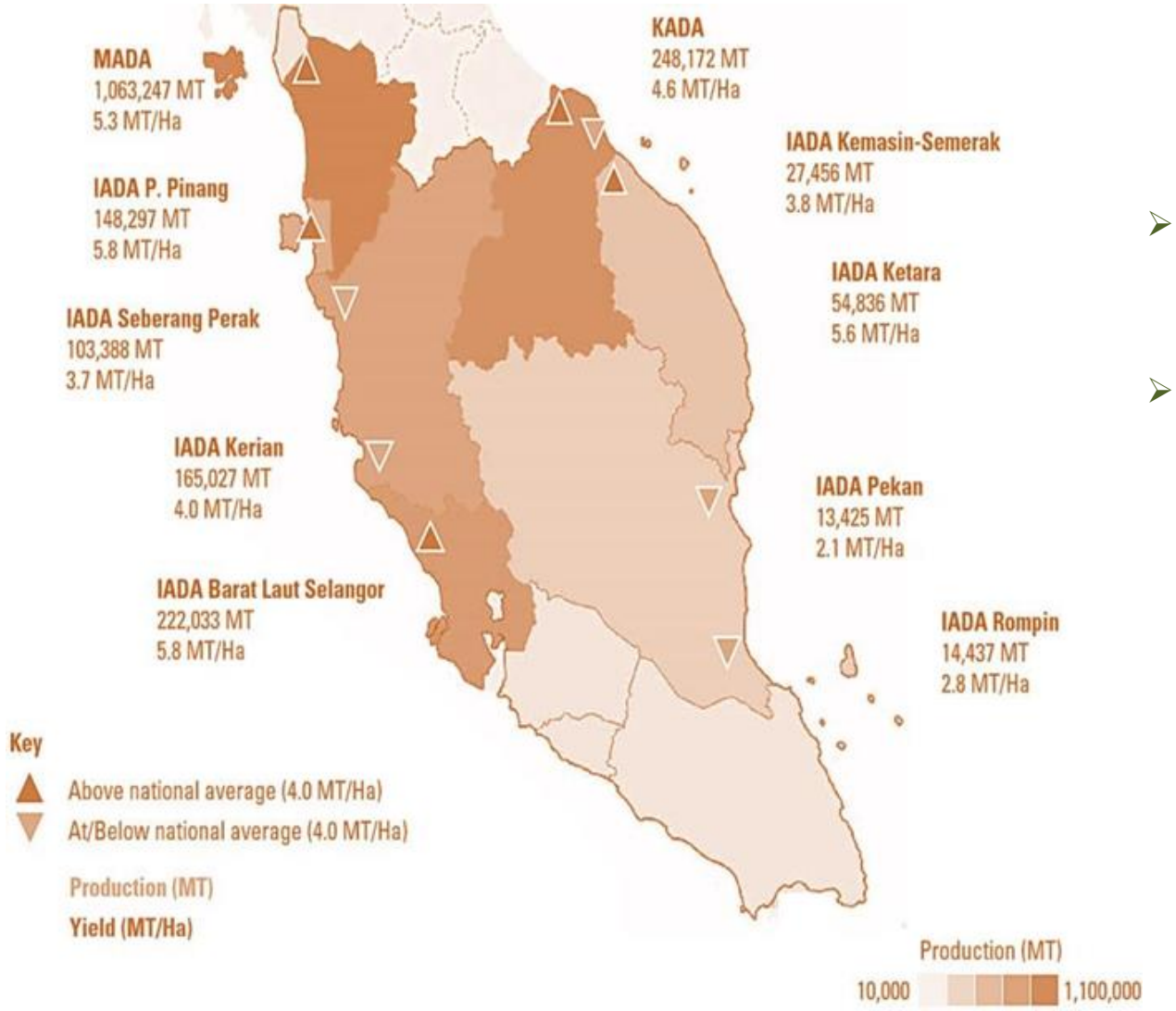
Wood Chips

Storage Area

Biomass Boiler

Case Study of Glove Manufacturer using woodchip

Current Utilisation of Rice Husk at Rice Mills



- Paddy production in Malaysia was estimated at 2.428 million tonnes.
- Rice husk generated is estimated at 22% or 534,356 tonnes.

Take Home Point

- ✓ Plan ahead your biomass fuel supply chain
- ✓ Pricing of biomass commodity is highly volatile linked to various factors - energy price, government initiatives, global trade competition etc.
- ✓ Biomass boiler has proven its energy efficiency case in Malaysia which is even more competitive than natural gas boiler (case study of glove manufacturers in Malaysia)
- ✓ Investment incentives from MIDA are available for such bioenergy investment
- ✓ Soft loans from bank are available
- ✓ Good payback period for glove manufacturers invest in biomass boiler

Thank You & Open for Discussion

LinkedIn

Dato' Leong Kin Mun

Email: dlkm@u-link.com.my

km.leong@mgtc.gov.my

kinmun.leong@biomass.org.my

M: +6012-290 2898

Join Greentech & Biomass Circle Telegram!

MALAYSIAN GREEN TECHNOLOGY
AND CLIMATE CHANGE CORPORATION

Workshop on Biomass Energy

6th November 2023
Aloft Hotel KL Sentral

"Introduction on Greenhouse Gas Emissions Assessment"

Sazalina Zakaria
Manager, GHG Advisory and Consultancy Division
Malaysian Green Technology and Climate Change Corporation (MGTC)

THE JOURNEY TOWARDS NET ZERO

MGTC is a government agency of the Ministry of Natural Resources, Environment and Climate Change (NRECC) mandated to drive the country in the scope of **Green Growth, Climate Change Mitigation and Green Lifestyle.**

Pusat Tenaga Malaysia

1998

Malaysian Green Technology Corporation

2010

Malaysian Green Technology & Climate Change Corporation

2021

Climate Change was added in 2019 during IGEM

Support the **National Climate Change Agenda** through

Green Technology
Green Growth
Green Recovery

Low Carbon Development

Green Incentives

Strategic Collaborations

Communication
Education
Public Awareness

SUPPORTING LOW CARBON DEVELOPMENT IN MALAYSIA

MGTC implements various government initiatives to support the nation's low carbon development through strategic approach and programmes such as:

Promoting Green Investment in the Country (via Foreign & Domestic Direct Investments)

1. Implementing Green Technology and Climate Change Initiatives Guided by Existing Policies and Roadmaps:

a. National Green Technology Policy
b. Green Technology Master Plan
c. Low Carbon Mobility Blueprint
d. Circular Economy Roadmap
e. National Policy on Climate Change

2. Facilitating Investment Promotion & Business Matching

a. International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM)
b. National Flagship Projects
c. International Expos (Astana, Dubai)
d. United Nations Climate Change Conference – COP28 UAE

Accelerate Green Economy & Advance Climate Action

1. Creating Green Market

a. Government Green Procurement (GGP) programme
b. MyHIJAU Directory of Products & Services
c. Sustainable Consumption & Production programmes
d. Low Carbon Cities programme
e. Electric Vehicle (EV) Charging Infrastructure programme – Yinson GreenTech Malaysia

2. Green Incentives & Certification

a. Green Technology Tax Incentives:
   i) GITA – Green Investment Tax Allowance
   ii) GITE – Green Income Tax Exemption
b. Green Financing:
   i) GTFS – Green Technology Financing Scheme
c. Green Certification:
   i) MyHIJAU Mark – Green Recognition Scheme (Green Labelling & Certification)

3. Green Advisory & Consultancy

a. Environmental Sustainability (ESG)
b. Corporate Green Roadmap/Blueprint/Action Plan
c. Carbon/GHG Emission Accounting & Reporting
   i) Low Carbon Operating System (LCOS)

Shaping Green Culture/Lifestyle among Business Community and Industry

1. Creating Awareness & Providing Education

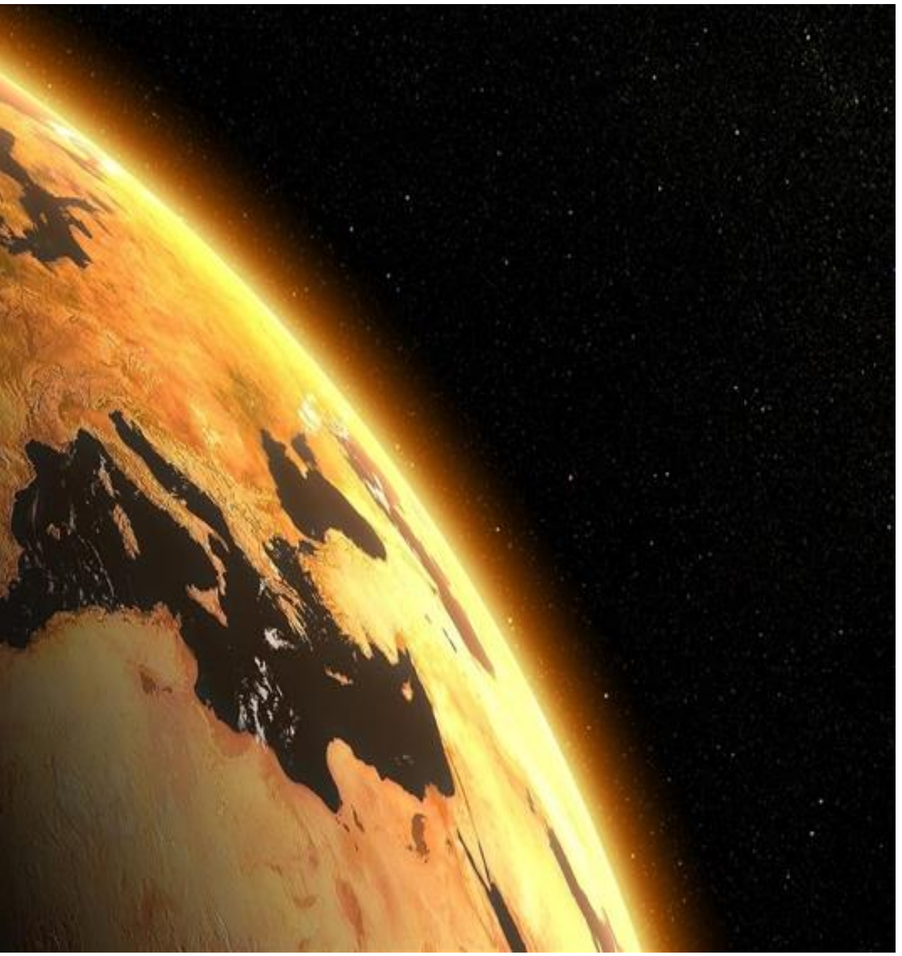
a. Green Skills Centre
   i) Technical Certification Training programme
   ii) Awareness Courses
   iii) Module Development
b. Conferences, Seminars, Workshops
c. Greening the House of Worship (CSR)
d. Youth Social Business

2. Recognising Achievement & Performance

a. National Energy Award (NEA)
b. Energy Management Gold Standard (EMGS)
c. Low Carbon City Diamond Recognition

Introduction to greenhouse gas (GHG)

Greenhouse Effect



It's normal for there to be some greenhouse gases in our atmosphere.

Extra greenhouse gases in our atmosphere are the main reason that Earth is getting warmer.

Greenhouse gases trap the Sun's heat in Earth's atmosphere.

Greenhouse Gases

The main gases responsible for the greenhouse effect include:

i. Carbon dioxide (CO_2)

ii. Methane (CH_4)

iii. Nitrous oxide (N_2O)

iv. Fluorinated gases- hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3)

Greenhouse Gases

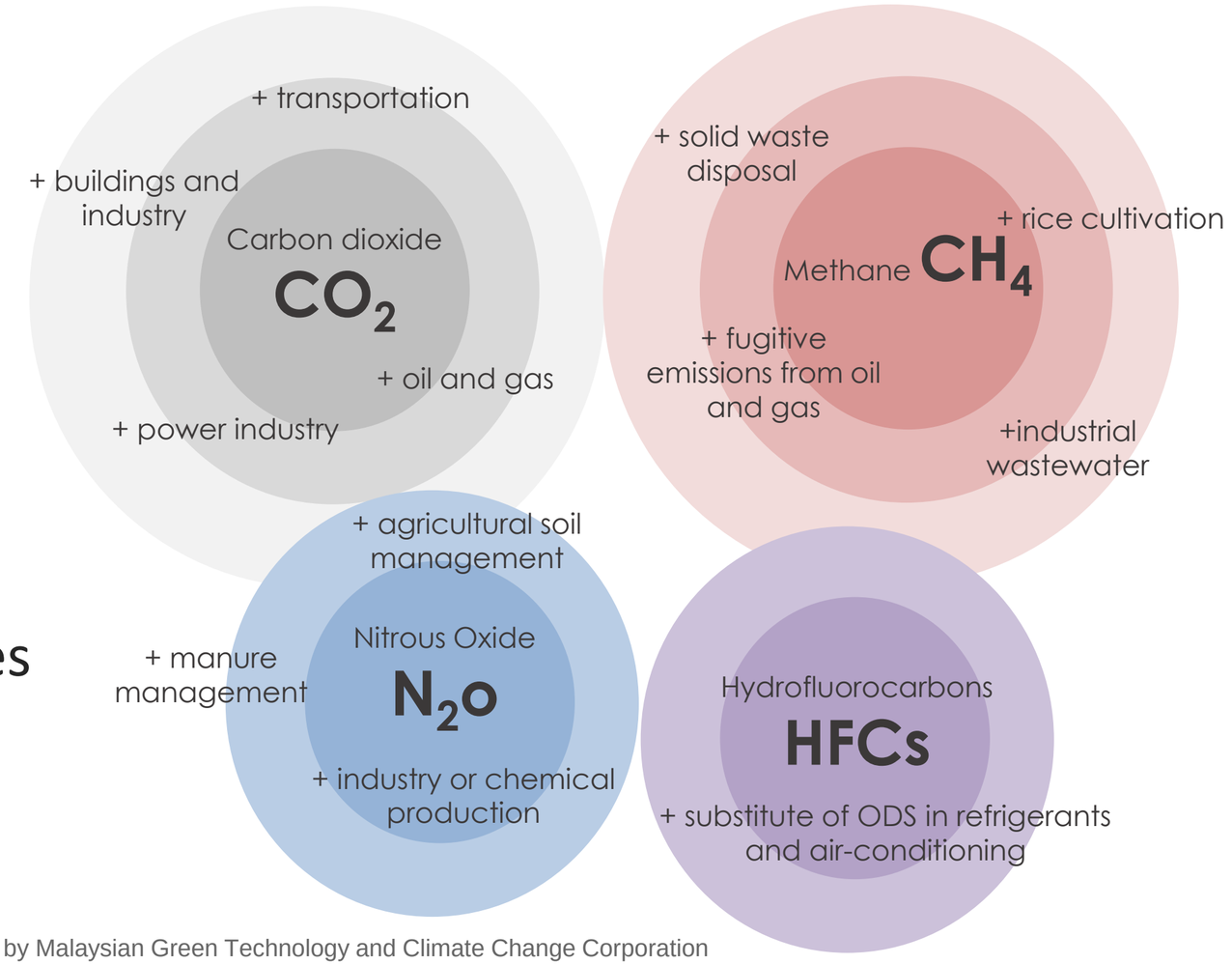
The main gases responsible for the greenhouse effect include:

i. Carbon dioxide (CO_2)

ii. Methane (CH_4)

iii. Nitrous oxide (N_2O)

iv. Fluorinated gases



Type of GHG and Sources

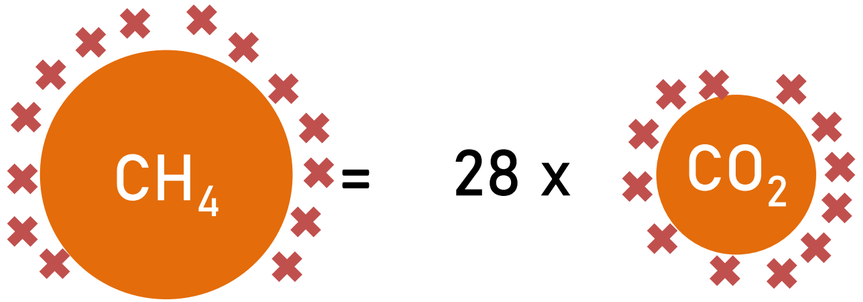
Greenhouse Gases

The main gases responsible for the greenhouse effect include:

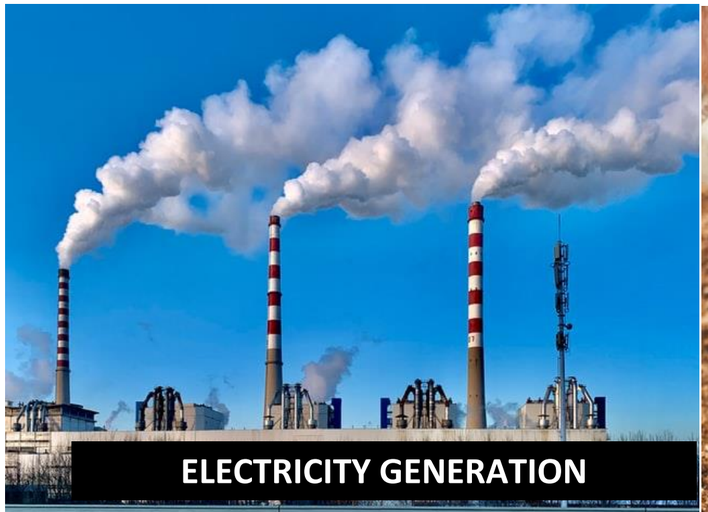
i. Carbon dioxide (CO_2)
ii. Methane (CH_4)
iii. Nitrous oxide (N_2O)
iv. Fluorinated gases

All greenhouse gases have its GWP **Global Warming Potential**.

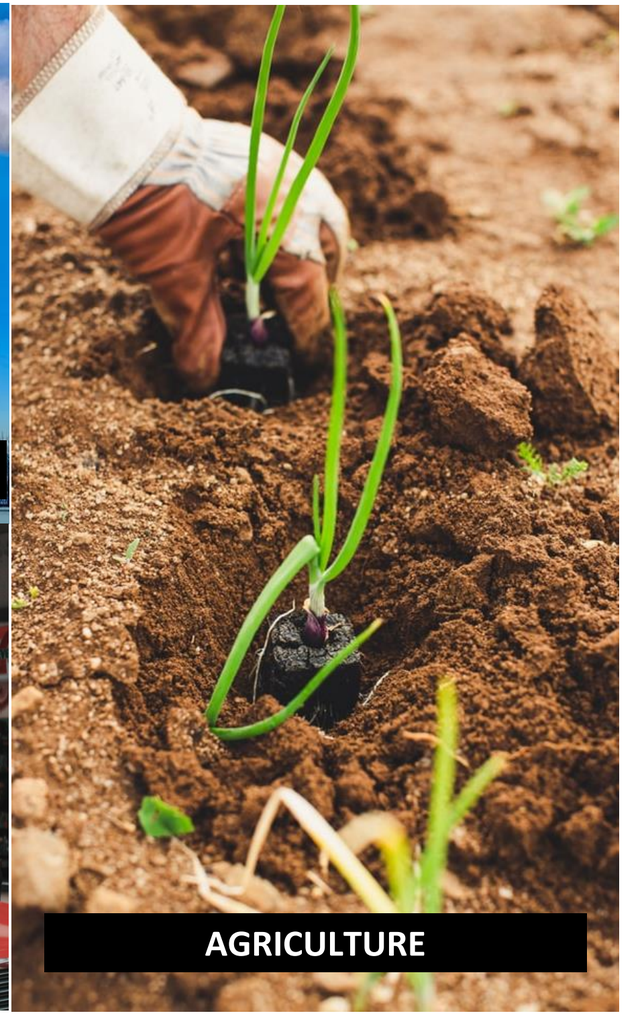
Abilities different greenhouse gases to trap heat in the atmosphere



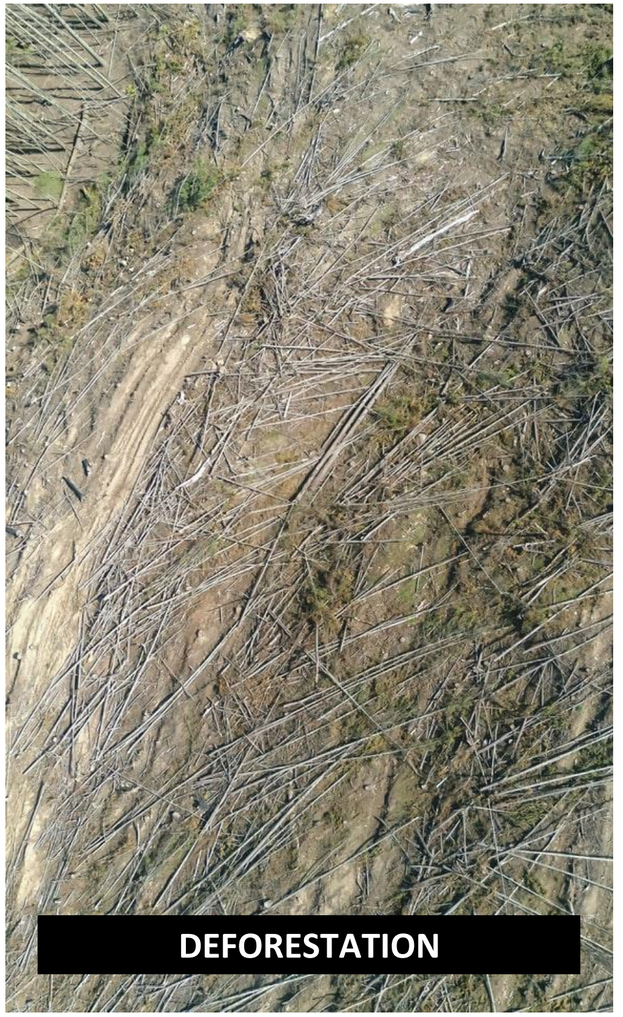
GHG Sources - Anthropogenic


ELECTRICITY GENERATION

TRANSPORT


AGRICULTURE


LIVESTOCK & POULTRY


DEFORESTATION

Impacts of Climate Change

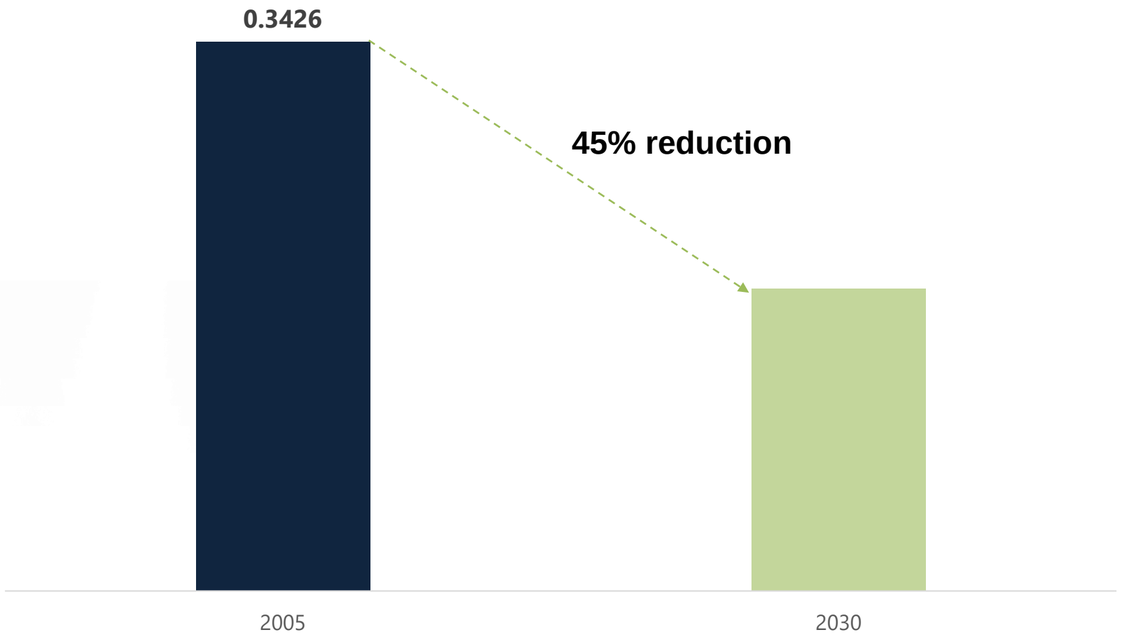
Responding to climate change

Malaysia has set a Nationally Determined Contribution (NDC) and long-term target as a response to climate change

Malaysia's NDC

"Malaysia intends to reduce its economy-wide carbon intensity (against GDP) of 45% in 2030 compared to 2005 level"

Malaysia carbon intensity ($kgCO_2e/RM$)



Source: Malaysia's Updated NDC and BUR4

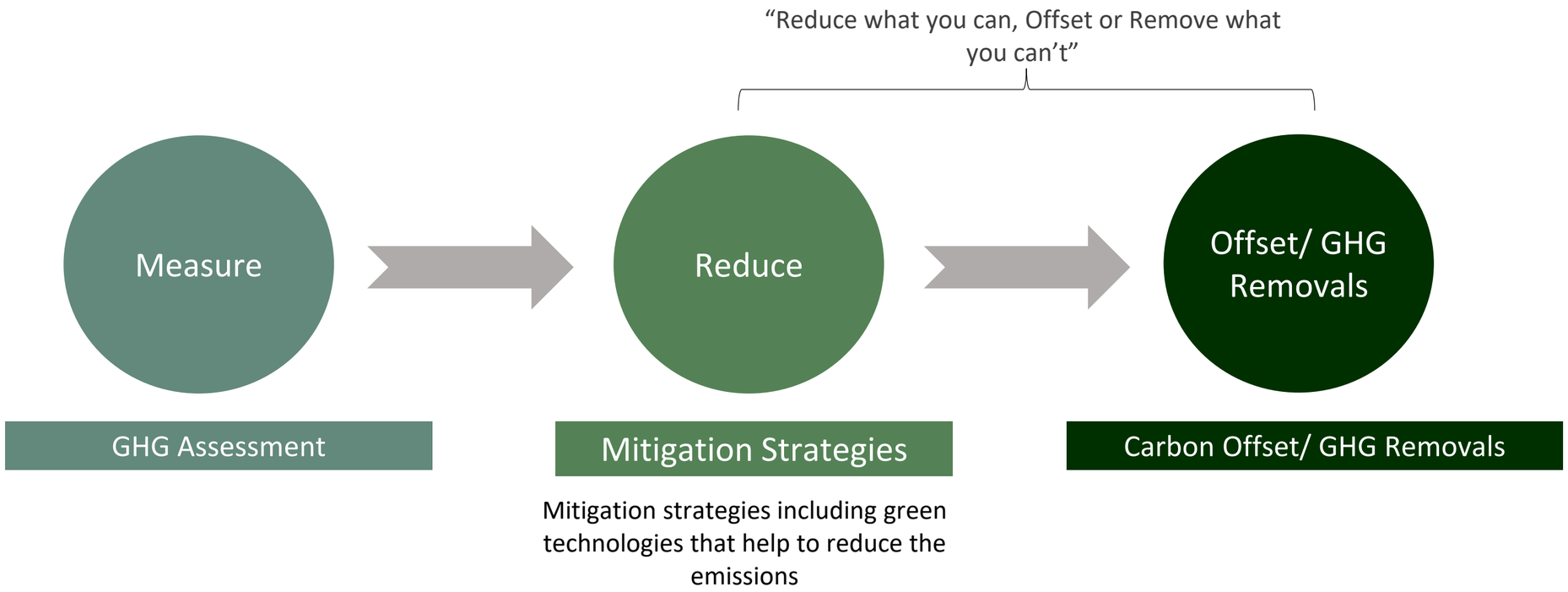
Malaysia's long-term goal

"The ministry is developing a long-term national low carbon development strategy in line with the country's aspiration to achieve net zero GHG reduction as early as 2050"

Source: RMK-12

Introduction to GHG Emissions Assessment

Key Steps to Manage Emissions



- Start by measuring the emissions based on the defined boundaries.
- The organisations will first reduce the emissions as much as possible through implementing mitigation strategies before considering carbon offsets or GHG removals.

Types of GHG Emissions Assessment

PERSONAL

is GHG emissions caused by each person's clothing, food, housing and traffic of daily life.

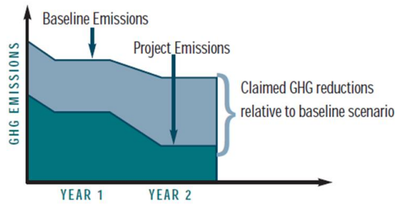
PRODUCT

measures the GHG emissions over the entire life of a product (goods or services)

ORGANISATION

measures the GHG emissions from all the activities across the organization, including energy used in buildings, industrial processes and company vehicles.

PROJECT



quantifies emissions that will be avoided by a given project in the future.
Impact estimated through a comparison with a baseline, "what if?" scenario

CITIES

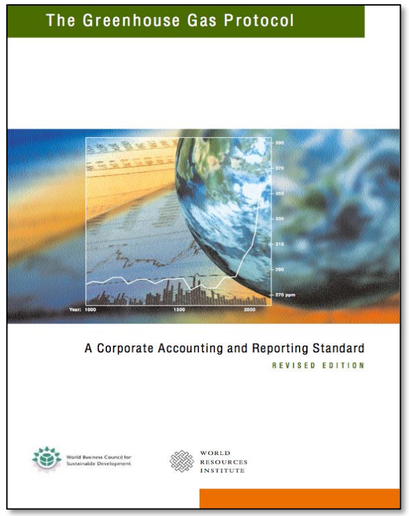
estimate of emissions and removals of greenhouse gases (GHG) from given sources or sinks, from a defined boundary

COUNTRY

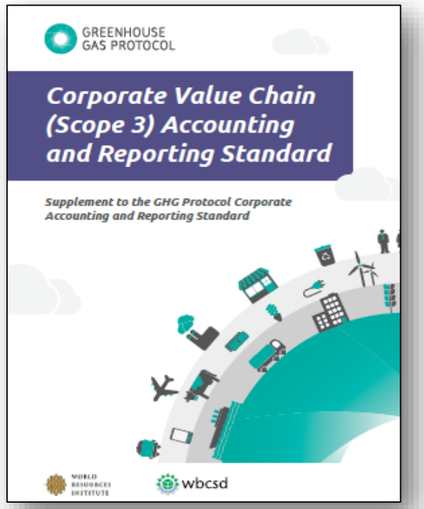
estimate of emissions and removals of greenhouse gases (GHG) from given sources or sinks, from a defined country in a specific period

Guidelines and Standards on GHG Accounting

ENTITY

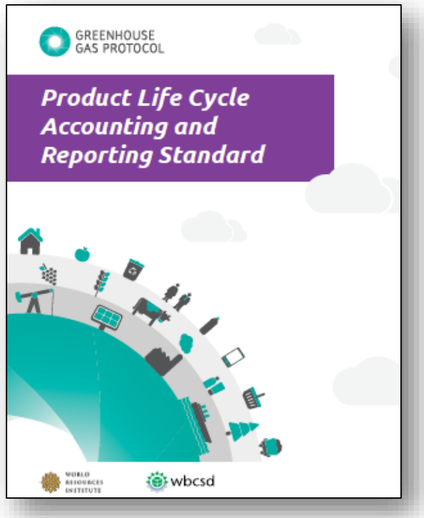


Corporate Standard

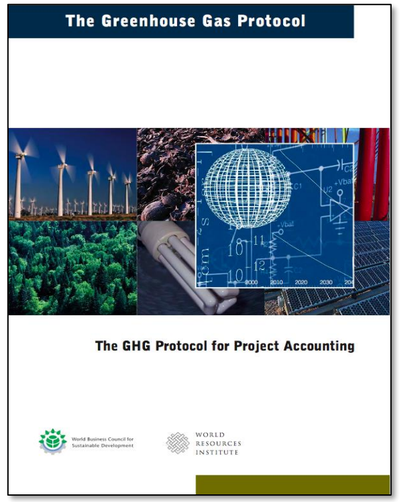


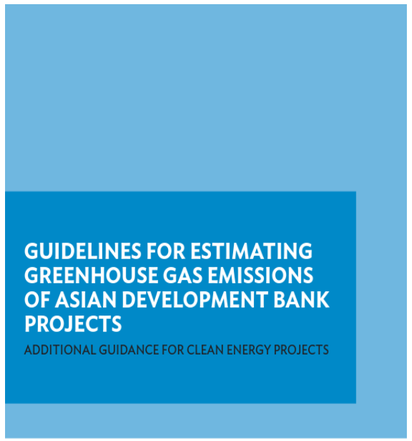
Value Chain (Scope 3)

PRODUCT

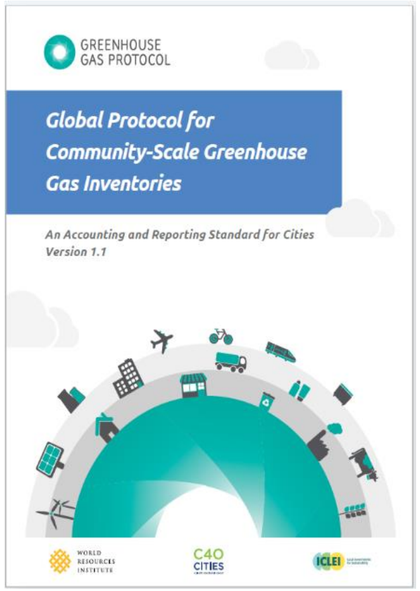


PROJECT





CITIES



ASIAN DEVELOPMENT BANK

How does GHG Assessment work?

GHG emissions can be quantified using one of two main methods:

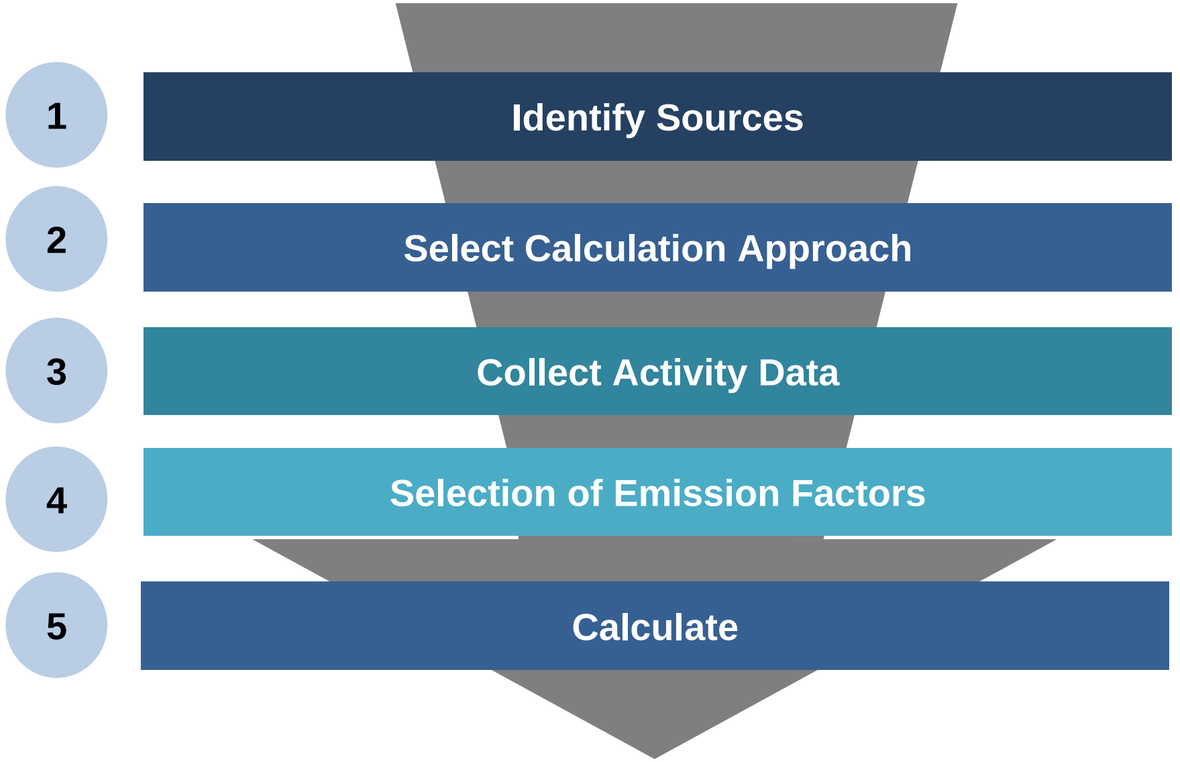
Direct Measurement

Uses physical measuring devices and equipment to gauge the actual quantity of GHGs emitted from a source. Think of a device in a smokestack that measures the amount of GHGs that pass through the smoke stack.

Calculation

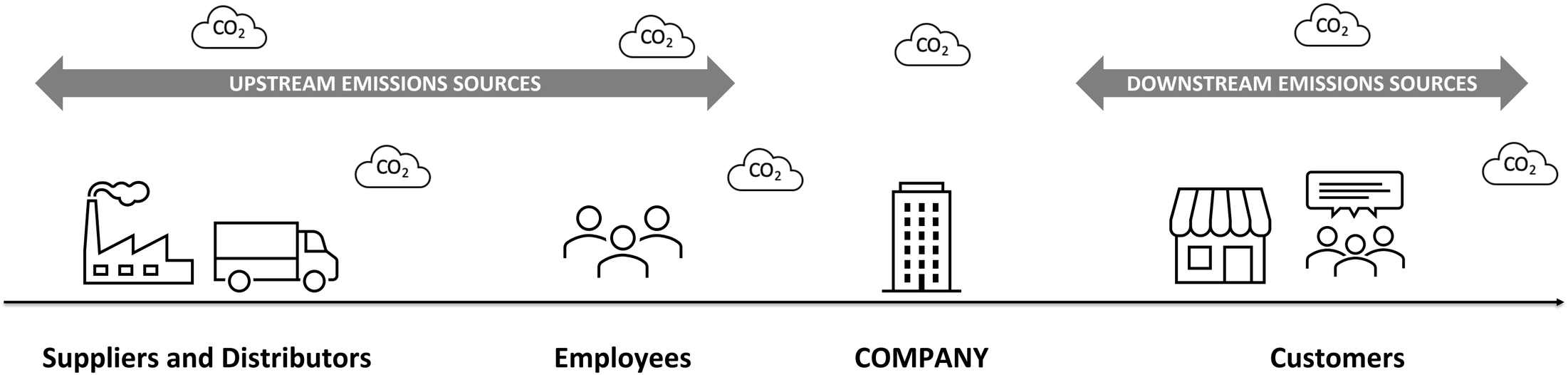
Uses existing data on the GHG emitting activities of your company to calculate your best estimate of GHG emissions.

How to calculate GHG Emissions in 5 Steps

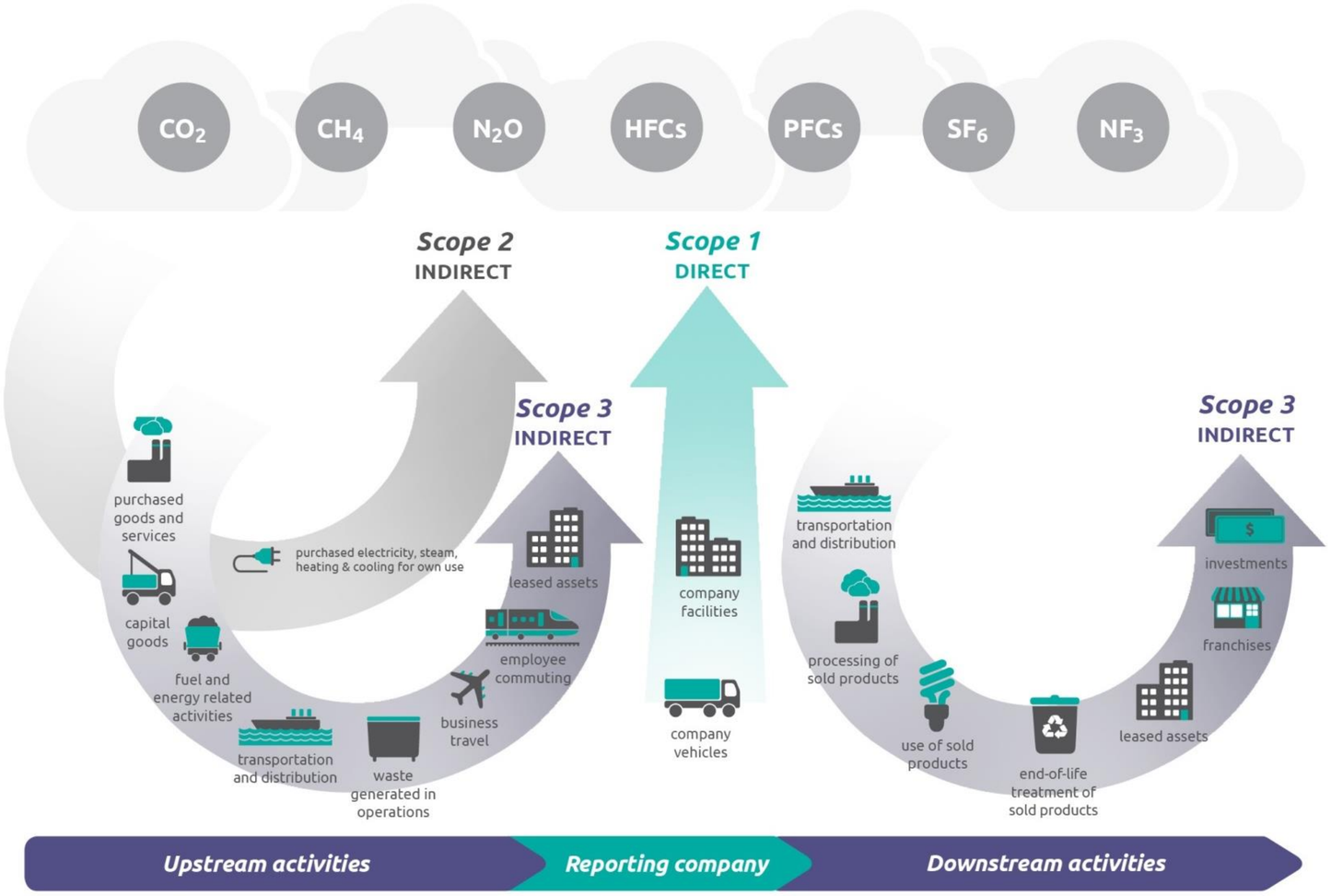


GHG Emissions Assessment for Organisation

GHGs are emitted from different sources across a company’s value chain

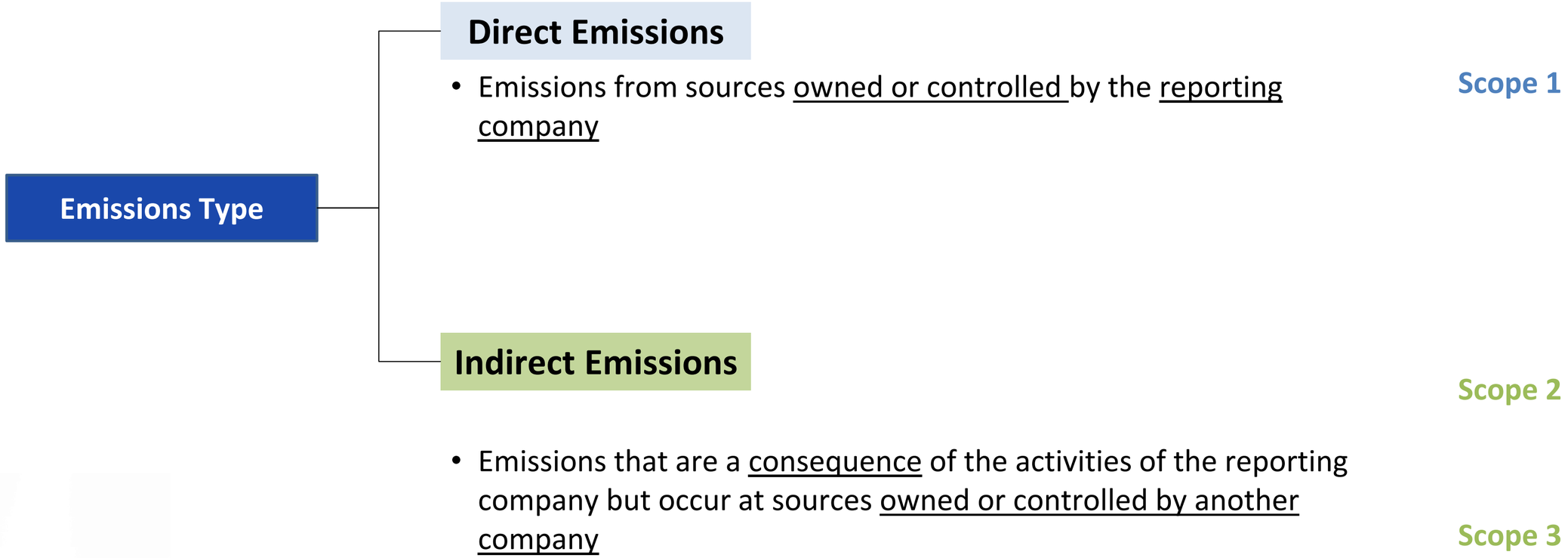


Scope 1, 2 & 3 under GHG Protocol



Source: The GHG Protocol Standard

Overview of Scopes under GHG Protocol



Source: The GHG Protocol Standard

Summary of Scopes under GHG Protocol

EMISSIONS TYPE	DEFINITION	EXAMPLES
Direct Emissions	**Scope 1 (Required)** Emissions from operations that are owned or controlled by the company	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc. 1. Stationary Combustion 2. Mobile Combustion 3. Fugitive Emissions 4. Process Emissions
Indirect Emissions	**Scope 2 (Required)** Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the company	Use of purchased electricity, steam, heating, or cooling
	Scope 3 (Optional) All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions	Scope 3 emissions can be divided into 15 categories. Examples: Production of purchased products, transportation of purchased products, etc

Source: The GHG Protocol Standard

Methodology GHG Calculation

Activity Data x Emissions Factor = Emissions (tonnes)

1

An activity is any action that creates emissions. Activity data is the quantifiable measurement of that activity.

2

Emission factors convert activity data to emission values.

Emissions (tonnes) **X** **Global Warming Potential (GWP)** **=** **Carbon Dioxide Equivalent (CO_2eq)**

translate your emissions into a common unit that compares and relates all your GHG emissions so you can report them as a single combined quantity.

GHG Emissions Assessment for Project

General steps in project accounting

1. Describe project & primary reduction(s)
2. Check eligibility (for carbon credit)
3. Additionality screen (for carbon credit)
4. Select baseline for primary reduction(s)
5. Estimate project reduction

1. Describe project: Typology

Project specific guidance for project developers & regulators	➢Energy & Power ➢Industrial Projects ➢Fugitive Emissions Capture ➢Agricultural Projects ➢Carbon Sequestration

2. Check eligibility

Different schemes have different rules:

- Allowable project types, locations, timing of project, etc.
- Contribute to sustainable development objectives
- Financial additionality – financing is additional to ODA and funding from multi-lateral organizations
- Investment additionality
- Host government approval

3. Additionality Screen

What is additionality, why does it matter?

- Criterion to assess and justify whether or not the GHG reduction would have occurred in the absence of the project
- Additionality is important when a GHG reduction is used as an offset against a mandatory or voluntary cap
- Environmental Integrity

4. Select baseline for emission reduction(s)

2 approaches:

1. GHG performance standard (benchmark approach)
2. Project-specific baseline

5. Estimate the GHG reduction

Example of Calculation Methodology for Renewable Project

- Type of RE
  - Mini hydro
  - Biomass
  - Biogas

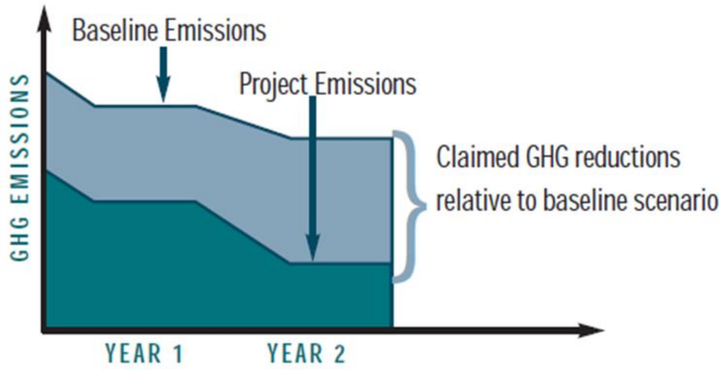


FIGURE 2.1b: Comparison against a baseline scenario for project accounting

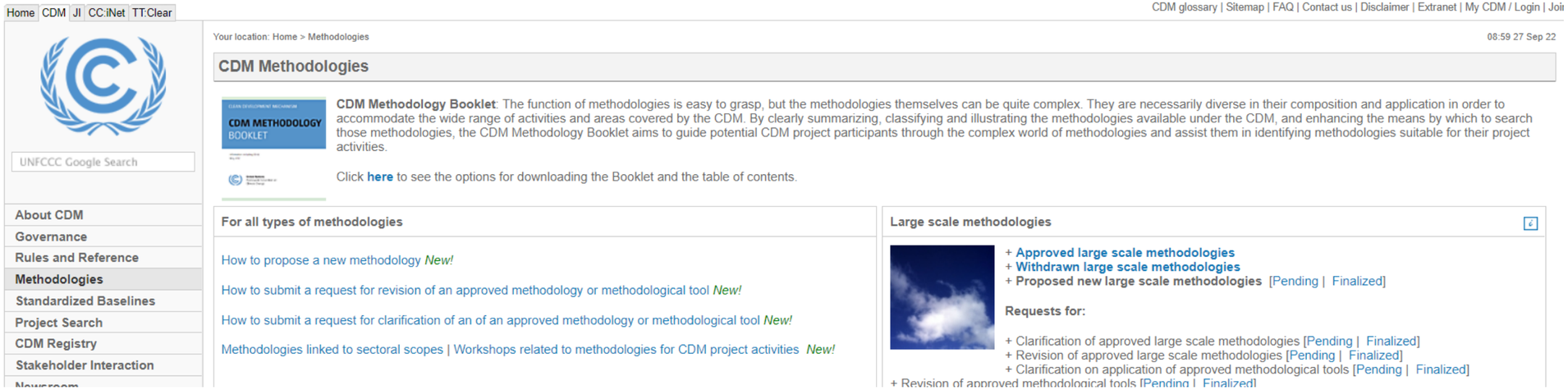
- Steps:

1. Baseline Emissions (BE_y) . The CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.
2. Project emission (PE_y) is the emission in the presence of project due to processes that release GHG to atmosphere.
3. Emission reductions (ER_y) as the difference between the project and baseline emissions.

$$\boldsymbol{ER_y = BE_y - PE_y}$$

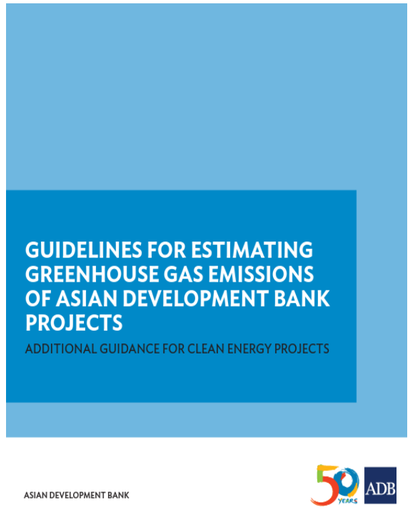
Options for Methodology

1. Clean Development Mechanism



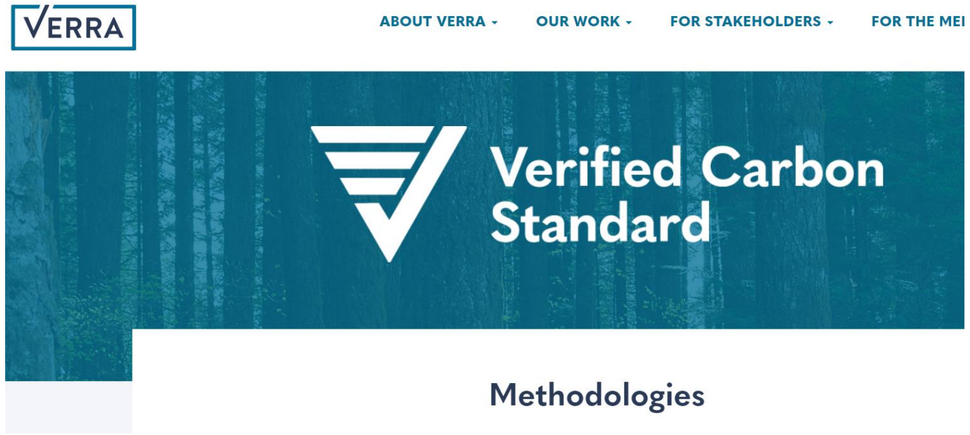
https://cdm.unfccc.int/methodologies/index.html

4. Asian Development Bank



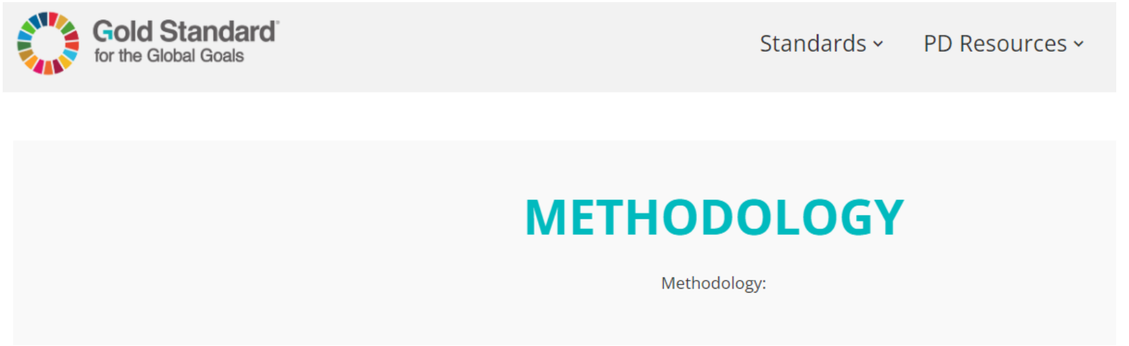
https://www.adb.org/sites/default/files/institutional-document/296466/guidelines-estimating-ghg.pdf

2. Verified Carbon Standard, or Verra



https://verra.org/methodologies/

3. Gold Standard



https://globalgoals.goldstandard.org/documents/methodology/

6 Things to Consider:

To **prioritise the emission hotspots** for reduction effort.

To **set a carbon reduction target** to demonstrate its commitment. The carbon reduction target can be absolute or intensity target.

To **decide the boundary of the target**. As a minimum, the target should be set for Scope 1 and Scope 2 emissions, but also exploring to include Scope 3 emissions.

To plan for a series of **carbon reduction programmes**.

To establish **enabling strategies** for GHG Reductions. (e.g. incentives, procurement practices, awareness, capacity building)

To **integrate climate change adaptation strategies** in designing mitigation strategies.

OUR SERVICES

NET ZERO PROGRAMME FOR CORPORATES

Our Services

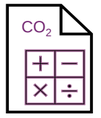
MGTC aspires to drive positive change in organisations to support the entities implementing, governing, and managing the shift toward sustainability.

We assist entities on GHG measurement and disclosure, setting short to long-term mitigation targets translating into action plans, and creating long-term value.

1

Review GHG Calculation

Conduct third-party review on existing GHG inventory based on international standard and guidelines



2

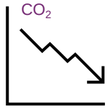
GHG Quantification & Reporting

Measure and report GHG emissions using the international standards and guidelines.

3

Develop Mitigation Strategies

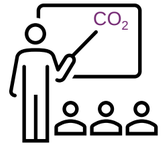
Develop mitigation strategies and identify priority areas for emissions reduction opportunities.



4

Develop Net Zero Roadmap

Craft short-term and long-term target towards net zero



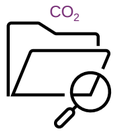
5

Capacity Building

Provide awareness, technical training & coaching programme.

NET ZERO PROGRAMME FOR CORPORATES

1



Review GHG Calculation

Conduct third-party review on existing GHG inventory based on international standard and guidelines

Review the GHG Inventory

- Review methodology used for calculation
- Review activity data (sources and the data collection method are not included)
- Review the selection of emission factors
- Review GHG emissions results

Review Organisational and Operational Boundaries Set

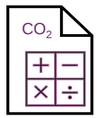
- Review existing Organisational and Operational Boundaries
- Review your Scope 1, Scope 2, and Scope 3 emission sources included.

Preparation of Report

- Recommendations provided is based on identified gaps for future improvements.

NET ZERO PROGRAMME FOR CORPORATES

2



GHG Quantification & Reporting

Measure and report GHG emissions using the international standards and guidelines.

Setting Organisational Boundaries → **Setting Operational Boundaries** → **Data compilation** → **GHG Calculation** → **Report Preparation**

Setting organisational boundaries: control approach or equity share approach.

Identify Scope 1, 2 and 3 sources of GHG emissions.

Compilation of activity data and selection of suitable emission factors.

Calculate emissions by sources and gases.

Preparation of Report with Graphical Summary

NET ZERO PROGRAMME FOR CORPORATES

3

Develop Mitigation Strategies

Develop mitigation strategies and identify priority areas for emissions reduction opportunities.

Conduct GHG Assessment

- Assess base year and current GHG emissions

Develop baseline of future emissions

- Projection of future emissions based on the key drivers identified in Step 2

STEP 1 → STEP 2 → STEP 3 → STEP 4

Identify key drivers

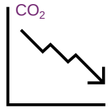
- Identify key drivers that influence future emissions

Identify strategies on mitigation

- Analyse hotspots emissions.
- Identify mitigation strategies for Scope 1, 2, 3.

NET ZERO PROGRAMME FOR CORPORATES

4



Develop Net Zero Roadmap

Craft short-term and long-term target towards net zero

Phase 1 》 **Phase 2** 》 **Phase 3**

GHG Emissions Assessment

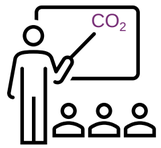
- Base year and current GHG emissions
- Develop baseline of future emissions
- Key Areas with highest emissions.

- Develop Mitigation Pathways, Identify mitigation strategies for Scope 1, 2, 3.
- Set interim & long-term targets.

- Detail action plan (5 years) including timeline, key performance indicators and programme ownership.

NET ZERO PROGRAMME FOR CORPORATES

5



Capacity Building

Provide awareness, technical training & coaching programme.

This capacity building programme aims to provide standard knowledge for participants in preparing the GHG inventory. The programme includes a series of lectures, hands-on exercises and customised case studies based on the following modules:

1. Module 1: Introduction to Climate Change
2. Module 2: Setting Organisational Boundaries & Operational Boundaries
3. Module 3: Calculation Approaches Scope 1 and 2 and selected Scope 3

The GHG Assessment Training Programme by MGTC is aligned with The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol Corporate Standard) which is the global standard for calculating corporate GHG emissions.

Objectives:

1. To provide awareness on climate change and its impacts
2. To educate on how to identify organisational and operational boundaries for an organisation
3. To educate on how to calculate GHG emissions covering Scope 1, 2 and selected Scope 3

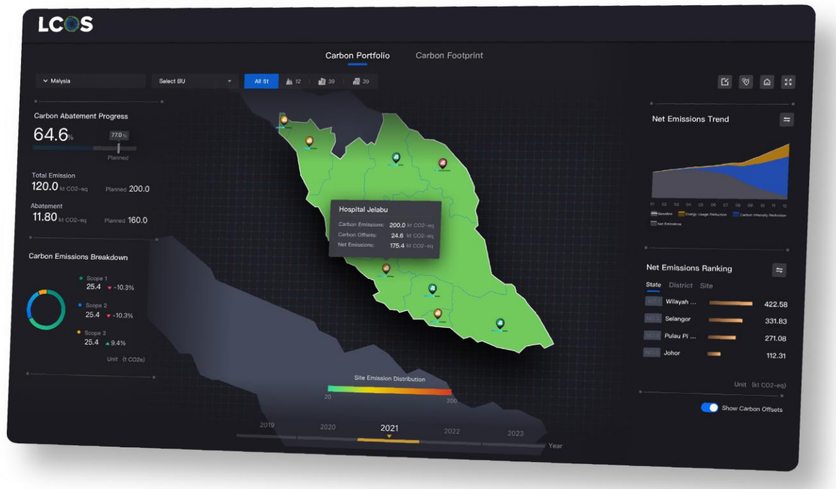
Learning Outcome:

1. Define what is climate change and its impacts to the environment
2. Define the organisational and operational boundaries of calculation
3. Explain basic principles on the approaches and methodologies in GHG accounting
4. Calculate GHG emissions for activities covered under the training programme

Duration: 1.5 days

LOW CARBON OPERATING SYSTEM (LCOS)

LCOS

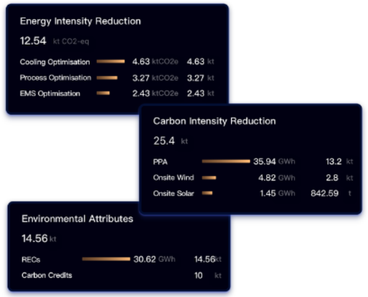


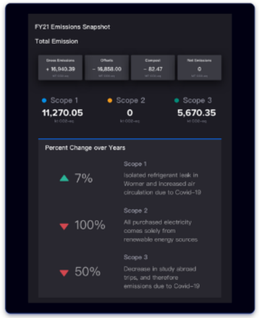
A **cloud** based carbon management platform aligned with globally recognised **standards** for **every company** to **measure** their impact on climate change and **contribute** towards a **net-zero** future.

ISO 14064 · GREENHOUSE GAS PROTOCOL · SUSTAINABLE DEVELOPMENT GOALS · PDPA COMPLIANCE · ISO 27001 Information Security Management · GDPR

Features

Let LCOS guide your path towards sustainability





Measure

Measure Scope 1, Scope 2 and Scope 3 GHG emissions across your entire business

Manage

Set targets, analyse monthly performance and benchmark against industry peers

Mitigate

Plan and track mitigation action, purchase renewable electricity and certified carbon offsets

Report

One-click report generation for easy third party verification and ESG disclosure

Benefits for organisation:

- Save money
- Improve energy efficiency
- Build a competitive advantage
- Manage risk
- Enhance reputation

LCOS makes it simple for organisation to measure their impact:

- Provides overview of regional-level carbon emission and abatement
- Allows organisation to track, monitor monthly progress, and plan reduction strategies
- Enables organisation to offset emissions

TERIMA KASIH

MALAYSIAN GREEN TECHNOLOGY AND CLIMATE CHANGE CORPORATION [99801006110 (462237-T)]

No.2, Jalan 9/10, Persiaran Usahawan, Seksyen 9, 43650 Bandar Baru Bangi, Selangor Darul Ehsan, Malaysia.

+603-8921 0800
info@mgtc.gov.my
+6019-308 8286
www.mgtc.gov.my

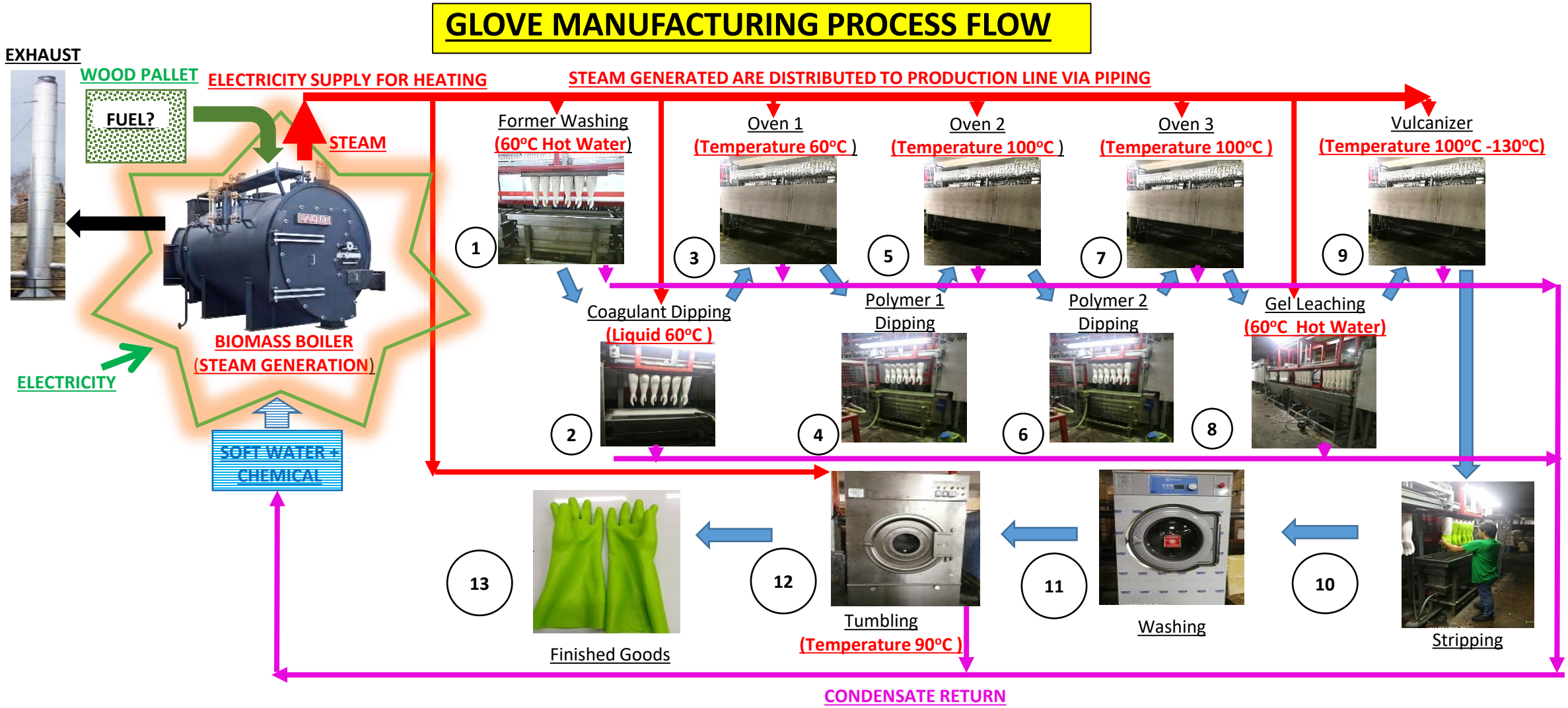
mgtc.my mgtc_my mgtc live

MRC Automation & Green Technology Fund

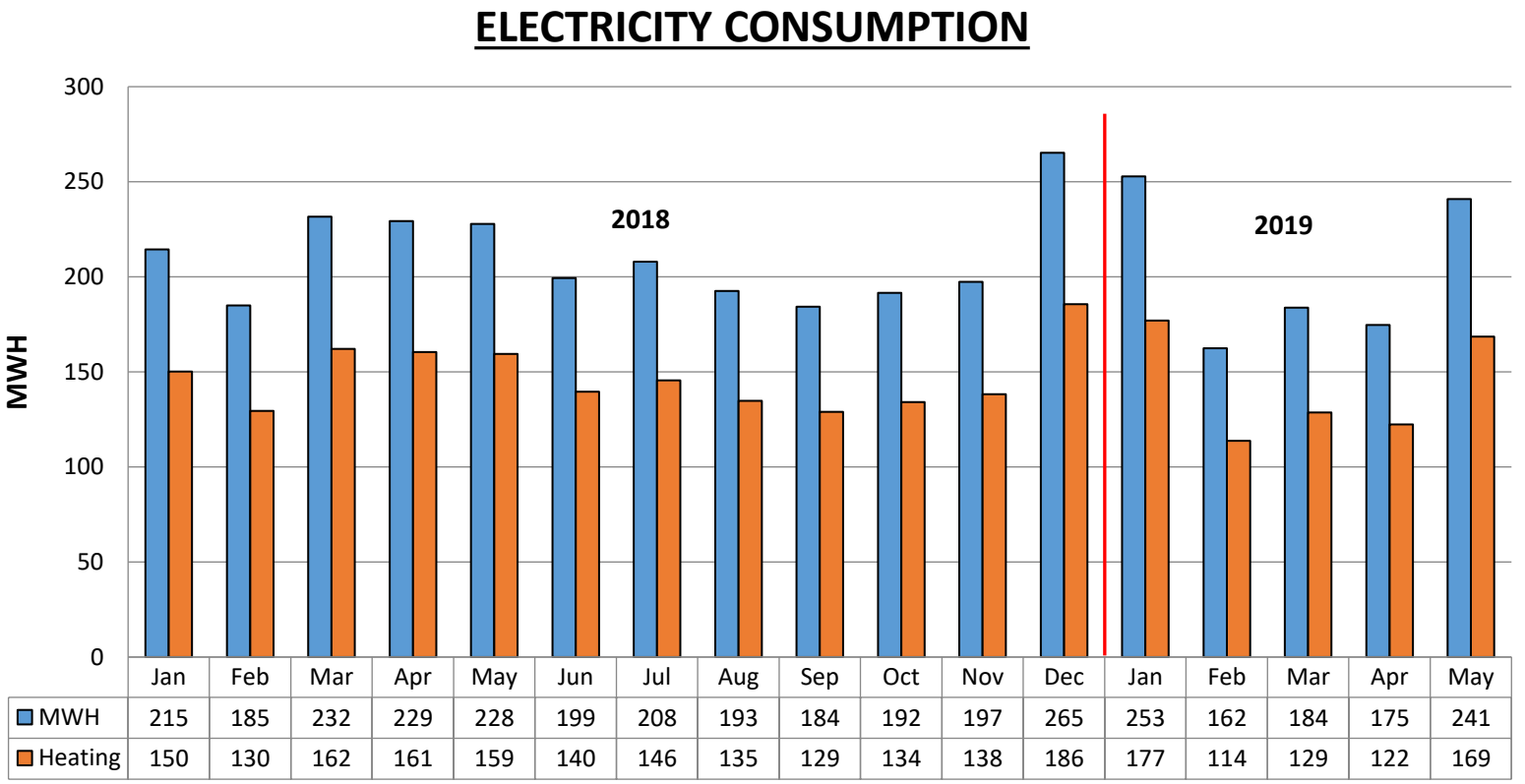
Company name:	DURAMITT SDN BHD
Project location:	Kulim, Kedah
Project Description:	Biomass Boiler
Related Products:	Supported, Unsupported and Bonded polymer dipped industrial gloves
Duration:	Sep 2018 – Aug 2019
Source of financing:	Bank loan

Company Profile

- Established in May 2000
- Our Products: Polymer Dipped And Bonded Industrial Glove



Monthly Electricity Consumption



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
MWH	215	185	232	229	228	199	208	193	184	192	197	265	253	162	184	175	241
Heating	150	130	162	161	159	140	146	135	129	134	138	186	177	114	129	122	169

HEATING AMOUNTED TO 70% OF TOTAL ELECTRICITY CONSUMPTION EQUIVALENT TO 12.5% OF DIRECT MANUFACTURING COST.

TARGET TO REDUCE HEATING COST TO 9.5% OF DIRECT MANUFACTURING COST 24% HEATING COST REDUCTION.

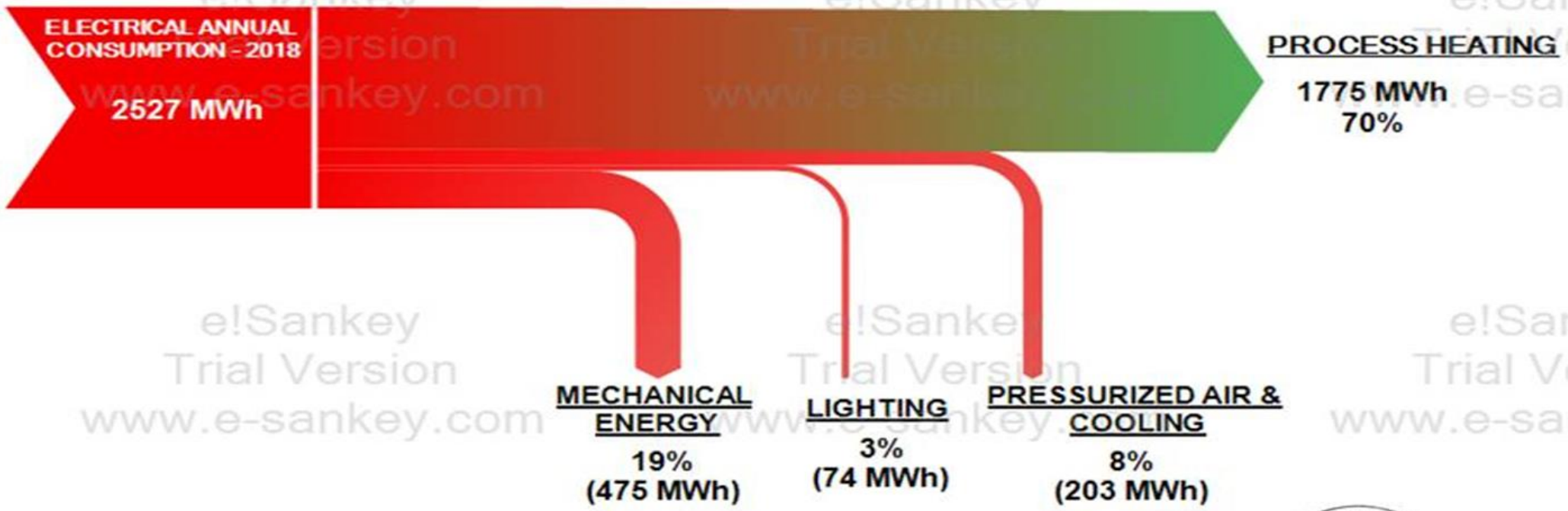
Electricity Consumption

Breakdown Of Electricity Consumption For 2018

		MWH
1	**Air Con**	34
2	**Lighting**	74
3	**Air Compressor**	112
4	**Chiller**	56
5	**Drive Motor**	404
6	**Blower**	8
7	**Fan**	55
8	**Electric Heater**	1775
9	**Hydraulic Power Pack**	8
		2526

	MWH	%
1 Pressurized Air & Cooling	203	8
2 Lighting	74	3
3 Mechanical Movement	475	19
4 Heating	1775	70
	2526	

DURAMITT ENERGY FLOW CHART



PROFESSIONAL ENGINEER WITH PRACTISING CERTIFICATE
MECHANICAL
IR. WONG SIN FUTT
C16727
MALAYSIA

WHY CHOOSE PROCESS HEATING COST REDUCTION?

- **70% of Total Electrical Energy used for Process Heating.**
- **Process Heating Cost Constitute to 12.5 % of Manufacturing Cost.**

WHY BIOMASS BOILER ?

- From the research done, the most efficient fuel available at that point of time at our location is wood.
- Carbon Neutrality
- Renewable
- Reduces Waste
- It produces lower level of Sulphur Dioxide

FUEL COMPARISON

STEAM BOILER OPERATION COST CALCULATION SHEET

					1 Ton of steam equivalent to 628KW		2.51 MW
No	**PARAMETER**	**UNIT**	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**
1	**BASIS**		**MFO**	**Diesel**	**N.GAS**	**WOOD PELLETS**	**Electricity**
2	**Steam Boiler Design Capacity**	Kg/hr	**1000**	**1000**	**1000**	**1000**	
3	**Actual steam consumption**	Kg/hr	**1000**	**1000**	**1000**	**1000**	
	Operating hour per day	hours	24	24	24	24	24
	Operating day per month	days	30	30	30	30	26
	Thermal efficiency	%	85	88	88	76	100
	Calorific value of fuel	kCal/kg	9850	10200	0.25 KCal/Btu	4000	
	Cost of Fuel	RM/kg	2.06	2.99	53.32 RM/MMBtu	0.488	
		RM/ton	2060	2990		488	
	Cost of Electricity	RM/kWh	0.441	0.441	0.441	0.441	0.441
	Electricity Load	kW	35	17	13.5	55	628
4	**FUEL CONSUMPTION**				**MMBtu**		
	Hourly	kg/hr	64.50	60.16	2.45	177.63	
	Daily	kg/day	1547.92	1443.85	58.91	4263.16	
	Monthly	kg/month	46437.74	43315.51	1,767.27	127894.74	
	Yearly	kg/year	557252.91	519786.10	21,207.27	1534736.84	
5	**FUEL COST**						
	Hourly	RM/hr	132.86	179.88	130.87	86.68	
	Daily	RM/day	3,188.72	4,317.11	3,140.91	2,080.42	
	Monthly	RM/month	95,661.75	129,513.37	94,227.45	62,412.63	
	Yearly	RM/year	1,147,941.00	1,554,160.43	1,130,729.37	748,951.58	
6	**ELECTRICITY COST**						
	Hourly	RM/hr	15.44	7.50	5.95	24.26	276.95
	Daily	RM/day	370.44	179.93	142.88	582.12	6,646.75
	Monthly	RM/month	11,113.20	5,397.84	4,286.52	17,463.60	172,815.55
	Yearly	RM/year	133,358.40	64,774.08	51,438.24	209,563.20	2,073,786.62
7	**LABOUR COST**						
	Nos. of Required Operator	nos.	3	3	3	6	
	Estimated labour cost per hour	RM/hr	8.33	8.33	8.33	16.67	
	Estimated labour cost per day	RM/day	200.00	200.00	200.00	400.00	
	Estimated labour cost per month	RM/month	6,000.00	6,000.00	6,000.00	12,000.00	
	Estimated labour cost per year	RM/year	72,000.00	72,000.00	72,000.00	144,000.00	
8	**MAINTENANCE COST**						
	Estimated maintenance cost per hour	RM/hr	1.74	1.39	1.16	2.31	
	Estimated maintenance cost per day	RM/day	41.67	33.33	27.78	55.56	
	Estimated maintenance cost per month	RM/month	1,250.00	1,000.00	833.33	1,666.67	
	Estimated maintenance cost per year	RM/year	15,000.00	12,000.00	10,000.00	20,000.00	
9	**TOTAL OPERATING COST**						
	Hourly	RM/hr	158.37	197.10	146.32	129.92	276.95
	Daily	RM/day	3,800.83	4,730.37	3,511.58	3,118.10	6,646.75
	Monthly	RM/month	114,024.95	141,911.21	105,347.30	93,542.90	172,815.55
	Yearly	RM/year	1,368,299.40	1,702,934.51	1,264,167.61	1,122,514.78	2,073,786.62
	Cost (RM/Kg)		**0.16**	**0.20**	**0.15**	**0.13**	
	Equivalent Cost (RM/KWH)		**0.25**	**0.31**	**0.23**	**0.21**	**0.44**
	Saving Against Electricity (%)		**43%**	**29%**	**47%**	**53%**	

BIOMASS BOILER

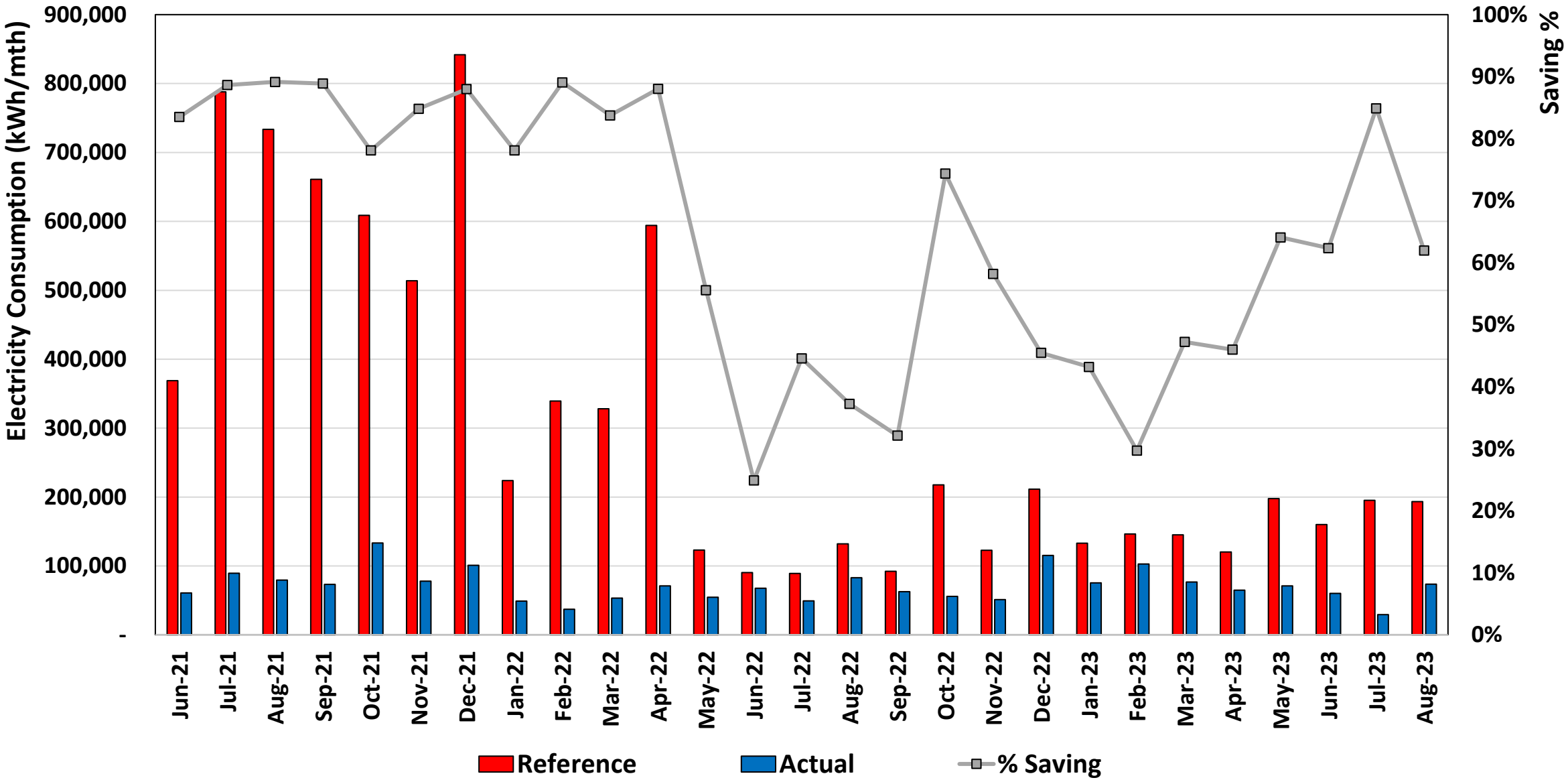
BIOMASS BOILER INSTALLATION

BIOMASS BOILER OPERATION

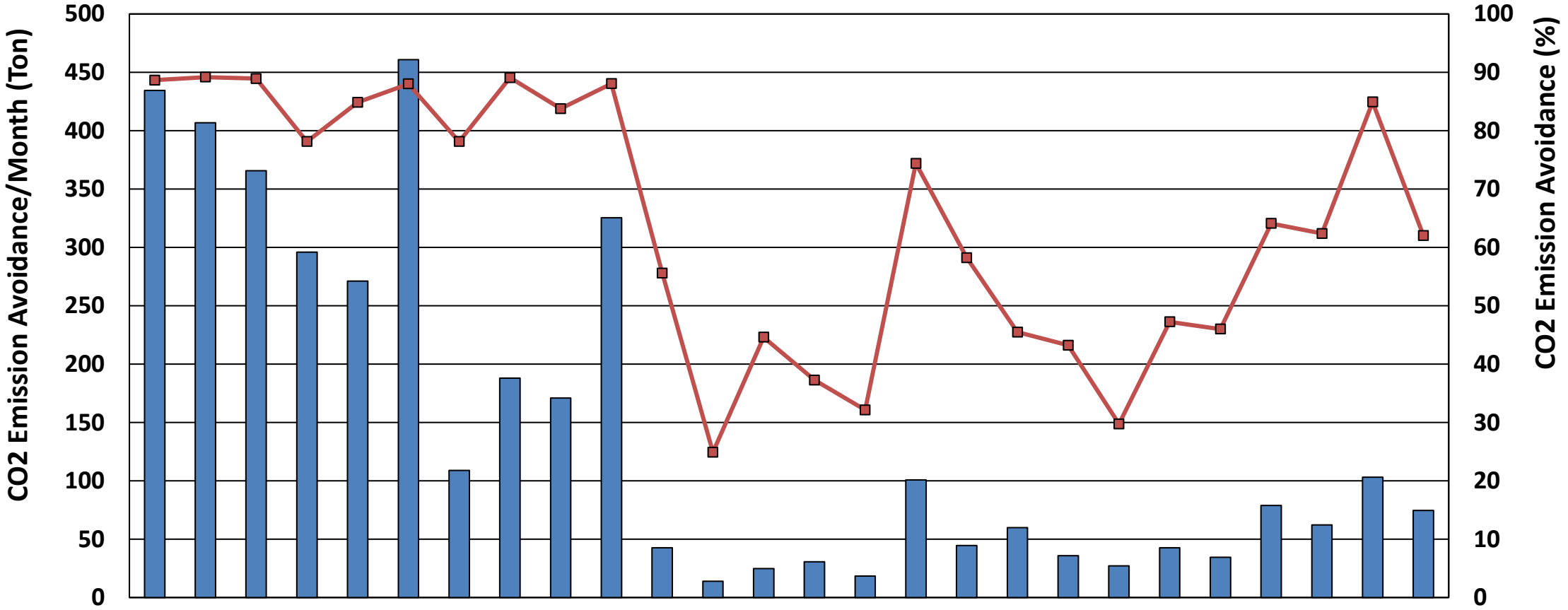
System Performance Analysis

Energy Cost		Energy Source	After New Boiler Installation
		Electricity	Steam
1)	Average Energy Consumption (KWH/Month) (For Heating)	161201	
2)	Average Production Output June-Nov 2019 (Pr)	198328	
3)	Heating Energy per pr glove (KWH/Pr)	0.813	
4)	Electricity Cost (RM/KWH)	0.48	0.212
5)	**Heating Cost Per Pair Glove (RM/Pr)**	**0.387**	**0.172**
6)	**Total Heating Cost (KRM)**	**77**	**34**
7)	**Saving(KRM)**		**43**
% Saving			**55**
Capacity Increase			
8)	**New Productin Line - Pr/Year**	**5616000**	
9)	**Total Heating Cost (KRM)**	**2173**	**968**
10)	**Saving(KRM)**		**1205**

ELECTRICITY CONSUMPTION & CO_2 AVOIDANCE

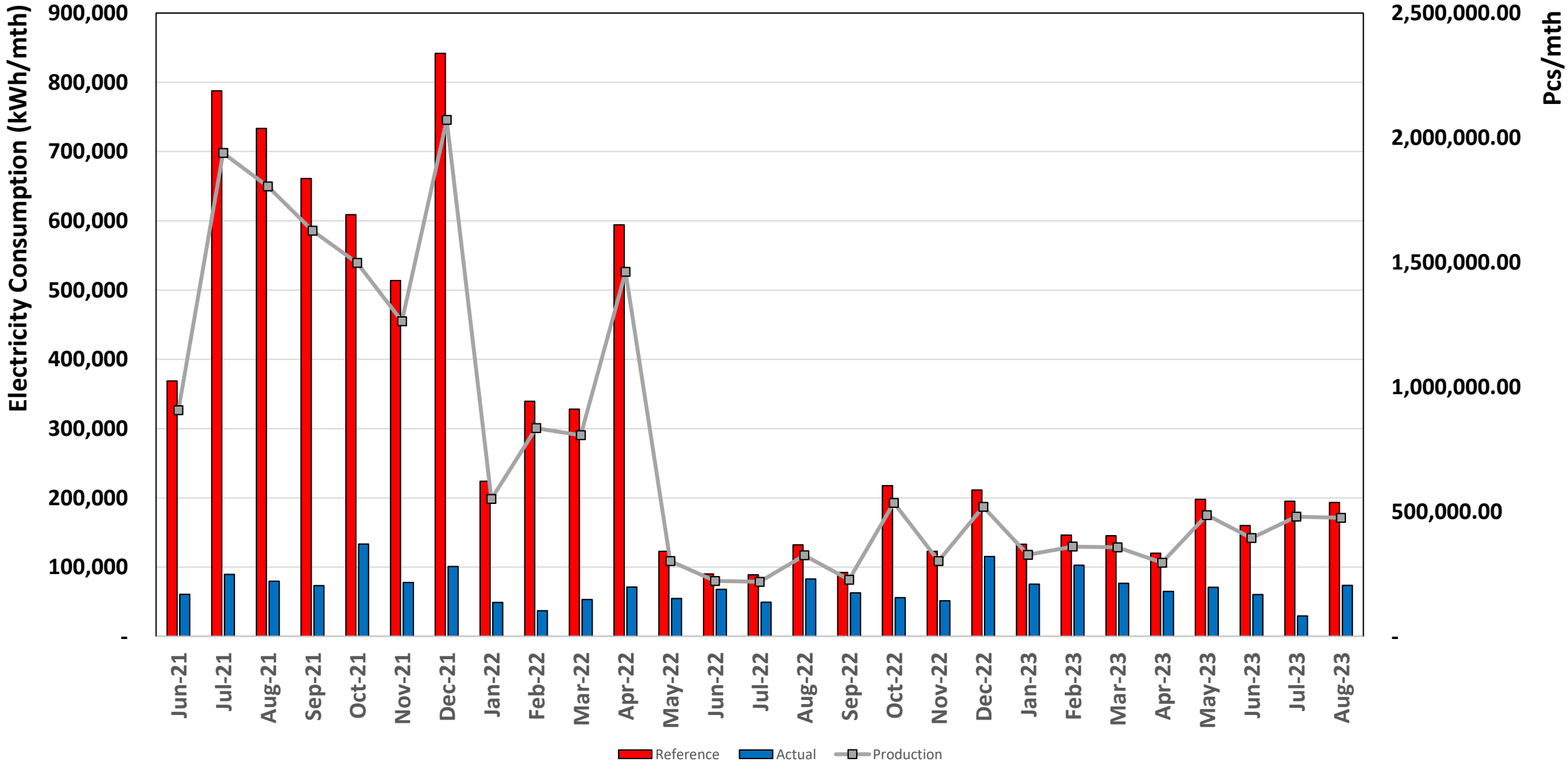


GHG CO2 EMISSION AVOIDANCE TREND

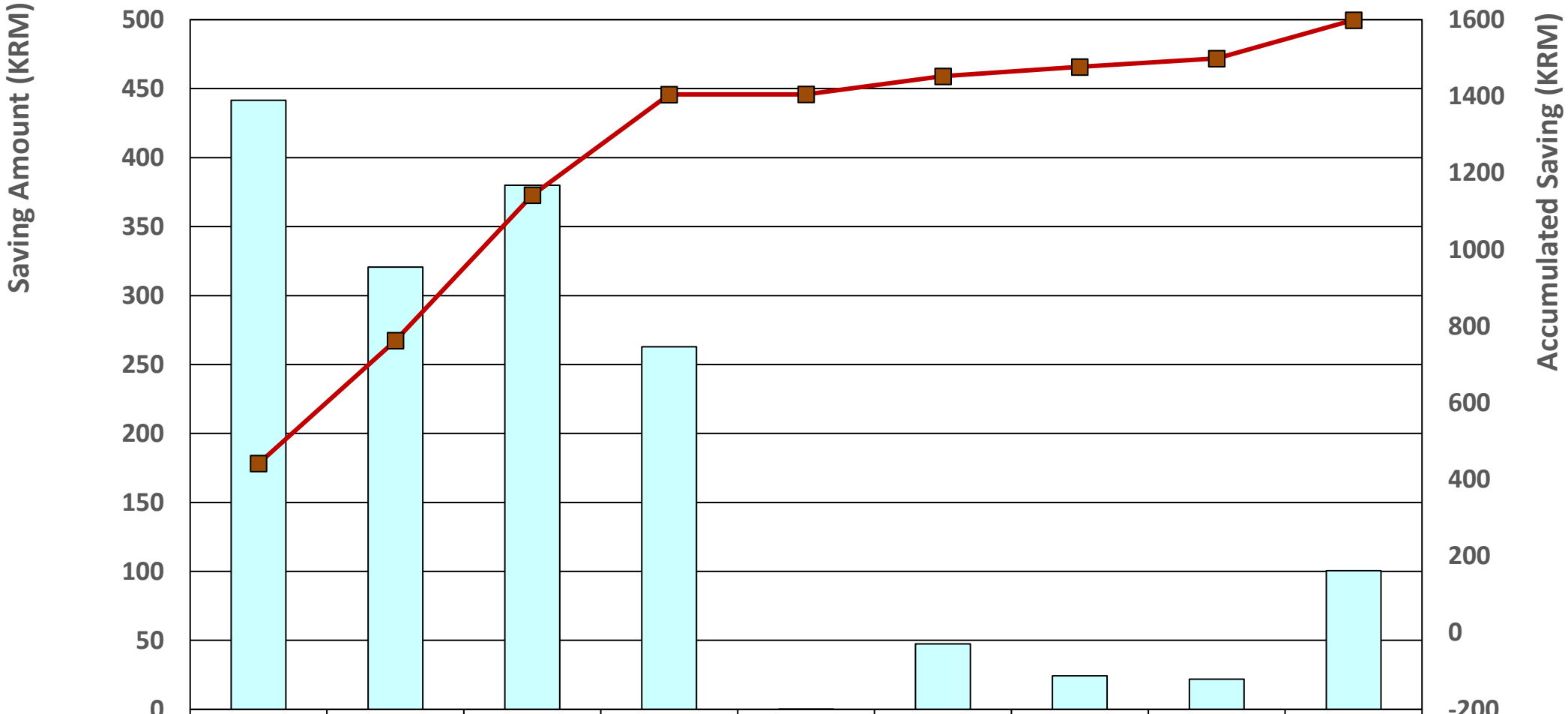


	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
CO2 Emission Reduction(Ton)	434	407	366	296	271	461	109	188	171	325	42	14	25	31	18	101	44	60	36	27	43	34	79	62	103	75
CO2 Emission Reduction(%)	89	89	89	78	85	88	78	89	84	88	56	25	45	37	32	74	58	45	43	30	47	46	64	62	85	62

ELECTRICITY CONSUMPTION Vs PRODUCTION CAPACITY



QUARTERLY ENERGY COST SAVING TREND



	Jun 21 to Aug 21	Sept 21 to Nov21	Nov 21 to Feb 22	Mar 22 to May 22	Jun 22 to Aug 22	Sept 22 to Nov 22	Dec 22 to Feb 23	Mar 23 to May 23	Jun 23 to Aug 23
Saving Amount KRM	442	321	380	263	0	48	24	22	100
Accumulated Saving KRM	442	762	1142	1405	1405	1452	1477	1499	1599

ACHEIVEMENT SUMMARY

- **Heating Cost Per Pair Glove**

	RM/Pr	% Reduction
Original	0.387	
Target	**0.147**	**62.0**
Actual	**0.223**	**40.9**

- **Green House Gas (CO_2) Avoidance**

July 2021 To August 2023

4,012 Ton

THANK YOU

RAPID GENESIS

Biomass Utilization as Renewable Energy for Low-Carbon Manufacturing

- By Mr. Tang Kok Mun

MRC
MALAYSIAN RUBBER COUNCIL

SYNOPSIS

As a nation with agriculture as one of its economic pillars, there exists tremendous opportunities in Malaysia for agricultural-based biomass to be utilised as a **source of renewable energy**.

This is becoming strategically more attractive as manufacturing companies seek to **lower their greenhouse gases emissions** for their products and services. After all, there is only so much roof space for any manufacturing plant to install solar PVs before companies have to resort to buying expensive carbon credits.

Biomass has been earmarked as one of the key strategic areas under the **12th Malaysian Plan**. In this presentation, the speaker will discuss the types and distribution of biomass resources in Malaysia, supply chain, opportunities as a source of renewable energy, as well as issues and challenges in utilization of biomass in Malaysia.

RAPID GENESIS

PRESENTATION OUTLINE

WHY BIOMASS?

OPPORTUNITIES AS LOW CARBON ENERGY SOURCE

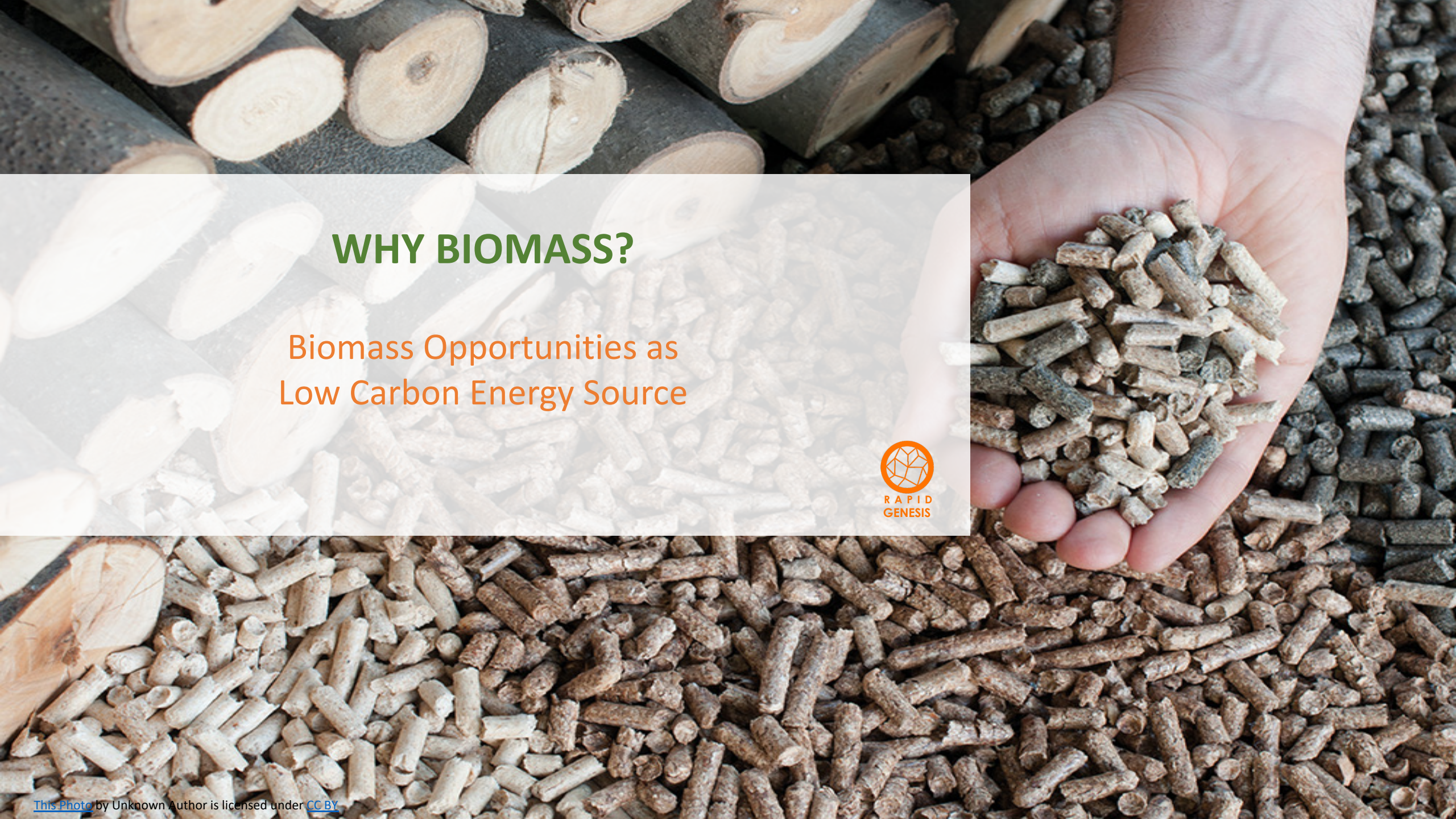
TYPES & CATEGORIES OF BIOMASS

SOURCES OF BIOMASS IN MALAYSIA

SUPPLY CHAIN

ISSUES AND CHALLENGES FOR USERS

RAPID GENESIS

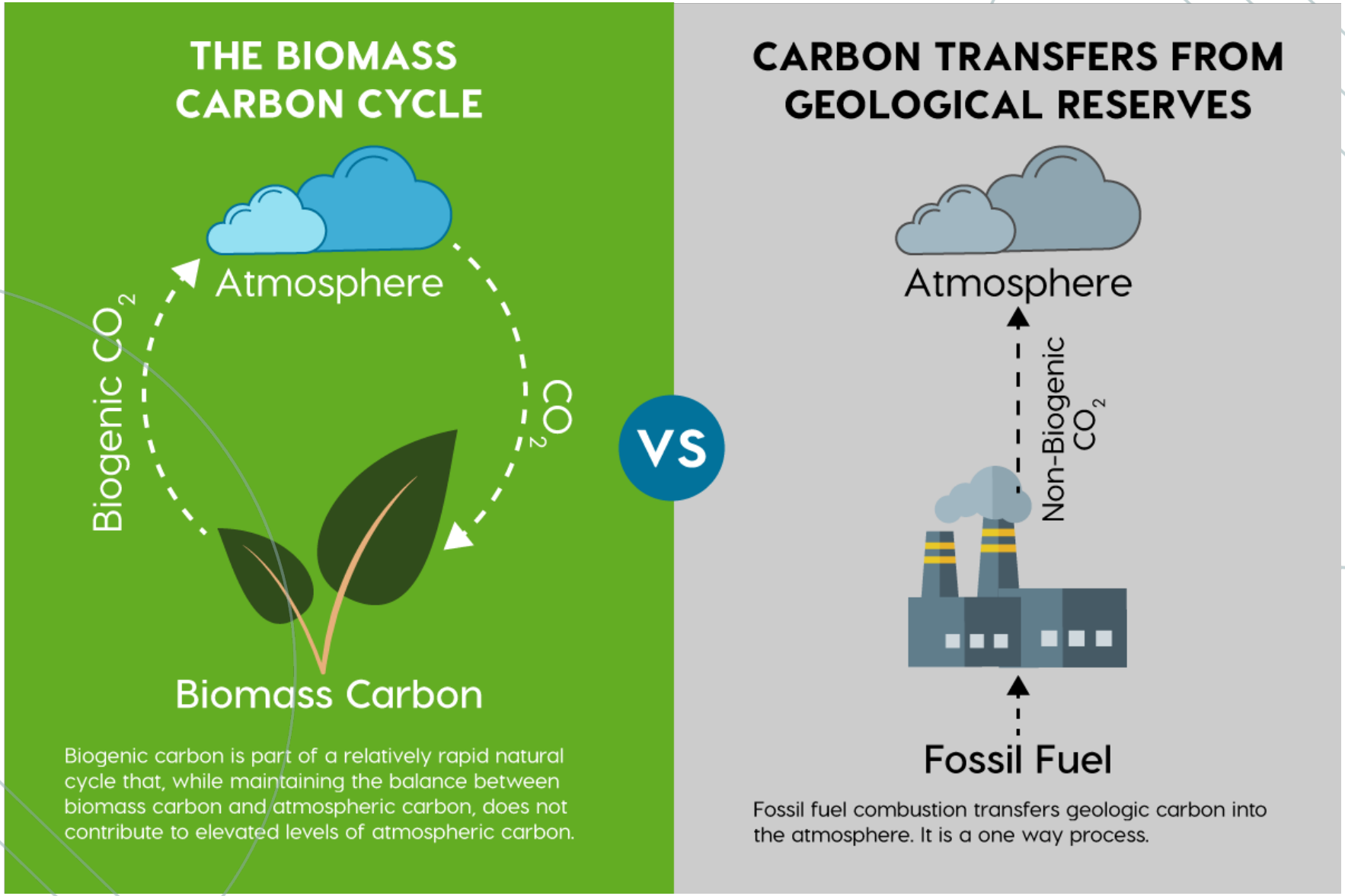


WHY BIOMASS?

Biomass Opportunities as Low Carbon Energy Source

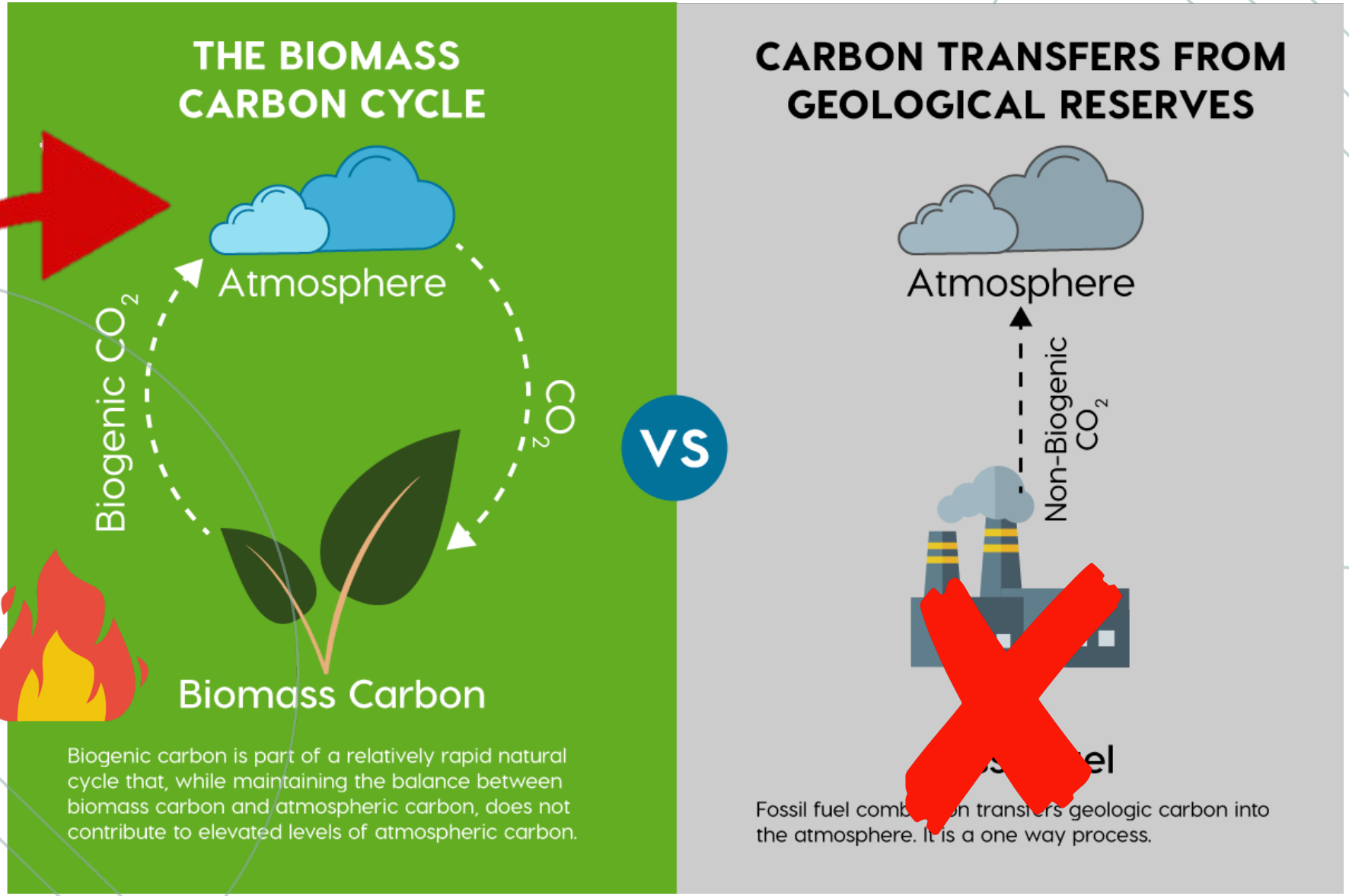
RAPID GENESIS

BIOMASS AS LOW-CARBON ENERGY SOURCE



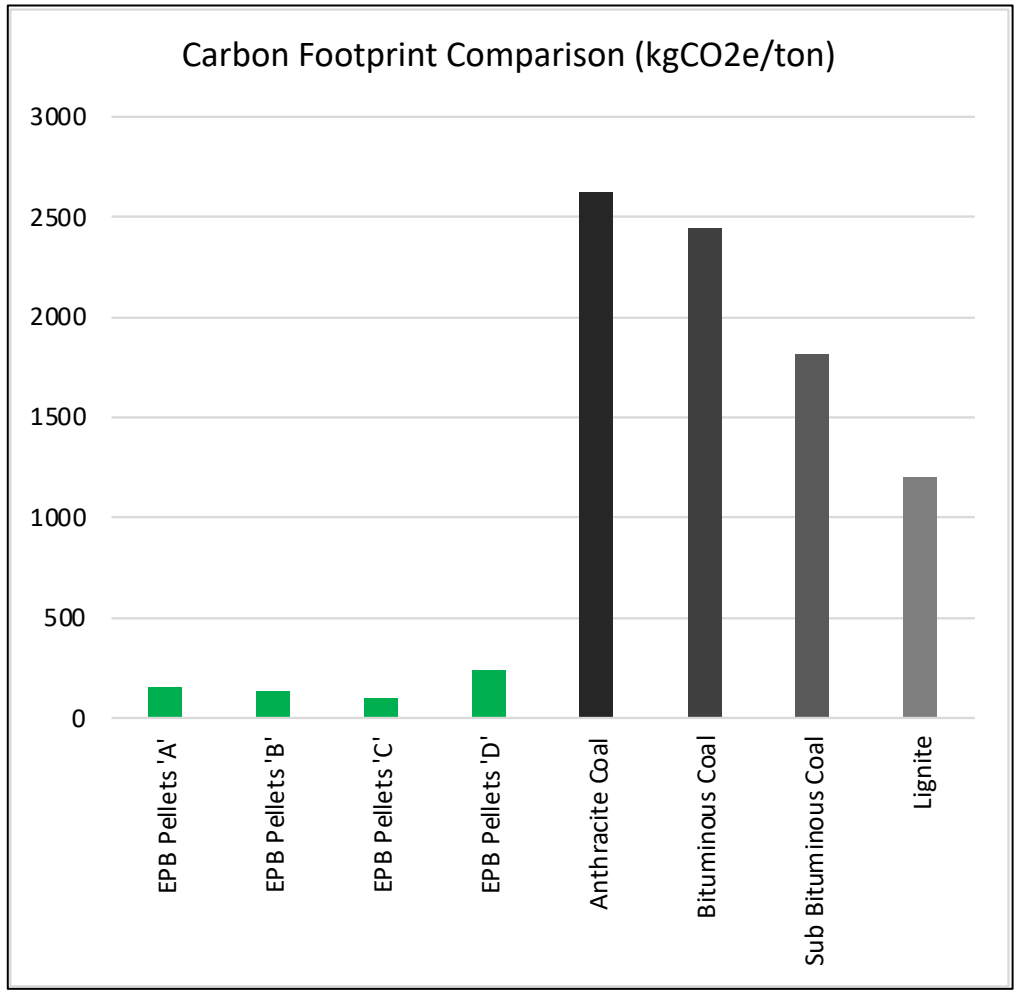
RAPID GENESIS

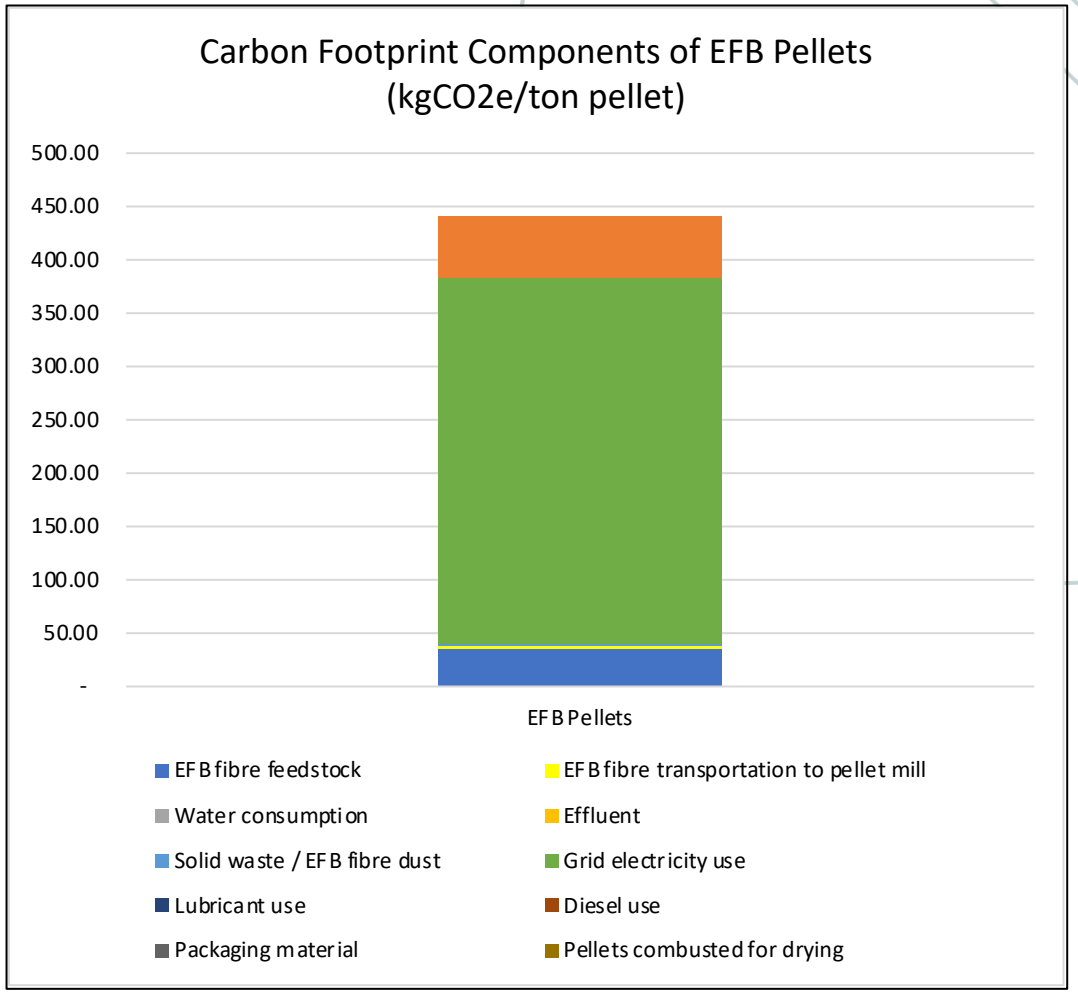
BIOMASS AS LOW-CARBON ENERGY SOURCE



BIOMASS AS LOW-CARBON ENERGY SOURCE

*However…biomass fuels are **NOT ZERO EMISSIONS!***



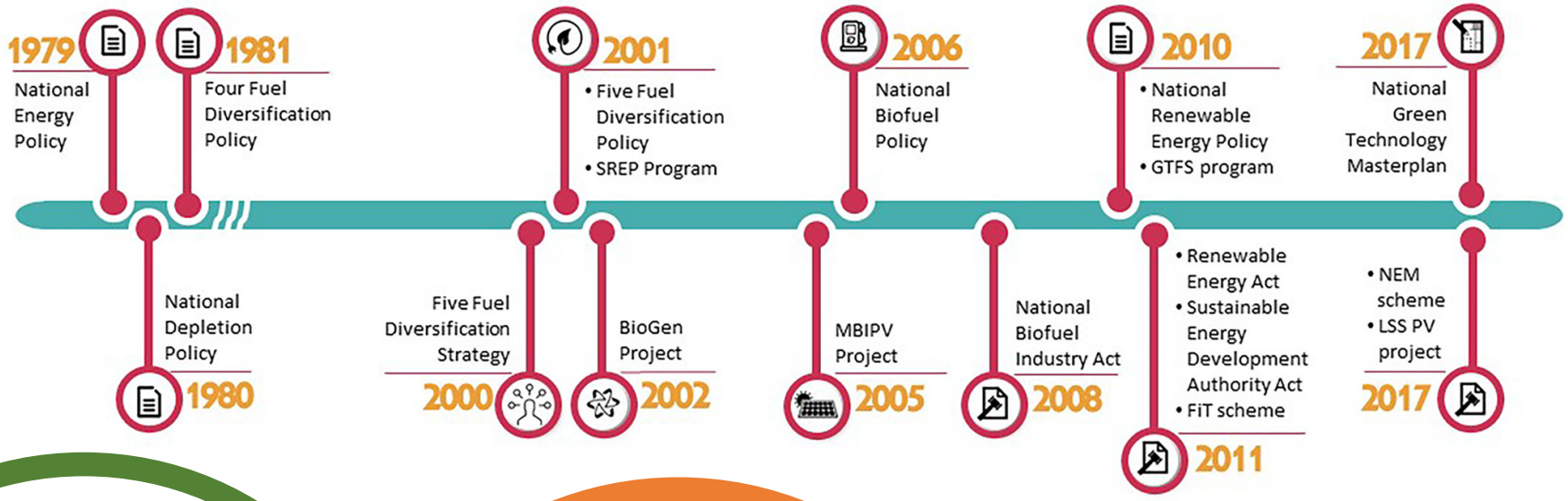


RAPID GENESIS

POLICY SUPPORT TOWARDS BIOMASS UTILIZATION & LOW-CARBON ECONOMY

- The Malaysian **Small Renewable Energy Power (SREP) Program**: 500 MW of additional qualified biomass, biogas, municipal solid waste, solar photovoltaics, and mini-hydroelectric facilities from 2001 to 2005.

- RE Resources under the **Renewable Energy Act 2011** (Act 725): Solar photovoltaics (PV), small hydropower, biogas, biomass and geothermal to be implemented under the Feed-in Tariff (FiT) mechanism. Establishment of SEDA.



12th Malaysian Plan

- Strategy A1 - Moving Towards a Low-Carbon Nation
- Strategy A8 - Realising the Potential of Biomass Industry
- Strategy C2 - Scaling-up Green Financing and Investments

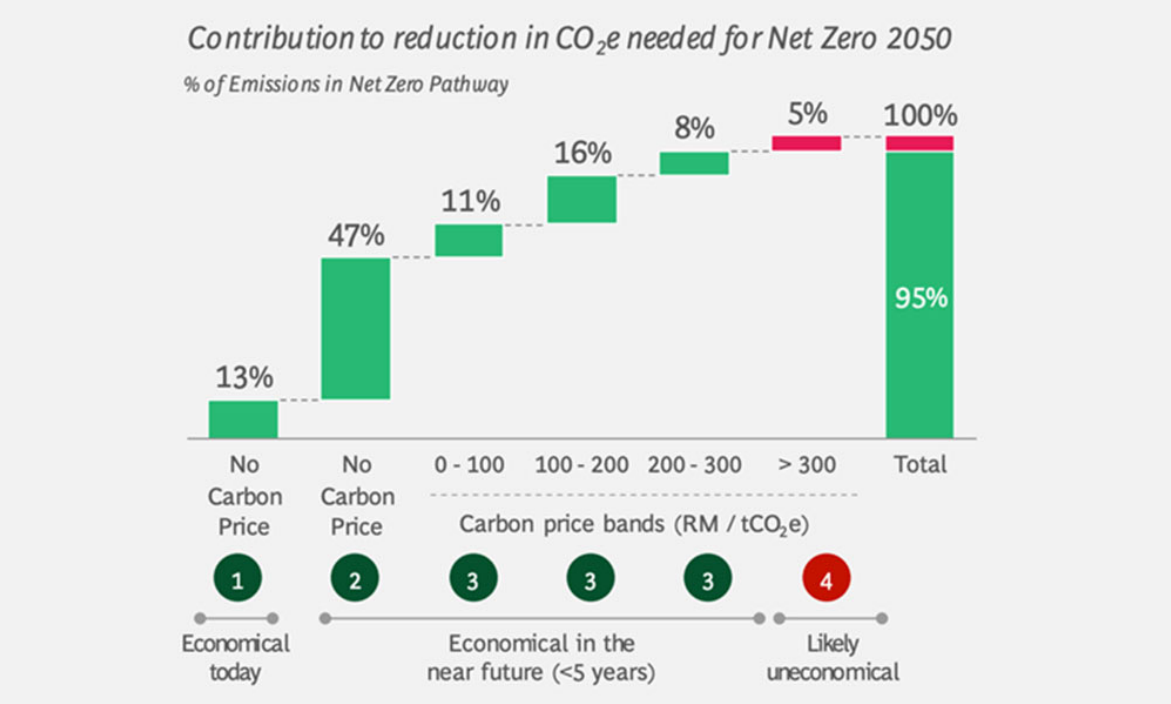
* Cost minimization with bioenergy clusters as centralized collection points for sustainable feedstock and to enable electricity generators

National Biomass Action Plan 2022-2030

- Ministry of Plantation and Commodities (KPK) - National Biomass Action Plan 2022-2030 in line with the National Energy Transition Roadmap.
- Deputy PM Datuk Seri Fadillah Yusof: Biomass important – energy resources from biomass sources. One stop centre to collect palm biomass, raw material processed into bio-fertilisers, animal feed, energy generation and other value-added products

RAPID GENESIS

CLIMATE CHANGE & SUSTAINABILITY



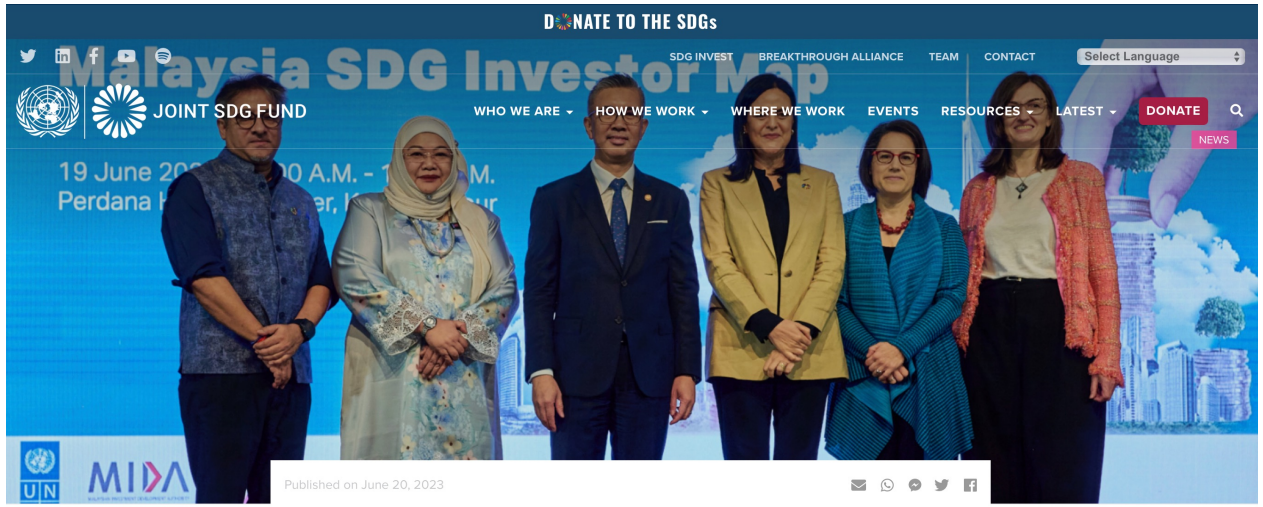
Malaysia Climate Change Commitment

- Since signing of Paris Agreement, government emphasizes green investments by increasing unconditional target to **cut carbon intensity against GDP by 45% by 2030 compared to 2005 levels**.
- First NDC sees 35% unconditional emissions reduction target and additional 10% conditional on external support.

Carbon Border Adjustment Mechanism (CBAM)

- Introduced as discouragement to 'carbon leakage'
- Risk of 'direct carbon leakage' if CBAM not implemented as carbon intensive countries would tend to shift their business to countries less committed than EU.
- Risk of 'indirect carbon leakage' may happen as lesser consumption of fossil fuels would be overcompensated by growing consumption in countries with less rigorous standards.
- 'Carbon leakage' would reduce efficiency of global climate policies – countries pollute more to produce goods needed but consumption in countries with high standards.

CLIMATE CHANGE & SUSTAINABILITY



MITI and the United Nations launch the Malaysia SDG Investor Map, a tool to find investment opportunities that are fully aligned with the Sustainable Development Goals

MIDA
MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

Forms and Guidelines

Home | Why Malaysia | Industries | Setting Up in Malaysia

Malaysia unveils SDG Investor Map to champion ESG principles

20 Jun 2023

Malaysia, as part of its staunch commitment to the United Nations' Sustainable Development Goals (SDGs), has introduced a large-scale and systematic plan to attain these goals and champion the environmental, social and governance (ESG) principles.

Investment, Trade and Industry Minister Tengku Datuk Seri Zafrul Abdul Aziz said the Malaysia SDG Investor Map launched yesterday is an essential tool to foster collaboration and facilitate strategic investments aligned with the SDGs.

He said due to the expected tightening of global financing conditions, projections by United Nations Conference on Trade and Development and the International Monetary Fund suggest that the SDG financing gap could reach US$4.3 trillion (RM19.9 trillion) per year from 2020 to 2025.

RAPID GENESIS

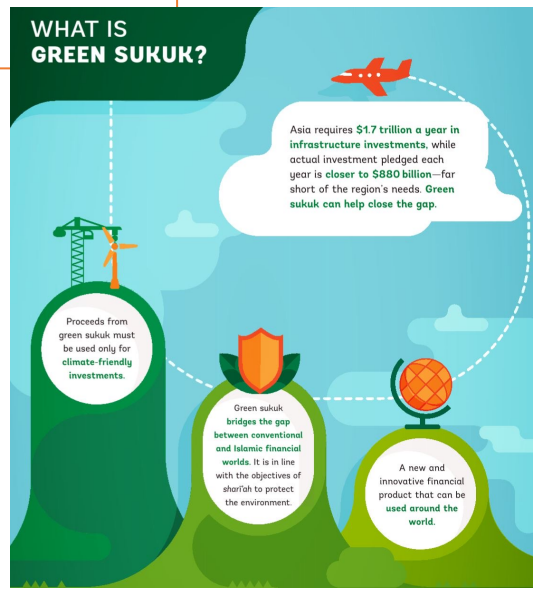
CLIMATE CHANGE & SUSTAINABILITY

Low Carbon Transition Facility

by Bank Negara Malaysia to assist SMEs to achieve net-zero emissions goal by 2050

Green Sukuk

Launched since 2017, green sukuk is an Islamic bond used to fund environmentally-sustainable infrastructure project, e.g. construction of RE generation facilities



INFOGRAPHIC

SOURCES: JC3, MYHIJAU, BANK WEBSITES | COMPILED BY KIRAN JACOB | INFOGRAPHIC BY LEE WAN YEE/ THE EDGE

Green financing and incentives in Malaysia

These forms of financing and incentives reward businesses that work towards reducing carbon emissions and becoming more sustainable. Here is an overview of the different types available to Malaysian businesses.

Green incentives

1. MyHIJAU Mark – The official green recognition scheme endorsed by the government of Malaysia. Any product or service that is recognised by the MyHIJAU Mark can be referenced for green procurement by the government or private sector.
2. Green Income Tax Exemption (GITE) – Applicable to green technology service providers listed under the MyHIJAU directory.
3. Green Investment Tax Allowance (GITA) Assets – Applicable to companies that acquire qualifying green technology assets and are listed under the MyHIJAU directory. The assets could be used to reduce emissions, conserve energy, water or recycle waste. They must be used for own consumption.
4. GITA Projects – Applicable to companies that undertake qualifying green technology projects for business or their own consumption.

Low carbon transition facility for SMEs

Bank Negara Malaysia's Low Carbon Transition Facility was established to help small and medium-sized enterprises (SMEs) to be in line with Malaysia's net-zero emission goal by 2050. The facility is available from Feb 3, 2022 until it is fully utilised.

Financing size per SME	Financing rate to SMEs	Tenure
Maximum RM10 million	**Maximum financing rate of 5% pa, inclusive of guarantee fee (if any)**	**Up to 10 years**

Budget 2022

In Budget 2022, the government announced key initiatives and incentives relating to ESG:

E ENVIRONMENT: MINIMISING THE IMPACT OF AN ORGANISATION ON NATURE

Initiatives to reduce carbon dioxide (CO_2) or other GHG emissions including:

- Green incentives and funding/matching grants for activities to reduce CO_2/GHG emissions (eg RM12 million matching grant for research to enhance light emitting diodes (LED) and electric vehicles (EV);
- RM 1 billion fund to support SMEs in reducing their carbon footprint; and
- Setting up Bursa Malaysia's Voluntary Carbon Market (VCM) platform to support trading of carbon credits to help manage organisations' carbon footprint.

S SOCIAL: CONTRIBUTIONS BY AN ORGANISATION TO PROMOTE FAIRNESS IN SOCIETY

Contributions to promote trust, welfare and equality in society, product safety and data privacy and security. For example:

- Funding/matching grants (eg RM 1.1 billion fund for training/upskilling, RM6.6 billion to implement various technical and vocational education and training initiatives); and
- RM7,000 tax relief for professional courses, including ESG-related programmes.

G GOVERNANCE: PROCESSES FOR DECISION MAKING, REPORTING AND ETHICAL BEHAVIOUR

Focuses on quality and scope of reporting and accountability. This includes tax transparency, for example:

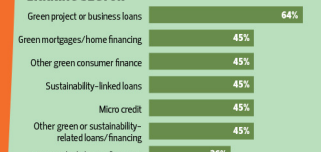
- Management of fiscal affairs by the authorities (proposed Fiscal Responsibility Act, tax expenditure statement); and
- Tax compliance certificates.

SOURCE: JOINT COMMITTEE ON CLIMATE CHANGE (JC3) REPORT ON THE SUSTAINABLE FINANCE LANDSCAPE IN MALAYSIA IN APRIL 2022.

Green products by banks

There is a growing trend of green products in Malaysia, with 91% of the banking sector having at least one or more green product or service offering, according to the Joint Committee on Climate Change (JC3) Report on the Sustainable Finance Landscape in Malaysia in April 2022.

BANKING SECTOR



Below are examples of green products offered by Malaysian banks (non-exhaustive list):

1 UOB
- Green Financing Framework for Circular Economy
- Smart City Sustainable Finance Framework
- Real Estate Sustainable Finance Framework
- Green and Sustainable Trade and Finance Framework

2 CIMB
- SME Renewable Energy Financing
- Sustainability-linked loans and sustainability-linked treasury solutions
- GreenBizReady for SMEs

3 MAYBANK
- Green Technology Financing Scheme
- Maybank Solar Financing

4 ALLIANCE BANK
- Green Technology Financing Scheme
- BizSmart Solution matching with green solution providers

5 RHB BANK
- RHB Vehicle Financing-i for hybrid or electric vehicles
- Solar Panel Financing Package

Green financing

Financial institutions are offering a plethora of green solutions to help businesses transition to a low-carbon economy.

GREEN AND SRI SUKUK FRAMEWORK

a. The Asian Development Bank Institute describes green sukuk as a shariah-compliant financial instrument with two labels, that is, "Islamic" and "Green". The "Islamic" label means it is an interest-free bond that generates returns for investors based on shariah principles, while the "Green" label means the sukuk is compliant with green bond standards.

b. The Sustainable and Responsible Investment (SRI) Sukuk Framework facilitates the financing of sustainable and responsible investment initiatives in Malaysia. To encourage and grow the SRI sukuk and bond segment, the Securities Commission Malaysia has established the SRI Sukuk and Bond Grant Scheme. The scheme application period is from January 2021 until it is fully utilised.

What else is out there?

Products observed in the global market include:
- Green housing insurance
- Green motor insurance
- Green insurance for business
- Green insurance for technology

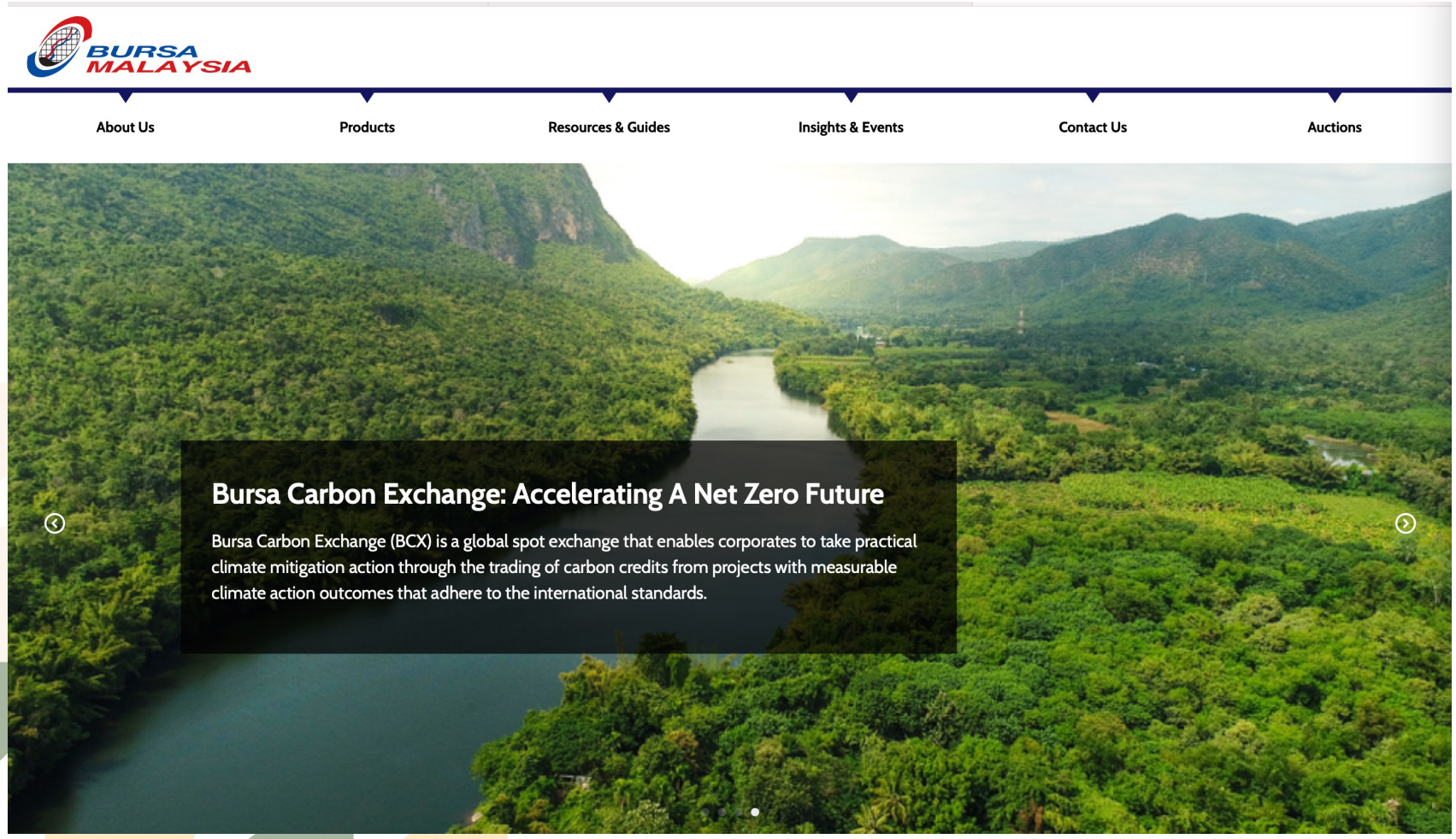
Source : The Edge Malaysia

RAPID GENESIS

CLIMATE CHANGE & SUSTAINABILITY

Voluntary Carbon Market

Malaysia opens its first auction for VCM in 2023
with RM7.7 million worth of carbon credits sold



RAPID GENESIS

TYPES & CATEGORIES OF BIOMASS

RAPID GENESIS

PALM KERNEL SHELL (PKS)

Estimated availability : 4-5 mil. tons

Estimated price ex-factory : RM 300 - 400 per ton

ADVANTAGES

1. High energy content ~ 16.9 MJ/kg wet basis
2. Compact and easily transportable
3. Well established supply chain
4. Direct use in existing boilers

CHALLENGES

1. Overseas demand
2. Higher pricing
3. Formation of clinker at high temperature (pic below)

RAPID GENESIS

EMPTY FRUIT BUNCHES (EFB) & EFB PELLETS

Estimated availability : 25 mil. tons

Estimated price : RM 60 - 70 per ton shredded EFB
ex-factory : RM 120 – 150 per ton pellets

ADVANTAGES

1. Abundance from the palm oil sector
2. Still relatively untapped
3. Mature pelleting technology

CHALLENGES

1. Competition with use in field mulching
2. Rapid degradation
3. Raw EFB difficult to transport & handle
4. Seasonal availability
5. High ash content

RAPID GENESIS

WOOD PELLETS

Torrefied Pellets

Estimated availability : 9 mil. tons
(upstream, midstream, downstream)

Estimated price : RM200 – 300 per ton ex-factory

ADVANTAGES

1. Compact and easily transportable
2. Well established supply chain
3. Direct use in existing boilers

CHALLENGES

1. Limited supply of wood waste from timber industry
2. Contamination from chemicals in downstream wood waste

RAPID GENESIS

BIOGAS FROM POME

Palm Oil Mill Effluent (POME)

POME Biogas - 40-50% methane

POME Biogas Upgrading >90% methane

Estimated potential : 2,400 GWh energy

ADVANTAGES

1. Direct use in gas boilers
2. Well established biogas technologies
3. Opportunity for carbon credits offset

CHALLENGES

1. Partnership with nearby palm oil mill(s)
2. Seasonal availability

RAPID GENESIS

BIOGAS FROM POME

GAS MALAYSIA PARTNERS KULIM GREENERGY IN GREEN GAS VENTURE

02/03/2022 08:02 PM

KUALA LUMPUR, March 2 -- Gas Malaysia Bhd has partnered Kulim Greenergy Sdn Bhd to produce Compressed Bio-Methane (Bio-CNG) to be injected into Gas Malaysia's Natural Gas Distribution System network.

In a joint statement, the companies said the Bio-CNG will be supplied by Kulim (Malaysia) Bhd's palm oil mills, namely Tereh and Sindora located in Kluang, Johor.

RAPID GENESIS

RICE HUSK & PELLETS

Estimated availability : 1.5 – 2.0 mil. tons

Estimated price : RM30 – 50 per ton rice husk
ex-factory : RM 150 – 200 per ton pellets

ADVANTAGES

1. Compact and easily transportable
2. Well established supply chain
3. Direct use in existing boilers

CHALLENGES

1. Competition use in rice mills
2. Seasonal availability

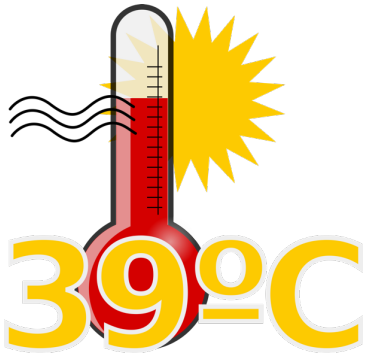
RAPID GENESIS

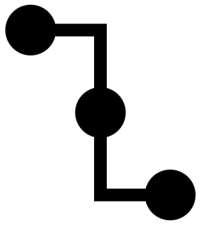
SOURCES OF BIOMASS IN MALAYSIA

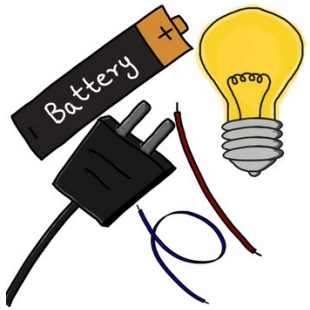
STATE	Palm Biomass	Wood Biomass	Rice Biomass	Others
Perlis			X	
Kedah			X	
P. Pinang				
Perak	X (South)	X (Interior)	X (North)	
Selangor	X (North & South)		X (Sekinchan)	Northport
N. Sembilan	X	X		
Melaka	X			
Johor	X	X		Agri waste
Pahang	X	X		
Terengganu	X	X		
Kelantan	X (Interior)	X (Interior)	X (Northeast)	Kenaf waste
Sarawak	X	X		
Sabah	X	X		

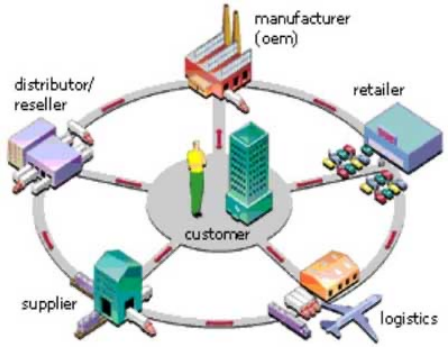
RAPID GENESIS

RAPID GENESIS









Issues & Challenges for Users

- **Logistics** is an important cost factor – proximity to sources is important
- Each type of biomass product has different **supply chain** - affecting availability, supply & cost to users
- Tapping into **new types** of biomass & sources
- **Storage** of biomass fuel – storage space, handling, dust pollution, fire & explosion safety etc.
- Selection of **suitable boiler** for biomass fuel or retrofitting
- Biomass energy to heat or mechanical energy **conversion efficiency**

Biomass Utilization as Renewable Energy for Low-Carbon Manufacturing

- By Mr. Tang Kok Mun

THANK YOU!

INSTALLATION PROCEDURES RULES AND REGULATION

WORKSHOP ON BIOMASS ENERGY

MRC FUND FOR AUTOMATION AND GREEN TECHNOLOGY

06 NOVEMBER 2023

ALOFT HOTEL KL SENTRAL

Penyampai Taklimat

Pravin Segaran A/L Segaran, Penolong Pengarah C44

Pengalaman Tugas di Jabatan Alam Sekitar:

1. **Jabatan Alam Sekitar Sarawak (Sept 2013 – Feb 2017)**
   - Unit Punca Tetap
   - Unit Aduan / OMPT / Kontingensi
   - Unit Pendidikan & Kesedaran Alam Sekitar
2. **Jabatan Alam Sekitar Pulau Pinang (Mac 2017 – Disember 2021)**
   - Unit Pelesenan
   - Unit Penguatkuasaan PYDT / PYBDT
3. **Jabatan Alam Sekitar Perak (Mac 2017 – Disember 2021)**
   - Unit Pendakwaan
   - Unit EIA

Kandungan

1. **Pengenalan ringkas kepada Akta Kualiti Alam Sekeliling 1974**
2. **Keperluan pematuhan di bawah Peraturan**
3. ***Way Forward***

Jabatan Alam Sekitar (JAS)

Visi

- Pemuliharaan alam sekitar untuk kesejahteraan rakyat.

Misi

- Memastikan pembangunan lestari di dalam proses memajukan negara.

Fungsi Utama JAS

- Melaksanakan program penguatkuasaan AKAS 1974 dan peraturan-peraturan yang digubal dibawahnya.
- Memulihara dan mempertingkatkan kualiti alam sekeliling.
- Mengawas dan mengawal pencemaran udara dari kilang, kenderaan dan pembakaran terbuka.
- Memberi khidmat nasihat kepada pemaju pembangunan.
- Memberi input dan nasihat kepada Kerajaan Negeri dan pihak berkuasa tempatan dalam perancangan projek pembangunan.
- Menjalankan siasatan aduan pencemaran alam sekitar.
- Memproses laporan Penilaian Kesan Kepada Alam Sekeliling (EIA).

Akta Kualiti Alam Sekeliling 1974

1. Akta Kualiti Alam Sekeliling 1974 diwartakan pada 14 Mac 1974

2. Akta Kualiti Alam Sekeliling 1974 dikuatkuasakan pada 15 April 1975

3. Enam (6) kali pindaan sejak tahun 1985 sehingga 2012. Butiran terperinci mengenai pindaan yang telah dilaksanakan adalah seperti berikut :-

   a. Akta A636 tahun 1985 berkaitan Kajian Kesan Kepada Alam Sekeliling (EIA);

   b. Akta A953 pada tahun 1996 berkaitan peningkatan denda, audit dan Kumpulan Wang;

   c. Akta A1030 tahun 1998 berkaitan larangan pembakaran terbuka dan kuasa mendakwa;

   d. Akta A1102 tahun 2001 berkaitan pembakaran terbuka dan aktiviti pengisytiharan pembakaran terbuka;

   e. Akta A1315 tahun 2007 berkaitan penjara mandatori bagi kes pelupusan haram buangan terjadual dan liabiliti kesalahan kepada prinsipal, agen dan pekerja; dan

   f. Akta A1441 tahun tahun 2012 berkaitan penambaikan pengurusan EIA, Kumpulan Wang Alam Sekeliling, kuasa tangkapan, penyitaan, pelucuthakan, orang berwibawa dan pemberi maklumat.

Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Getah Asli Mentah) 1978

- Berkuatkuasa sepenuhnya sejak 01 April 1979
- Tafsiran: Premis Yang Ditetapkan (Getah Asli Mentah)

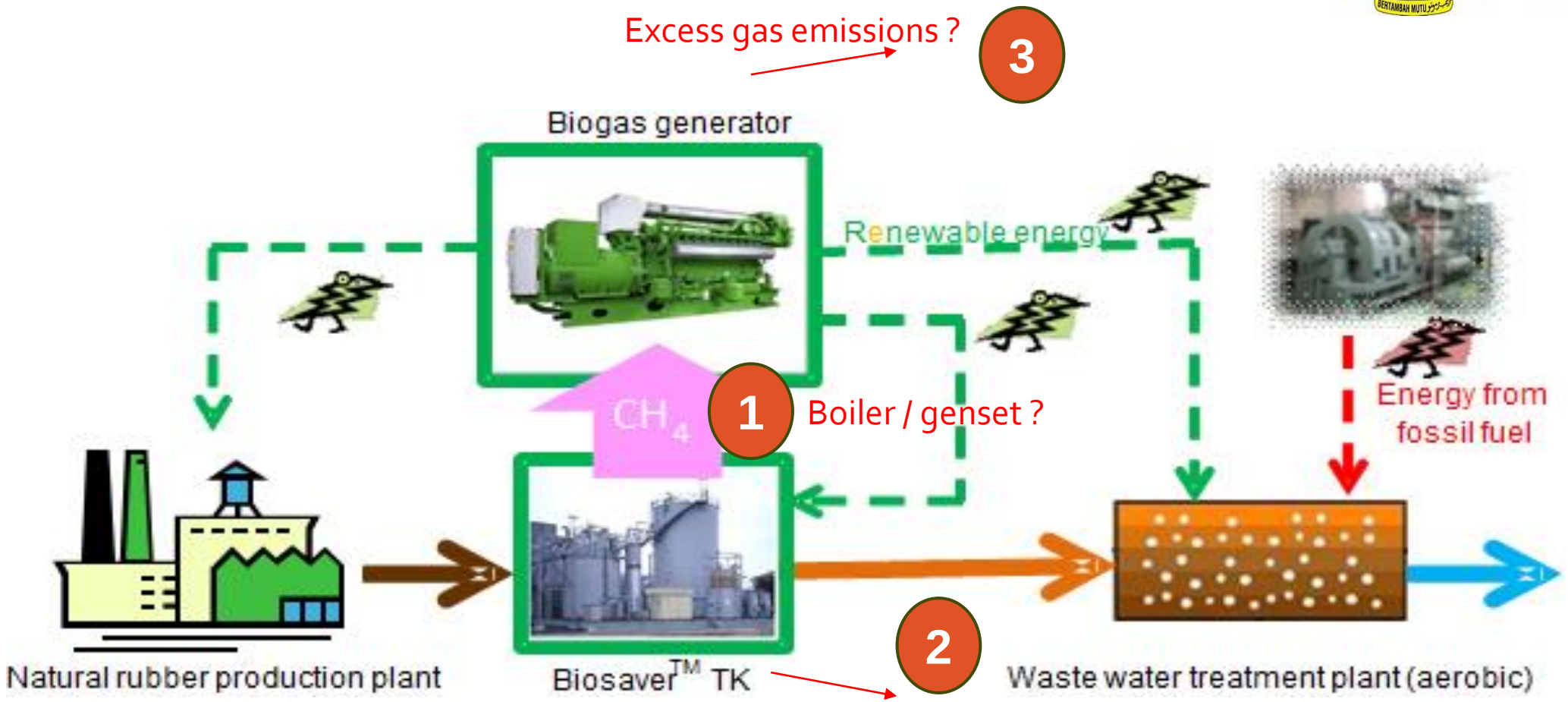
  - Premis yang diduduki atau digunakan bagi pengeluaran atau memproses

    a. Getah asli mentah dalam bentuk yang ditentukan secara Teknik, dalam bentuk susu getah termasuk yang belum divulkan atau bentuk getah yang diubahsuaikan dan getah maksud khas; dan

    b. Keping lazim, skim, kerip atau apa-apa bentuk lain getah mentah yang belum diperihalkan, dengan kuantiti sebanyak 5 tan atau lebih sehari atau dengan kemampuan pengeluaran atau memproses yang sama kuantitinya.

- Penduduk atau pengguna Premis Yang Ditetapkan (PYDT) hendaklah mendapatkan **kebenaran bertulis dibawah Seksyen 19** & **lesen dibawah Seksyen 18**, Akta Kualiti Alam Sekeliling 1974 daripada Jabatan Alam Sekitar

Contoh aliran proses biogas industri getah



KB Sek.19
Lesen Sek.18

Pindaan syarat
- Layout plan
- Process flow
- other info as required by DOE

Additional waste stream?

1 Pemasangan / ubahsuai / naiktaraf dandang (*boiler*) atau janakuasa (generator)

- **Peraturan 5, PPKAS (Udara Bersih) 2014**
  - Pemunya atau penduduk sesuatu premis tidak boleh (**memasang / ubahsuai / naiktaraf Alat Pembakaran Bahan Api**), tanpa memberi pemberitahuan bertulis terdahulu sebelumnya kepada Ketua Pengarah Kualiti Alam Sekeliling
  - Dikemukakan tidak kurang daripada **30 hari sebelum kerja tersebut dimulakan**
  - Format pemberitahuan mengikut borang yang telah ditetapkan oleh Jabatan Alam Sekitar
    - Dandang – https://www.doe.gov.my/wp-content/uploads/2021/07/AS_PUB_N-APB-PEMBERITAHUAN-BERTULIS-APB-WRITTEN-NOTIFICATION-FBE.pdf
    - Janakuasa - https://www.doe.gov.my/wp-content/uploads/2021/07/AS_PUB_N-JANA-PEMBERITAHUAN-BERTULIS-JANAKUASA-WRITTEN-NOTIFICATION-GENERATOR.pdf

2 Pemasangan / ubahsuai / naiktaraf Sistem Pengolahan Efluen (SPE)

- **Peraturan 6, PPKAS (PYDT)(GAM) 1978**
  - Semua jenis perubahan dalam PYDT yang mengubah atau mungkin mengubah **kuantiti atau kualiti efluen**, perlu mendapat **Kebenaran Bertulis** daripada Ketua Pengarah Kualiti Alam Sekeliling
  - Format borang: https://www.doe.gov.my/wp-content/uploads/2021/07/AS.6-Information-On-Prescribed-Premises-Raw-Natural-Rubber-Waste-Disposal.pdf
- Tambahan *loading* efluen kepada Sistem Pengolehan Efluen sedia ada (cth: *liquor* daripada *scrubber* yang digunakan untuk merawat gas *hydrogen sulfide*)
- Sekiranya melibatkan premis bukan PYDT, boleh merujuk kepada **Peraturan 4, PPKAS (Efluen Perindustrian) 2009**
  - Format borang: https://www.doe.gov.my/wp-content/uploads/2021/07/Borang_Notifikasi-Pemberitahuan_Bertulis.pdf

3 Pemasangan / ubahsuai / naiktaraf Sistem Kawalan Pencemaran Udara (SKPU)

- **Peraturan 7, PPKAS (Udara Bersih) 2014**
  - Pemunya atau penduduk sesuatu premis hendaklah melantik **jurutera professional** untuk mereka bentuk dan menyelia pembinaan SKPU
  - Dikemukakan tidak kurang daripada **30 hari sebelum kerja tersebut dimulakan**
  - Format pemberitahuan mengikut borang yang telah ditetapkan oleh Jabatan Alam Sekitar
    - Scrubber (untuk merawat gas *hydrogen sulfide*) – https://www.doe.gov.my/wp-content/uploads/2021/07/AS_PUB_N-SCRUBBER-PEMBERITAHUAN-BERTULIS-PENGGAHAR-WRITTEN-NOTIFICATION-SCRUBBER.pdf
  - Kemuka ***written declaration & as-built drawing*** dalam tempoh 30 hari selepas SKPU mula operasi

Kelebihan menggunakan tenaga boleh diperbaharui

Jenis Bahan Api	Kelebihan (*Benefit*)
Biomass	• Kandungan sulfur yang lebih rendah berbanding arang batu (penjanaan SO_2 yang lebih rendah) • Dengan *pre-treatment* serta teknik pengeringan yang sesuai, boleh menjadi sumber penjanaan tenaga yang efisien melalui pembakaran yang lengkap
Biogas	• Penggunaan *natural gas* sebagai *reburning fuel* boleh mengurangkan penjanaan Particulate Matter (PM), SOx & CO_2 secara kadar terus dengan kuantiti arang batu yang digantikan • *Pre-heating natural gas* boleh meningkatkan kecekapan terma • Penjanaan PM < 5 mg/Nm^3 & SO_2 < 10 mg/Nm^3 (patuh PUB 2014)

Maklumat Perhubungan

Jabatan Alam Sekitar Negeri Perak

Tingkat 7, Bangunan Seri Kinta,
Jalan Sultan Idris Shah
30000 Ipoh, Perak Darul Ridzuan

No.Tel: 05-254 2744
No.Faks: 05-255 8535

019-4502847

p.segaran@doe.gov.my

BIOMASS BOILER SOLUTION IN MALAYSIA

SONG Shyne Loong
Email address: SSL@Vyncke.com
Project Sales Manager
Vyncke Sdn Bhd

6th Nov 2020

BIOMASS BOILER SOLUTIONS

VYNCKE

GLOBAL ORGANIZATION

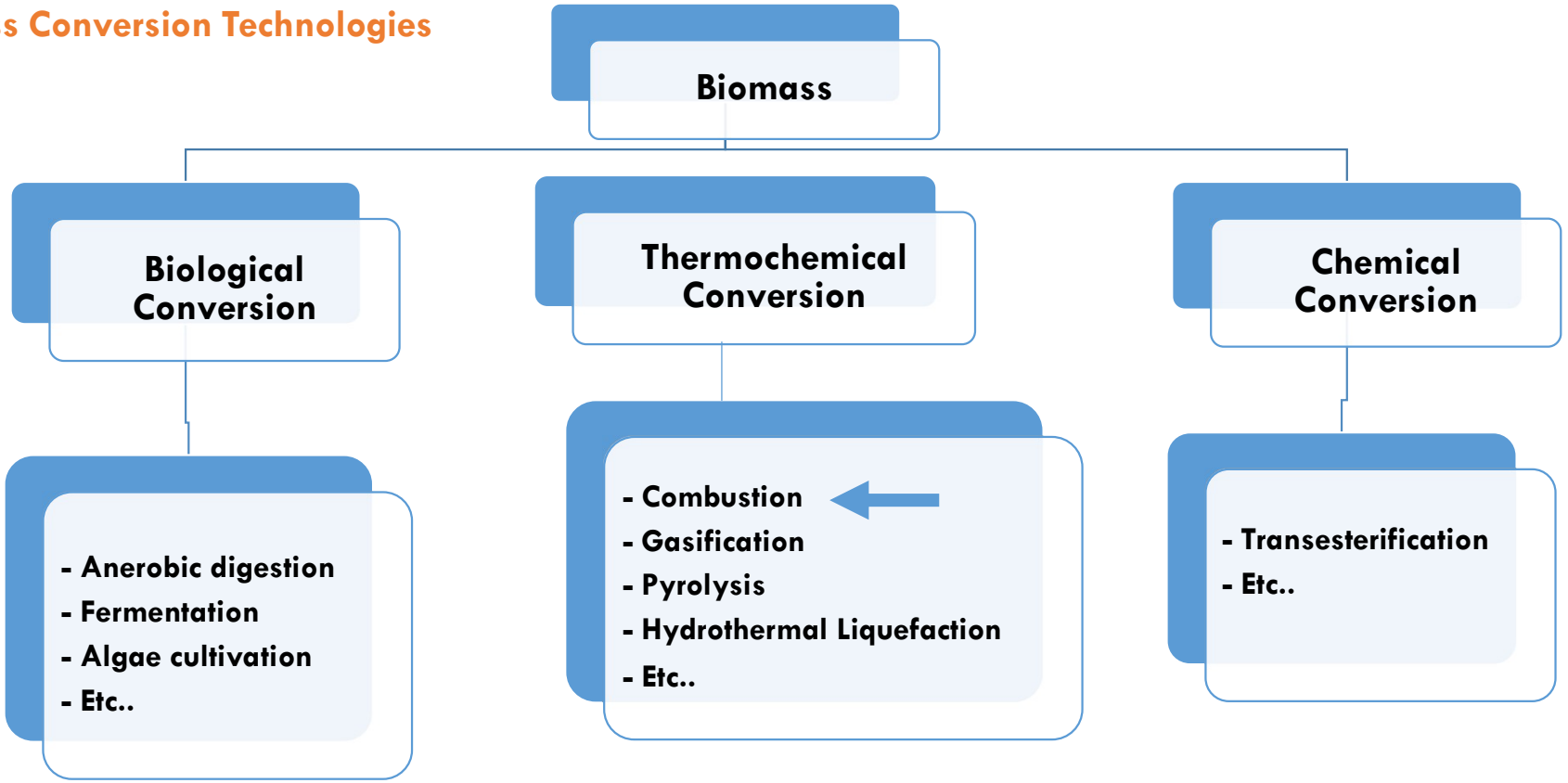
OUR SOLUTIONS

MARKETS & REFERENCE

CASE STUDY – EMPTY FRUIT BRUNCHES VS NATURAL GAS

BIOMASS BOILER SOLUTIONS

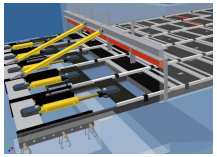
Biomass Conversion Technologies



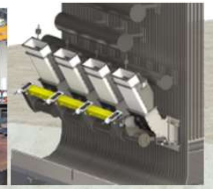
BIOMASS BOILER SOLUTIONS

Typical Biomass Boiler Solution Flow

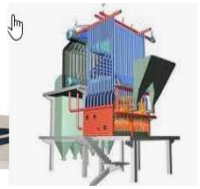
Fuel Management System



Feeding System



Boiler Concept



Economizer

Combustion Technologies

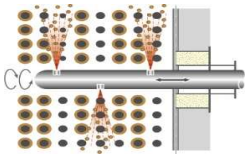
Flue Gas Treatment

ESP

Baghouse Filter

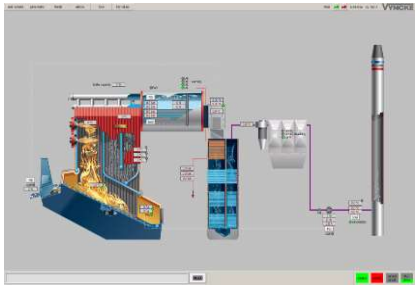
Online Cleaning System

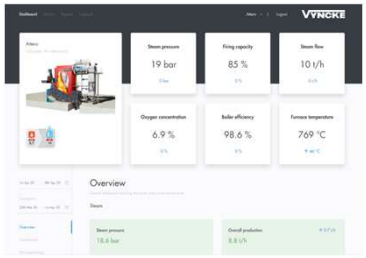
Soot blowers



Online deashing system

PLC system





BIOMASS BOILER SOLUTIONS

Combustion Technologies

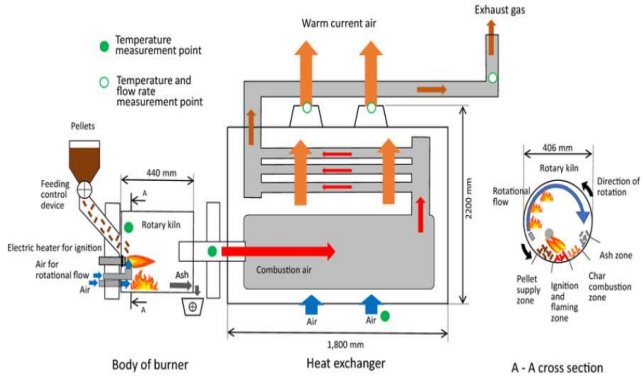
Combustion Technologies

Fluidized Bed
- Bubbling fluidized bed
- Circulating fluidized bed

Grate Firing
- Fixed grate
- Vibrating grate
- Traveling grate
- Dumping grate
- Reciprocating
- Step grate
- Etc…

Others
- Rotary Kiln
- Conical underfeed
- Dust Burners
- Etc…

Rotary Kiln

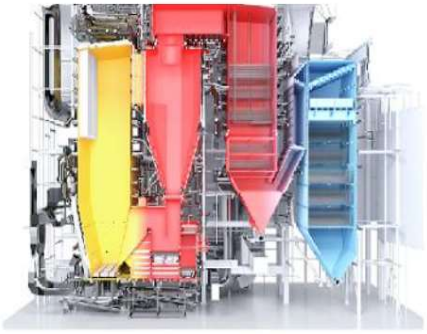


Small-scale rotary kiln biomass pellet boiler

Conical underfeed

Dust burners

BIOMASS BOILER SOLUTIONS

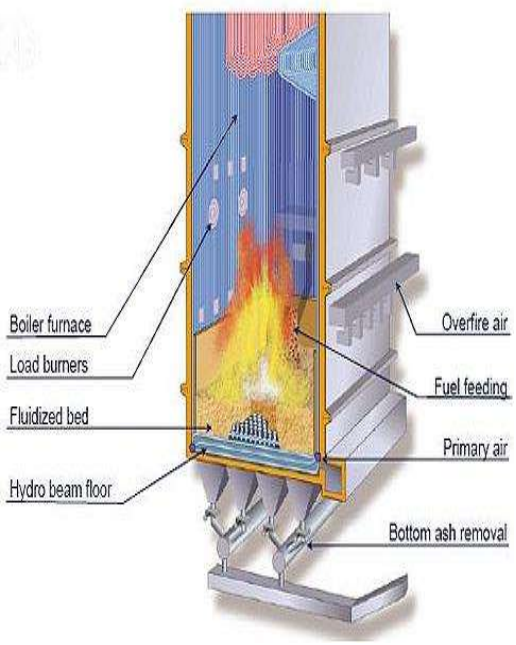


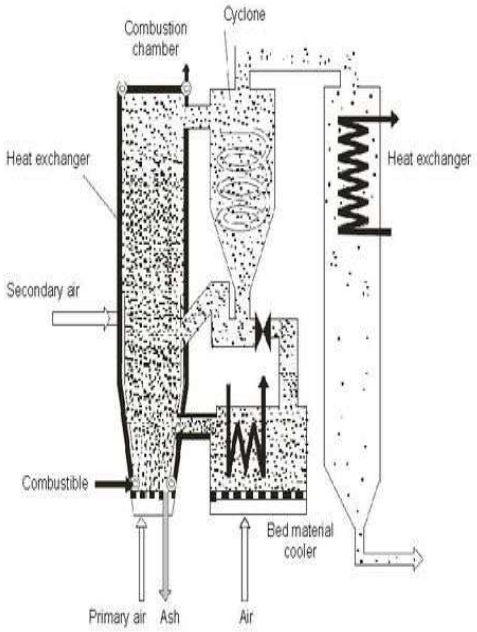
Choose the right biomass boiler solutions!

- Meet your requirement
- Total cost of ownership
- Fuel flexibility
- Good performance
- Consistent supply of energy
- Reliability
- After sales support
- Etc…

BIOMASS BOILER SOLUTIONS

Combustion Technology - Bubbling fluidzied bed/ Circulating fluidized bed





Descriptions

- Utilized a bed of inert particles/sand to suspend and combust biomass fuels in a bubbling , fluid-like state/high velocity turbulent flow for better mixing , under an oxygen – rich environment.

Advantage

- High efficiency >85-90%

Disadvantages

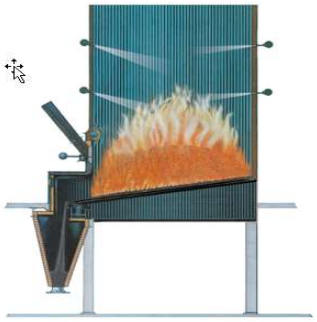
- Constant fuel size is required, <80mm/ <40mm, moisture content <40%
- **Fuel preparation is a must to prevent impurities => High risk of formation agglomerate and fouling**
- Minimum fuel flexibility
- High OPEX - Power consumption and maintenance cost
- Turndown of less than ½ is not possible

Applications :

- Coal, limited biomass – constant fuel quality wood chips, saw dust, bark, etc..

BIOMASS BOILER SOLUTIONS

Combustion Technology - Fixed grate



Descriptions

- Biomass fuel are manually feed into grate

Advantage

- Low capex

Disadvantages

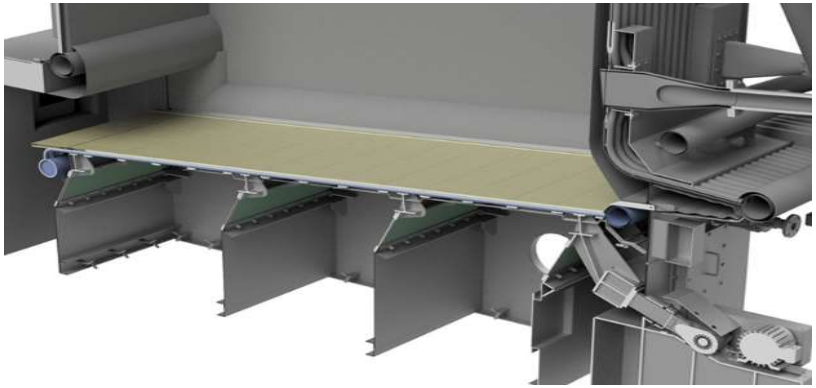
- No fuel movement, thick fuel bed => Poor combustion air penetration
- High unburned => Manual intervention needed to mix the fuel/to rake out the burned fuel.
- Manual raking => Mixture of burned and unburned fuel
  => Entering of false air once the boiler door is open
  => Very low boiler efficiency!
- Operators exposed to a potential of backfired

Applications :

- Coal, palm kernel shell, wood chips, etc..

BIOMASS BOILER SOLUTIONS

Combustion Technology - Vibrating grate



Descriptions

- Fuel transported on the grate by vibrating movements

Advantage

- Lower capex
- Lower ash build up on the grate

Disadvantages

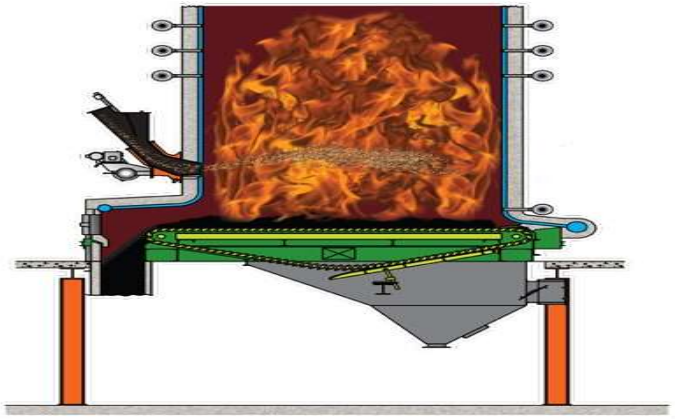
- Lack of fuel flexibility!
- Small range of fuel size, homogenous fuel distribution is required
- Single combustion zone, speed, air inlet throughout entire grate
- Overall thermal efficiency low 70-75%
- High OPEX : Frequent shutdown for maintenance,
  : Operation hour per year < 80%
- Higher degree of ash carry over in flue gas
- Noise and vibration

Applications :

- Coal, palm kernel shell, wood chips, etc..

BIOMASS BOILER SOLUTIONS

Combustion Technology - Travelling grate (Chain grate)



Descriptions

- Fuel transported on a horizontally moving endless conveyor belt

Advantage

- Lower capex
- Lower ash build up on the grate

Disadvantages

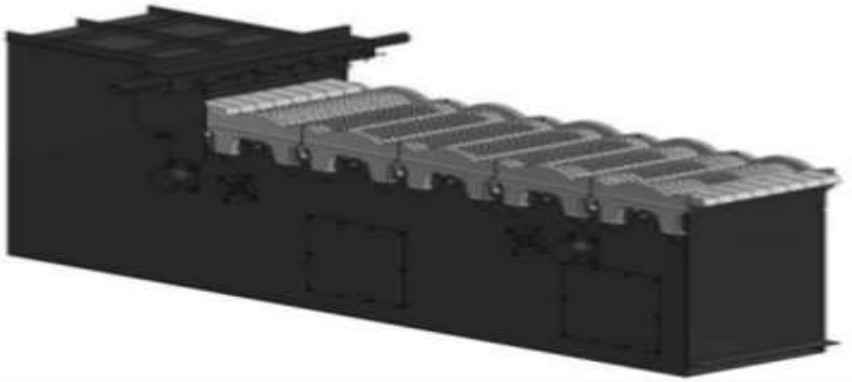
- Lack of fuel flexibility!
- Small range of fuel size, homogenous fuel distribution is required
- Single combustion zone, speed, air inlet throughout entire grate
- Overall thermal efficiency low 70-75%
- High OPEX : Frequent shutdown for maintenance
  : Operation hour per year <80%
  : Large number of moving parts and lubrication problems

Applications

- Palm kernel shell, wood chips, etc..

BIOMASS BOILER SOLUTIONS

Combustion Technology - Air-cooled reciprocating grate



Descriptions

- Fuel transported by grates move back and fort, creating reciprocating motion, by hydraulic pusher under the grates, air-cooled, single speed, single air inlet flow

Advantage

- Higher fuel flexibility
- Low maintenance requirement

Disadvantages

- High capex
- Single speed and air inlet flow throughout entire grate
- Overall thermal efficiency low 75-80%
- Operation hour per year <85%

Applications

- Palm kernel shell, wood chips, rice husks etc..

BIOMASS BOILER SOLUTIONS

Combustion Technology - Water-cooled step grate

Descriptions

- Fuel transported by grate moves in steps, fuel move through different combustion zones by side driven hydraulic cylinder system
- Water-cooled, multizone combustion, adjustable zone speed and air inlet flowrate in each combustion zone

Advantage

- Highest fuel flexibility – Multi-fuels
- Overall thermal efficiency high > 85%
- Low OPEX : Minimum shutdown for maintenance,
  : Operation hour per year > 91%

Disadvantages

- High capex

Applications

- Multi-fuels, dry or wet fuel, 100% EFB, cocoa shell, rice husks, palm kernel shell, wood chips, etc..

BIOMASS BOILER SOLUTIONS - SUMMARY

HI	FLUIDIZED BED	VIBRATING GRATE	TRAVELLING GRATE	AIR-COOLED RECIPROCATING	WATER-COOLED STEPGRATE
FUEL FLEXIBILITY	• STRICT FUEL PREPARATION • CONSTANT PARAMETERS REQUIRED (FUEL SIZE / DENSITY/ CHEMICAL) • MOISTURE LIMIT < 40%	• STRICT FUEL PREPARATION • CONSTANT PARAMETERS REQUIRED (FUEL SIZE / DENSITY/ CHEMICAL) • DIFFICULTIES TO COPE WITH VARIABLE MOISTURE	• STRICT FUEL PREPARATION • CONSTANT PARAMETERS REQUIRED (FUEL SIZE / DENSITY/ CHEMICAL) • DIFFICULTIES TO COPE WITH VARIABLE MOISTURE	• VARIABLE FUEL SIZE ALLOWED • VARIABLE FUEL DENSITY ALLOWED • VARIABLE FUEL COMPOSITION • MOISTURE LIMIT <50%	• VARIABLE FUEL SIZE ALLOWED • VARIABLE FUEL DENSITY ALLOWED • VARIABLE FUEL COMPOSITION • MOISTURE LIMIT 60%
EFFICIENCY	HIGH > 85-90% *(BUT BOILER CAPACITY MUST BE LARGE)*	LOW ~ 70-75% HIGH UNBURNED WITH VARIABLE FEEDSTOK	LOW ~ 70-75% HIGH UNBURNED WITH VARIABLE FEEDSTOK	LOW ~75-80%	HIGH > 85%
AVAILABILITY	LIMITED ON AGRO FUELS	LIMITED ON AGRO FUELS < 7000 H	LIMITED ON AGRO FUELS < 7000 H	< 7500 H	> 8000 H
AGGLOMERATION	DEFLUIDISATION REQUIRED MANUAL SHUTDOWN & REMOVAL	AIRCOOLED: HIGH AGGLOMERATION	AIRCOOLED: HIGH AGGLOMERATION	AIRCOOLED: HIGH AGGLOMERATION	WATERCOOLED: LOW AGGLOMERATION EXTRACTION BY AUTOMATIC DEASHING
OPEX	VERY HIGH	HIGH	HIGH	LOW	LOW
CAPEX	-	LOW	LOW	HIGH	HIGH

BIOMASS BOILER SOLUTIONS

VYNCKE

GLOBAL ORGANIZATION

OUR SOLUTIONS

MARKETS & REFERENCE

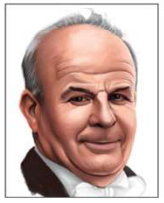
CASE STUDY – EMPTY FRUIT BRUNCHES VS NATURAL GAS

HISTORY

1st GENERATION
Louis VYNCKE

1912 - 1940

2nd GENERATION
Michel VYNCKE



1940 - 1972

3rd GENERATION
Dirk VYNCKE

1972 - 2002

4th GENERATION
Peter & Dieter VYNCKE

2002 - ...

HISTORY

BIOMASS BOILER SOLUTIONS

VYNCKE

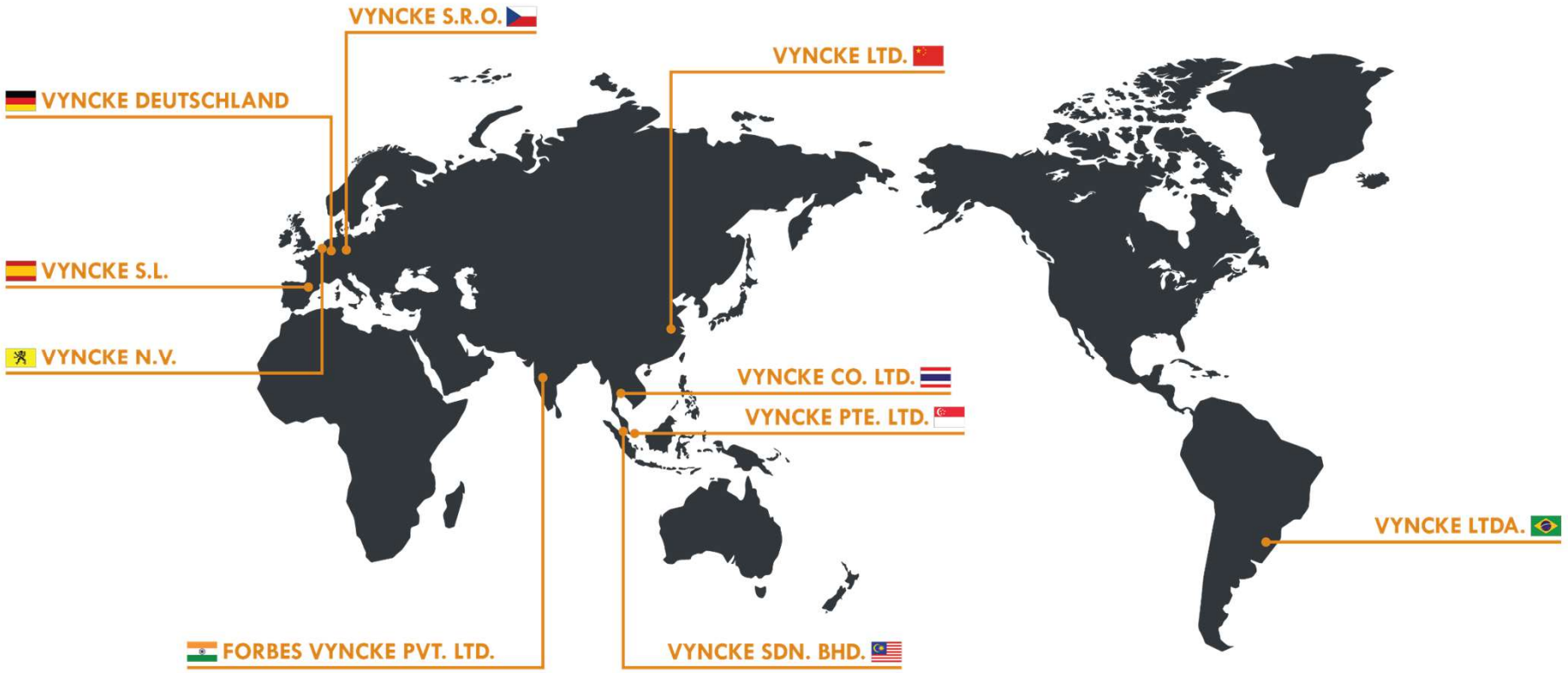
GLOBAL ORGANIZATION

OUR SOLUTIONS

MARKETS & REFERENCE

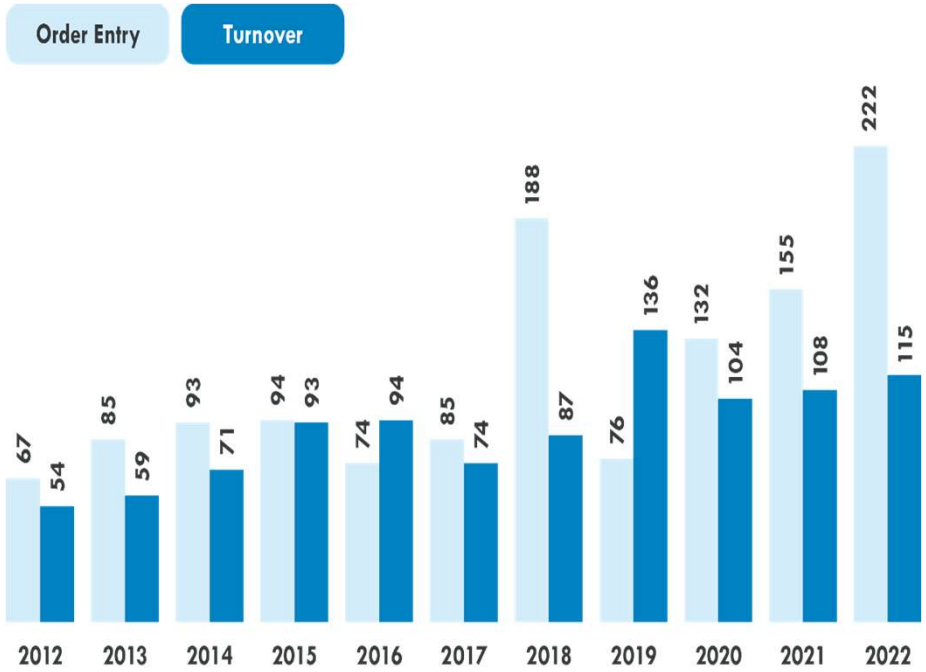
CASE STUDY – GLOVE PLANT (EMPTY FRUIT BRUNCHES VS NATURAL GAS)

GLOBAL PRESENCE



GLOBAL ORGANIZATION | WORKSHOP FRÝDEK-MÍSTEK

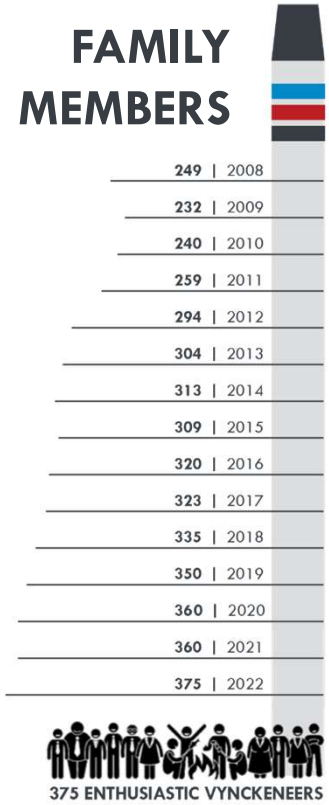
GLOBAL ORGANIZATION | TURNOVER & PROJECT OVER THE LAST DECADE



Projects Over The Last Decade

GLOBAL ORGANIZATION | VYNCKENEERS

FAMILY MEMBERS



375 VYNCKENEERS
OPERATING FROM

20 China	6 Brazil		
134 Czech Republic	158 Flanders	21 Malaysia	1 Ivory Coast
1 Singapore	2 Germany	18 Thailand	14 Spain

BIOMASS BOILER SOLUTIONS

VYNCKE

GLOBAL ORGANIZATION

OUR SOLUTIONS

MARKETS & REFERENCE

CASE STUDY – EMPTY FRUIT BRUNCHES VS NATURAL GAS

OUR SOLUTIONS

TURNING BIOMASS & WASTE TO ENERGY

SOLID FUEL RANGE

OUR SOLUTIONS

JNO
3 - 25 MW

WTB - V
5 - 100 MW

WTB - H
10 - 100 MW

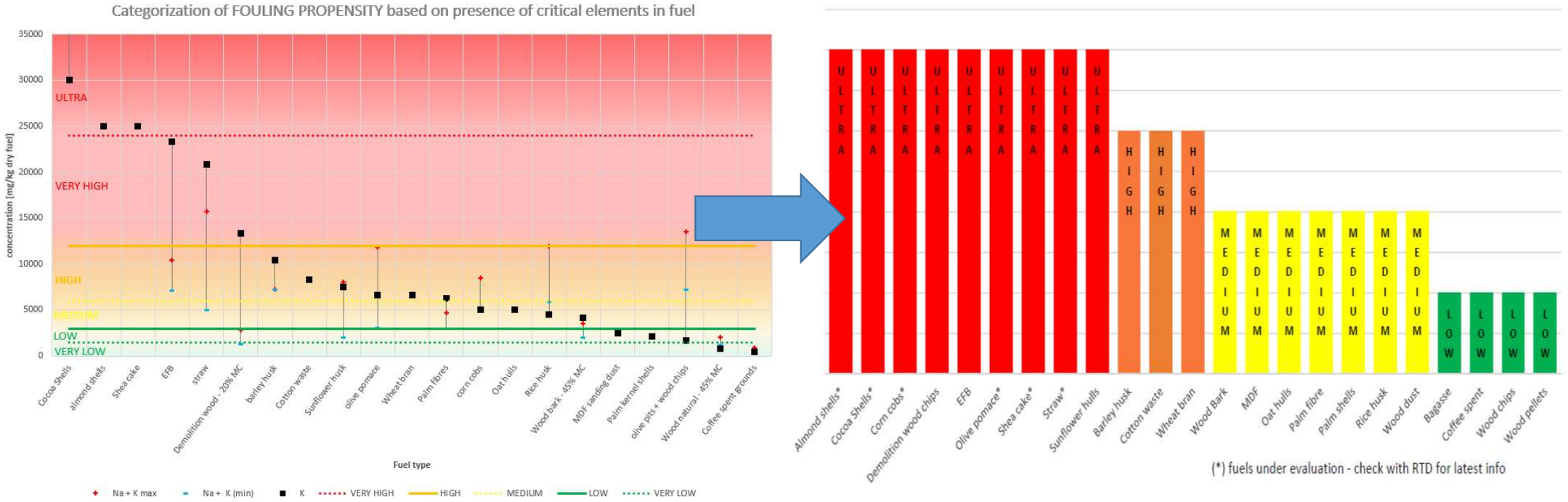
TFH II
3 - 40 MW

MMD III
25 - 100 MW

MMD IV
25 - 100 MW

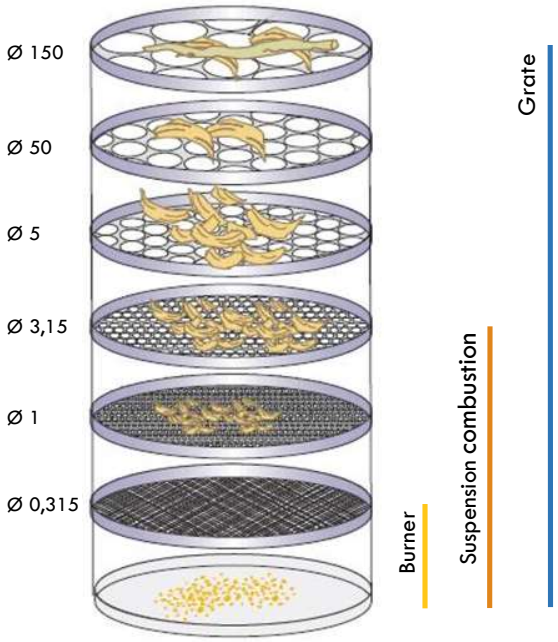
OUR SOLUTIONS – THE FUEL

TECHNOLOGY | BIOMASS – FOULING

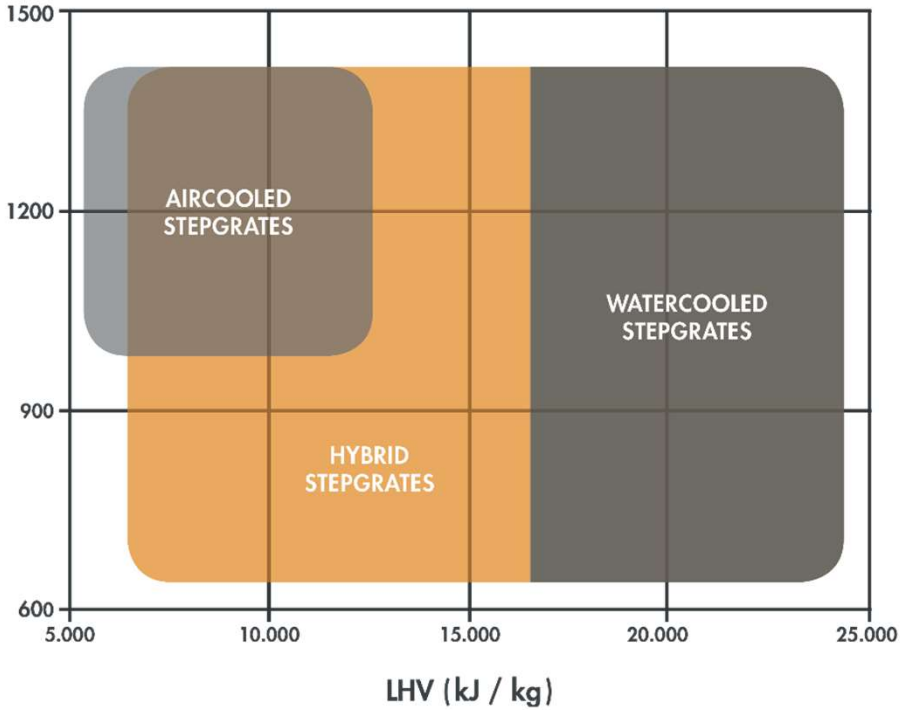


OUR SOLUTIONS – THE GRATE

TECHNOLOGY | BIOMASS – COMBUSTION TECHNOLOGY SELECTION

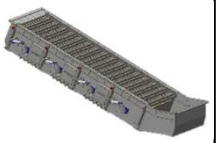


	LHV (kJ/kg)	ASH MELTING POINT
WOOD (20 %)	16.000	1.100
WOOD (40 %)	10.000	1.100
WOOD (60 %)	6.000	1.100
RICE HUSK	13.000	1.300
OAT HULLS	15.000	750
SUN FLOWER HULLS	18.000	700
WHEAT BRAN	15.000	700
EMPTY FRUIT BUNCHES	7.000	750
PAPER AND PLASTIC PELLETS	23.000	750



OUR SOLUTIONS – THE GRATE

TECHNOLOGY | BIOMASS – RANGE OF GRATE

FAMILY	ONE			FORNAX		VULCAN	
TYPE	DWS-ONE			DWS-FORNAX	DAS-FORNAX	DWS-VULCAN	DAS-VULCAN
							
FUEL	Biomass	Biomass	Biomass	RDF, specific biomass	RDF, specific biomass	RDF, specific biomass	RDF, specific biomass
INTERNAL CODE	DWS 2.0	DWS 2.0	DWS 2.0	DWS 3.1	DAS 3.1	DWS 4.1	DAS 4.1
COOLING CONFIGURATIONS	FW	HY	SW	HY	AC	HY	AC

OUR SOLUTIONS – THE GRATE

TECHNOLOGY | BIOMASS – THE ART OF MAKING FIRE – IN DEPTH !

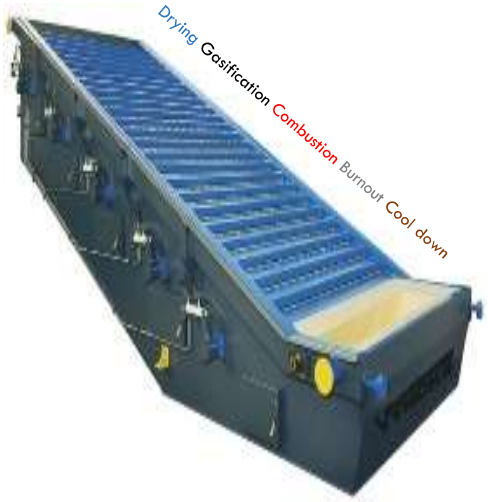
- Each **COMBUSTION STEP** needs different grate speed and air flow
  - Adjustable stroke length and velocity per zone
  - Adjustable air flow per zone

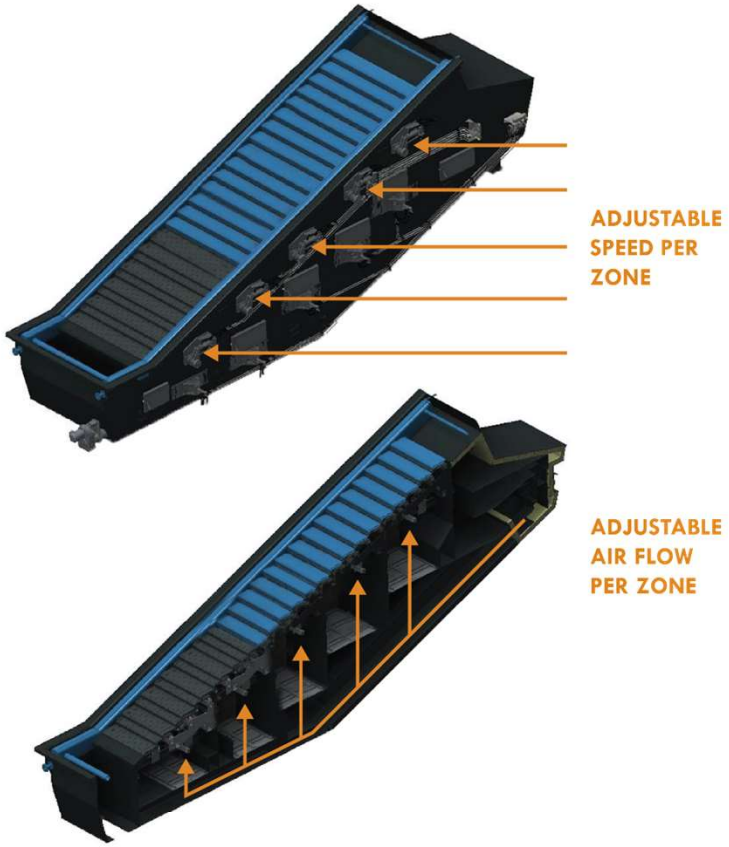
- **GRATE COOLING DECOUPLED FROM AIR SUPPLY**
  - Air : combustion
  - Water : cooling

➡ Allows optimal air flow settings for
- combustion
- CO/NO_x control

- Lower flue gas flow / losses
  - Higher **EFFICIENCY**

- **WATER PROTECTS THE GRATE**
  - Longer lifetime
  - Avoid cracks and hot spots
  - Thermal expansion





OUR SOLUTIONS – THE BOILER

TECHNOLOGY | BIOMASS – BOILER

TIME
- Residence time

TEMPERATURE
- Refractory
- Air preheating
- Fluegas recirculation

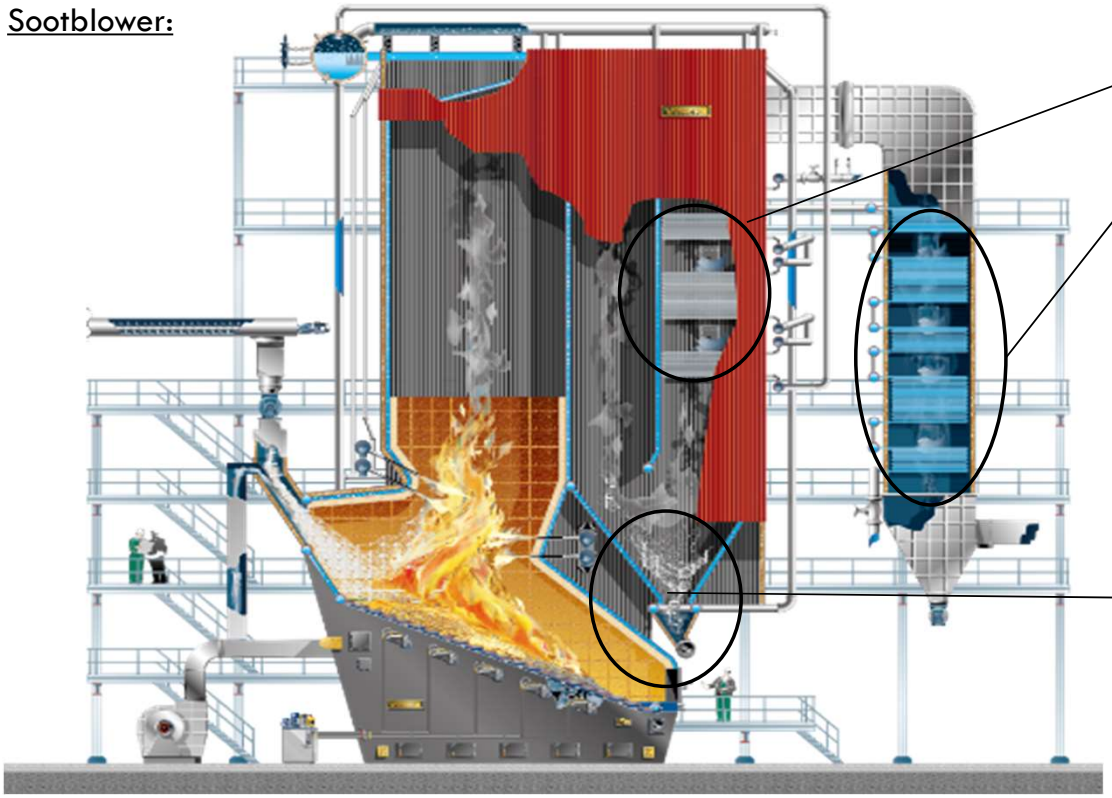
TURBULENCE
- Primary air distribution
- Secondary air

EMISSION
- Triple air staging

OUR SOLUTIONS – ONLINE CLEANING

TECHNOLOGY | BIOMASS – ONLINE CLEANING SYSTEM

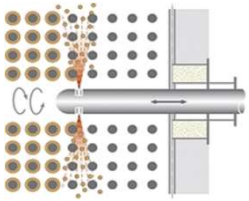
- Sootblower:



Economizer

Sootblowers on compressed air

Installed below the convection part



- Water cooled ash screw conveyor at 2nd/3rd pass of radition section

OUR SOLUTIONS – SMART PLANT

SMART PLANT – BRIDGE CONTAINER

POSSIBLE CHALLENGES IN YOUR OPERATION

OPERATOR

- Varying daily shape
- Qualification - Experience
- Knowledge sharing

GREEN FUEL

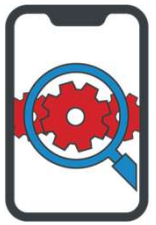
- Variability (humidity – particle size)
- Smooth stable combustion – response time
- Emission control

MAINTENANCE

- Planning
- Execution time
- Down time

SMART PLANT

WHAT'S IN IT FOR YOU ?

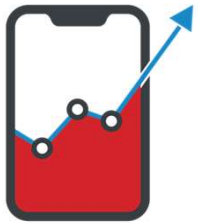


MORE TRANSPARENCY

- Clearer communication
- Alarms overview
- Higher availability
- Health score card

OPTIMIZED MAINTENANCE

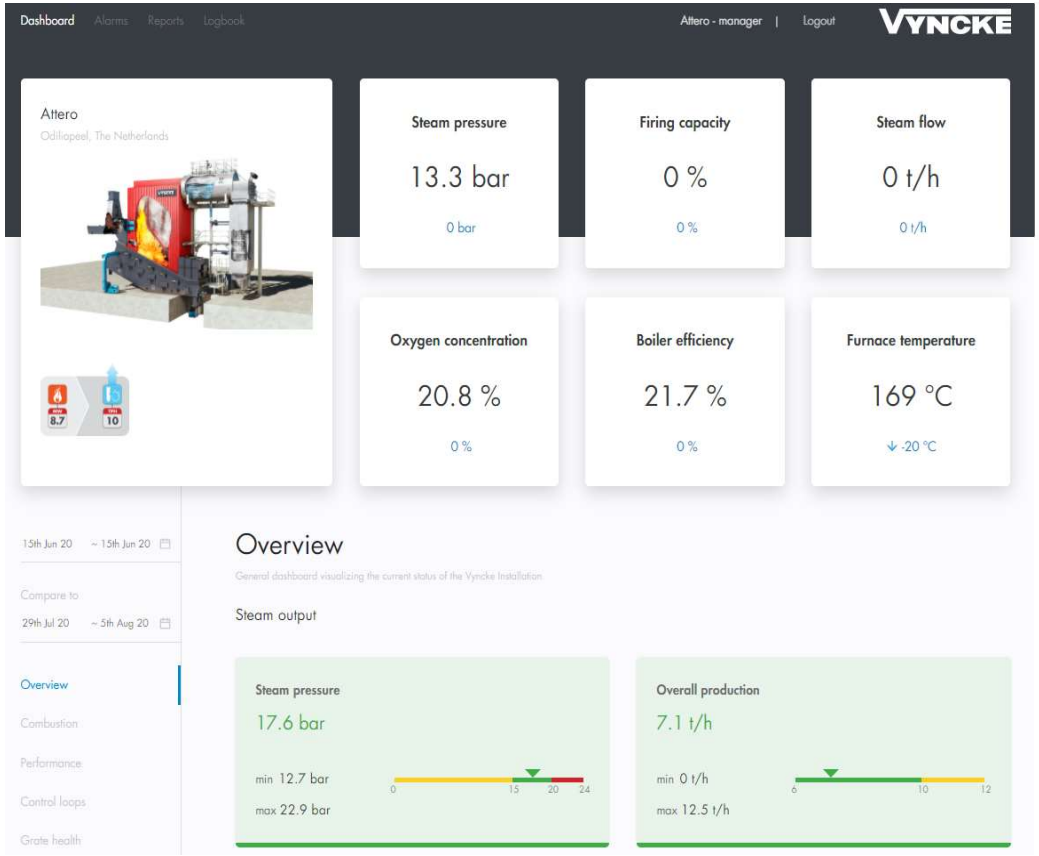
- Reduce intervention time
- Optimize resources
- Reduce downtime

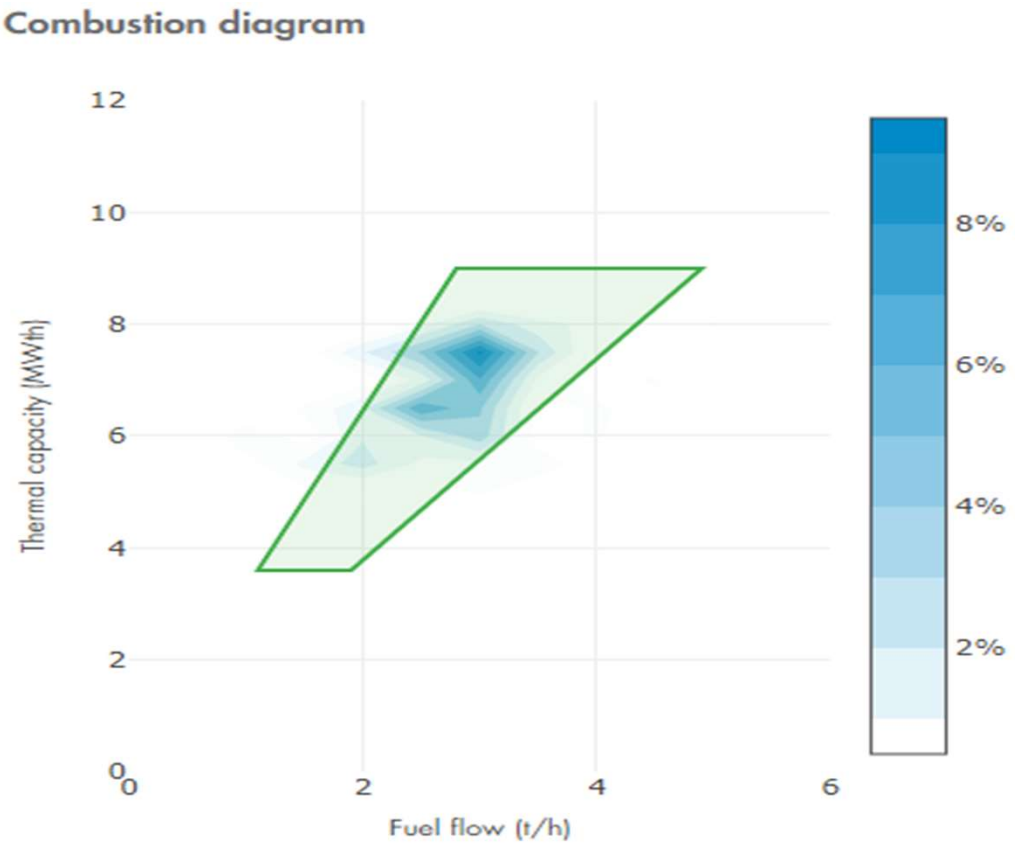


HIGHER PRODUCTIVITY

- Extends product life of critical components
- Improves efficiency and availability of people & energy plant

OUR SOLUTIONS – SMART PLANT





OUR SOLUTIONS – SMART PLANT

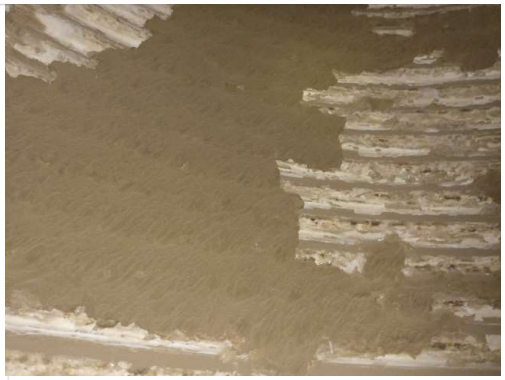
SMART PLANT - FOULING CASE STUDY

Management

INTELLIGENCE

Fouling

coil



COLD STOP 48-72h
HOT STOP 4-6h

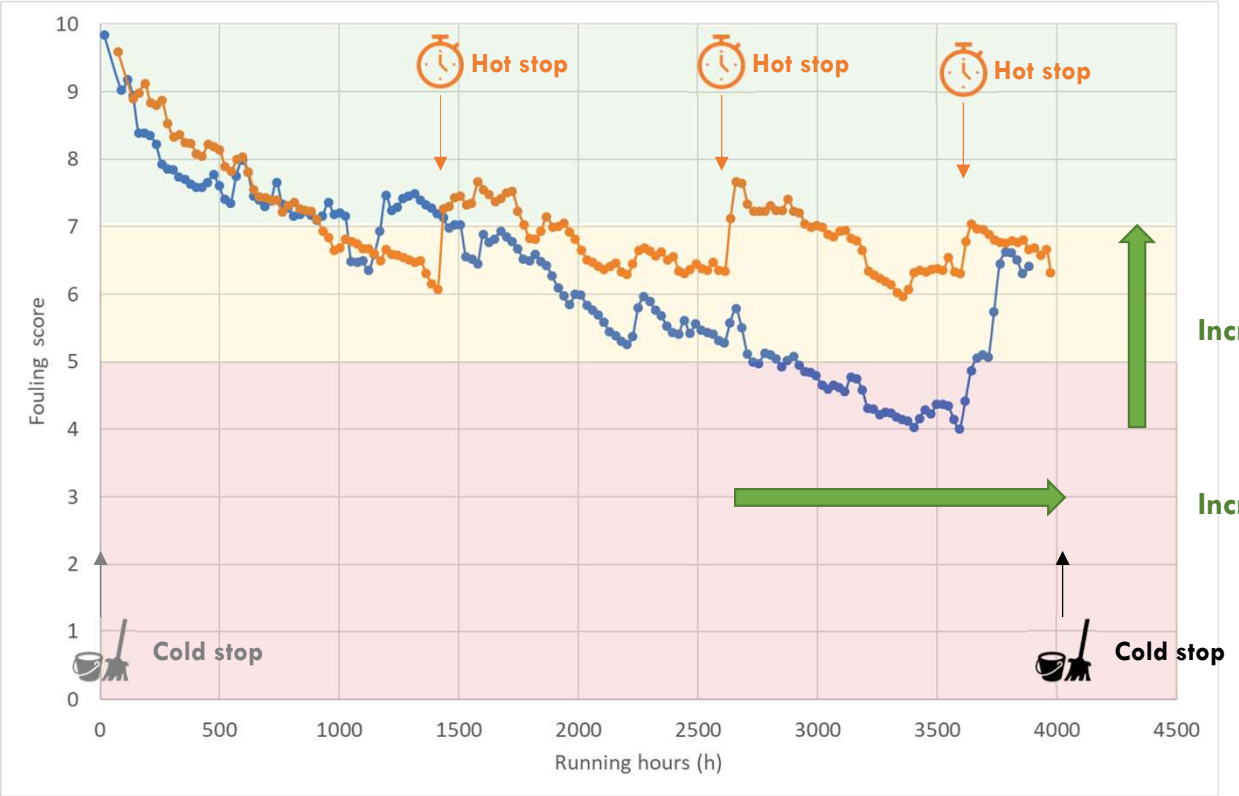
SMART PLANT - FOULING CASE STUDY

USE
EXISTING DATA

VISUALIZE
THE PROCESS

LEARN
HOW IT WORKS

ADAPT
TO IMPROVE



AVAILABILITY
2500h >> +5000h
= SAVE IN DOWNTIME

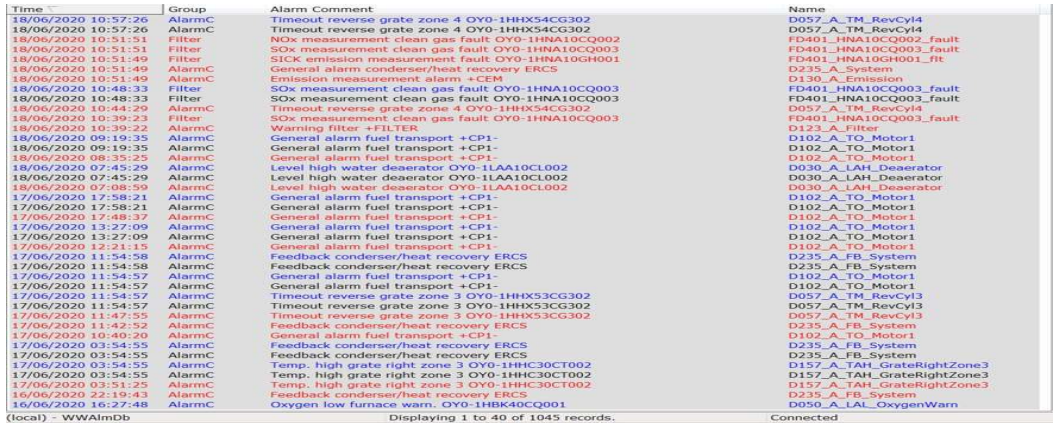
COLD STOP 48-72h
HOT STOP 4-6h

OUR SOLUTIONS – SMART PLANT

SMART PLANT – INTELIGENT –INSIGHT ALAM

Are you analyzing your alarms?

- Not so easy
- Lots of alarms
- All mixed up
- Alarm chain reactions



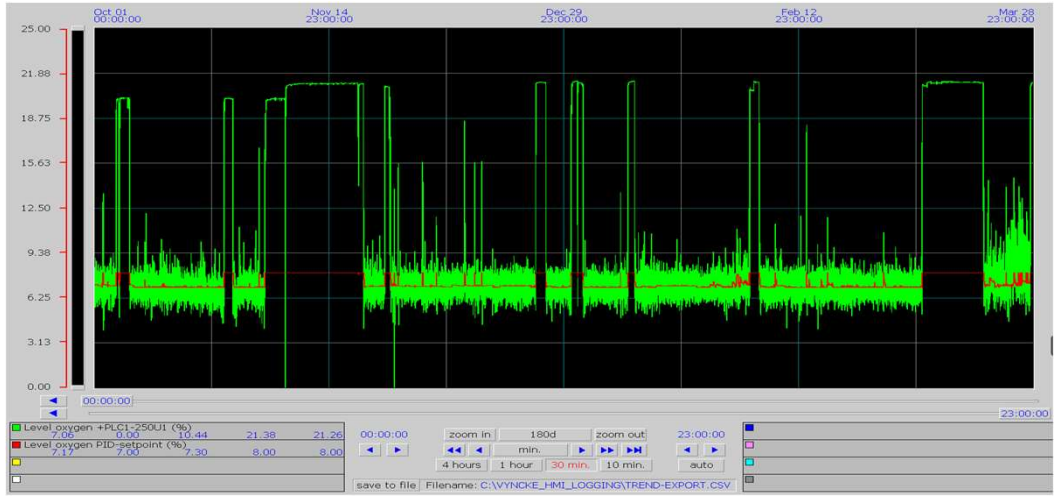
Time	Group	Alarm Comment	Name
18/06/2020 10:57:26	AlarmC	Timeout reverse grate zone 4 OY0-1HHX54CG302	D057_A_TM_RevCyl4
18/06/2020 10:57:26	AlarmC	Timeout reverse grate zone 4 OY0-1HHX54CG302	D057_A_TM_RevCyl4
18/06/2020 10:51:51	Filter	NOx measurement clean gas fault OY0-1HNA10CQ002	FD401_HNA10CQ002_fault
18/06/2020 10:51:51	Filter	SOx measurement clean gas fault OY0-1HNA10CQ003	FD401_HNA10CQ003_fault
18/06/2020 10:51:49	Filter	SICK emission measurement fault OY0-1HNA10GH001	FD401_HNA10GH001_flt
18/06/2020 10:51:49	AlarmC	General alarm condenser/heat recovery ERCS	D235_A_System
18/06/2020 10:51:49	AlarmC	Emission measurement alarm +CEM	D130_A_Emission
18/06/2020 10:48:33	Filter	SOx measurement clean gas fault OY0-1HNA10CQ003	FD401_HNA10CQ003_fault
18/06/2020 10:48:33	Filter	SOx measurement clean gas fault OY0-1HNA10CQ003	FD401_HNA10CQ003_fault
18/06/2020 10:44:29	AlarmC	Timeout reverse grate zone 4 OY0-1HHX54CG302	D057_A_TM_RevCyl4
18/06/2020 10:39:23	Filter	SOx measurement clean gas fault OY0-1HNA10CQ003	FD401_HNA10CQ003_fault
18/06/2020 10:39:22	AlarmC	Warning filter +FILTER	D123_A_Filter
18/06/2020 09:19:35	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
18/06/2020 09:19:35	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
18/06/2020 08:35:25	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
18/06/2020 07:45:29	AlarmC	Level high water deaerator OY0-1LAA10CL002	D030_A_LAH_Deaerator
18/06/2020 07:45:29	AlarmC	Level high water deaerator OY0-1LAA10CL002	D030_A_LAH_Deaerator
18/06/2020 07:08:59	AlarmC	Level high water deaerator OY0-1LAA10CL002	D030_A_LAH_Deaerator
17/06/2020 17:58:21	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 17:58:21	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 17:48:37	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 13:27:09	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 13:27:09	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 12:21:15	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 11:54:58	AlarmC	Feedback condenser/heat recovery ERCS	D235_A_FB_System
17/06/2020 11:54:58	AlarmC	Feedback condenser/heat recovery ERCS	D235_A_FB_System
17/06/2020 11:54:57	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 11:54:57	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 11:54:57	AlarmC	Timeout reverse grate zone 3 OY0-1HHX53CG302	D057_A_TM_RevCyl3
17/06/2020 11:54:57	AlarmC	Timeout reverse grate zone 3 OY0-1HHX53CG302	D057_A_TM_RevCyl3
17/06/2020 11:47:55	AlarmC	Timeout reverse grate zone 3 OY0-1HHX53CG302	D057_A_TM_RevCyl3
17/06/2020 11:42:52	AlarmC	Feedback condenser/heat recovery ERCS	D235_A_FB_System
17/06/2020 10:40:20	AlarmC	General alarm fuel transport +CP1-	D102_A_TO_Motor1
17/06/2020 03:54:55	AlarmC	Feedback condenser/heat recovery ERCS	D235_A_FB_System
17/06/2020 03:54:55	AlarmC	Feedback condenser/heat recovery ERCS	D235_A_FB_System
17/06/2020 03:54:55	AlarmC	Temp. high grate right zone 3 OY0-1HHC30CT002	D157_A_TAH_GrateRightZone3
17/06/2020 03:54:55	AlarmC	Temp. high grate right zone 3 OY0-1HHC30CT002	D157_A_TAH_GrateRightZone3
17/06/2020 03:51:25	AlarmC	Temp. high grate right zone 3 OY0-1HHC30CT002	D157_A_TAH_GrateRightZone3
16/06/2020 22:19:43	AlarmC	Feedback condenser/heat recovery ERCS	D235_A_FB_System
16/06/2020 16:27:48	AlarmC	Oxygen low furnace warn. OY0-1HBK40CQ001	D050_A_LAL_OxygenWarn

(local) - WWAlmDb Displaying 1 to 40 of 1045 records. Connected

How do you judge if a control loop is performing well or not ?

Not so easy

- What is the time period?
- What is the range, scaling, zoom?
- What is expected or normal?
- How was it before?



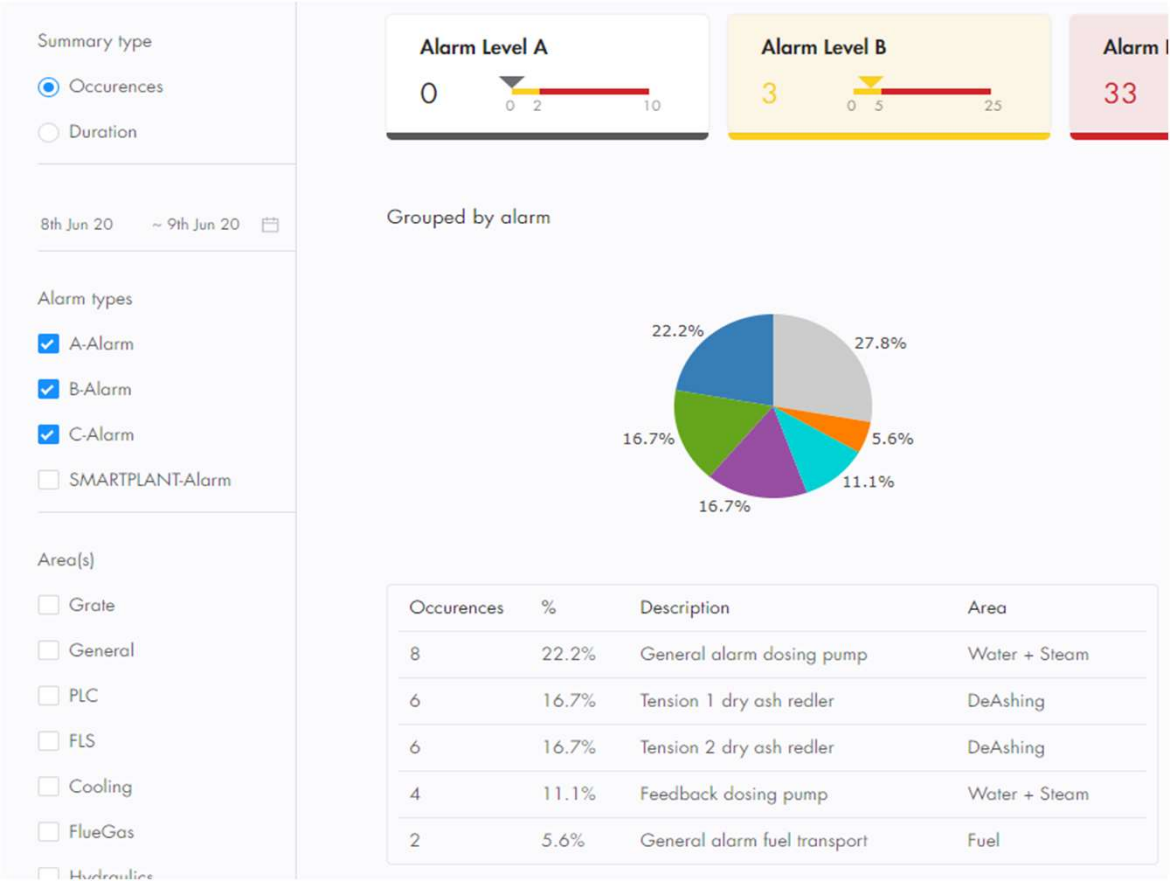
OUR SOLUTIONS – SMART PLANT

SMART PLANT – INTELIGENT –INSIGHT ALAM

Tool:
- Quantify
- Objective

Strength
- Minimal effort / maximal results

Free bonus : alarm reduction works in 2 ways
- Direct : increase availability
- Indirect : less alarms and downtime => more focus



Occurences	%	Description	Area
8	22.2%	General alarm dosing pump	Water + Steam
6	16.7%	Tension 1 dry ash redler	DeAshing
6	16.7%	Tension 2 dry ash redler	DeAshing
4	11.1%	Feedback dosing pump	Water + Steam
2	5.6%	General alarm fuel transport	Fuel

OUR SOLUTIONS – SMART PLANT

SMART PLANT – INTELIGENT –INSIGHT ALAM

Algorithm continuously evaluates

Results are objective & easy

Detect underperformance, early

- malfunction or wear of components
- fouling or degradation of the installation
- changes in process or load patterns
- changes in fuel characteristics
- modifications in other parts of the installation
- loops in manual

BIOMASS BOILER SOLUTIONS

VYNCKE

GLOBAL ORGANIZATION

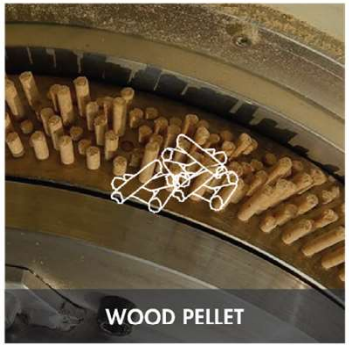
OUR SOLUTIONS

MARKETS & REFERENCE

CASE STUDY – EMPTY FRUIT BRUNCHES VS NATURAL GAS

MARKETS | OUR PLAYING FIELD

MARKETS | WOOD



MARKETS | WOOD

MARKETS | FOOD & AGRI


BARRY CALLEBAUT
Manuelita
COFCO AGRI
GROUPE LACTALIS
INDUPALMA
Negocios en la palma de su mano
SÜDZUCKER
Mewah
ANNO D·E 1753
agraria
BUNGE
ANORA
ofi
make it real
Cargill
wilmar
SOYA HELLAS
Nestlé

MARKETS | RECOVERED FUELS

MARKETS | RECOVERED FUELS

KIOWATT

steag

KANTOR ENERGY

Ontex Group Company

800 SUPER

BECIS Commercial Industrial Solutions

EVONIK INDUSTRIES

LG

GROUPE FRANÇOIS

金 福 贸 易 私 人 有 限 公 司

aeb amsterdam

Hartalega

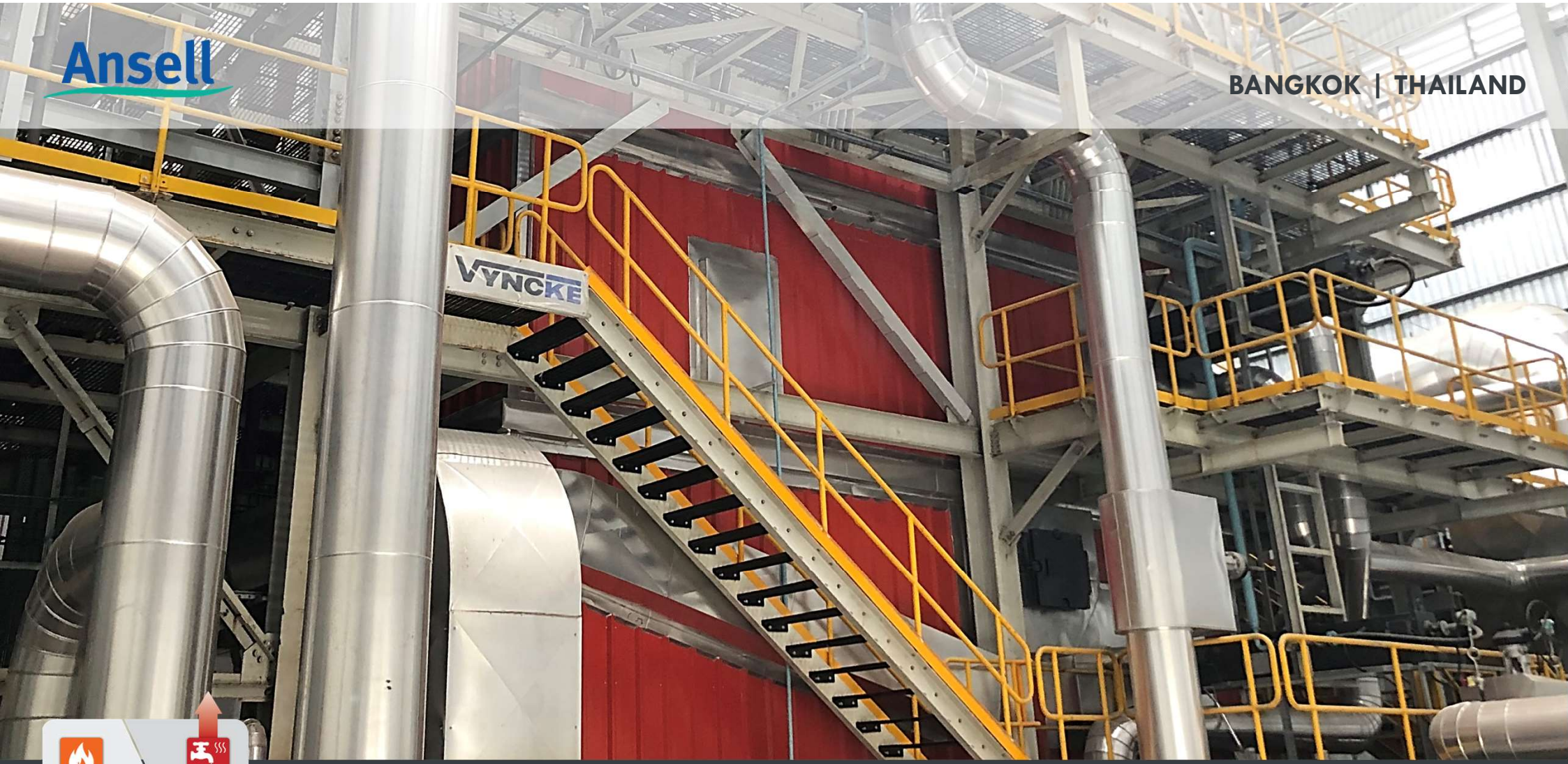
BESTARI JAYA, SELANGOR | MALAYSIA

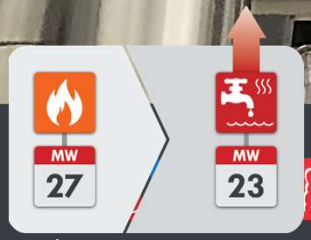
vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

Ansell

BANGKOK | THAILAND



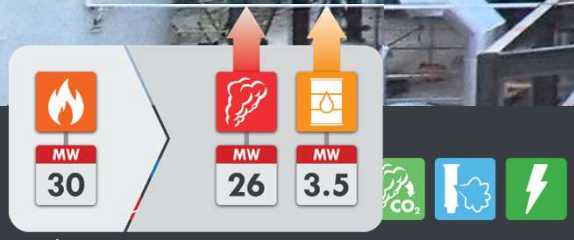


vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

PIONEEROSB
Evolution Beyond Expectations

ALOR SETAR, KEDAH | MALAYSIA



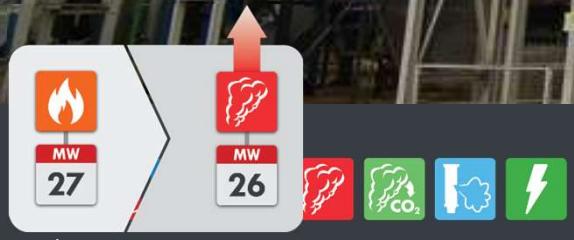
vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

PIO

RAINBOW PELLET

KUALA LIPIS | MALAYSIA



vyncke.com

CLEAN ENERGY TECHNOLOGY

VYNCKE

JBCOCOA

TANJUNG PELEPAS | MALAYSIA

MW 7.7

TPH 10

vyncke.com

CLEAN ENERGY TECHNOLOGY

VYNCKE

JDE
JACOBS DOUWE EGBERTS

SUPER

MRC
MALAYSIAN RUBBER COUNCIL

JOHOR BAHRU | MALAYSIA

MW
18

TPH
21

vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

CLOVER

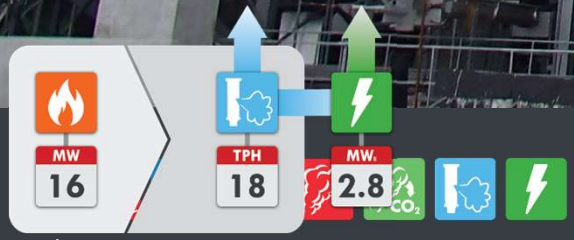
PHICHIT PROVINCE | THAILAND

vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

800 SUPER

SINGAPORE



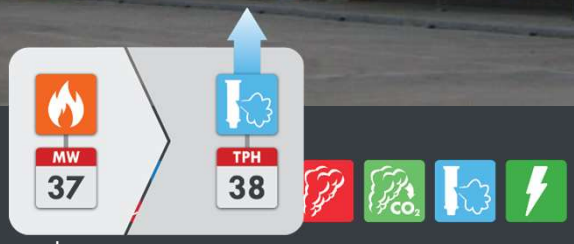
vyncke.com

CLEAN ENERGY TECHNOLOGY

VYNCKE

sembcorp

JURONG ISLAND | SINGAPORE

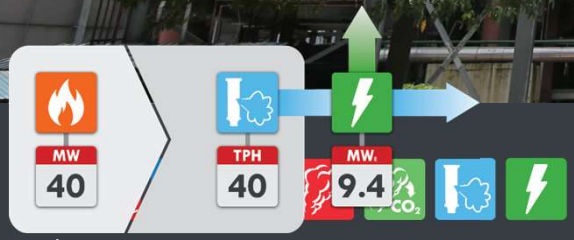


vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

金 KIM HOCK
福 CORPORATION

SHIPYARD CRESCENT | SINGAPORE

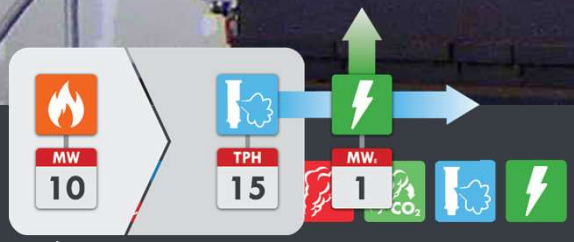


vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

金 KIM HOCK
福 CORPORATION

TUAS | SINGAPORE



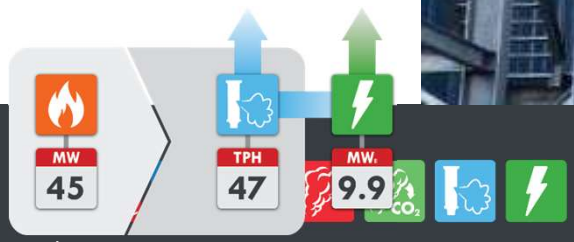
vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

金 KIM HOCK
福 CORPORATION

MRC
MALAYSIAN RUBBER COUNCIL

LOYANG WAY | SINGAPORE



vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

ecoWise
ecoworld | better world

SUNGEI KADUT | SINGAPORE

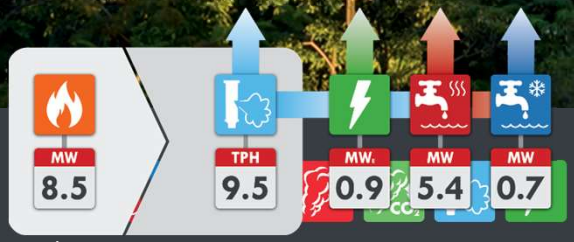
vyncke.com

CLEAN ENERGY TECHNOLOGY
VYNCKE

ecoWise

Gardens by the Bay

MARINA BAY | SINGAPORE



vyncke.com

CLEAN ENERGY TECHNOLOGY

VYNCKE

ecoWise

Gardens by the Bay

MARINA BAY | SINGAPORE

MRC MALAYSIAN RUBBER COUNCIL

vyncke.com

CLEAN ENERGY TECHNOLOGY

VYNCKE

BIOMASS BOILER SOLUTIONS

VYNCKE

GLOBAL ORGANIZATION

OUR SOLUTIONS

MARKETS & REFERENCE

CASE STUDY – EMPTY FRUIT BRUNCHES VS NATURAL GAS

CASE STUDY – BIOMASS EMPTY FRUIT BRUNCES VS NATURAL GAS

ENERGY NET OUTPUT: 20.1MW

INSTALLED BASE: Natural gas boilers

REQUEST:

- Reduce carbon footprint of the production plant
- Reduce energy cost of the production plant
- Flexibility to run on empty fruit brunches, palm kernel shells, palm fibres and wood chips

CASE STUDY – BIOMASS EMPTY FRUIT BRUNCES VS NATURAL GAS

Biomass Source

BIOMASS SOURCE	NCV (kcal/kg)	1 T FEEDSTOCK VS T/H STEAM
WOOD PELLETS	4,000 kcal/kg	5.6 ton/h
PALM KERNEL SHELLS	3,800 kcal/kg	5.3 ton/h
COCOA SHELLS	3,800 kcal/kg	5.3 ton/h
RICE HUSKS	3,300 kcal/kg	4.6 ton/h
WOOD CHIPS	2,500 kcal/kg	3.5 ton/h
SPENT COFFEE GROUNDS	2,200 kcal/kg	3.1 ton/h
EMPTY FRUIT BUNCHES	2,100 kcal/kg	2.9 ton/h

CASE STUDY – BIOMASS EMPTY FRUIT BRUNCES VS NATURAL GAS

Cost/ Ton of steam

TYPE OF FUEL.	FUEL PRICE	NET CAL VALUE	COST / TON OF STEAM
NATURAL GAS	50.00RM/mmBtu	11,500 kcal/kg	142.00 RM/ton steam
DIESEL OIL	2.15 RM/l	9,300 kcal/kg	165.00 RM/ton steam
WOOD PELLETS	500.00RM/ton	4,000 kcal/kg	89.30 RM/ton steam
PALM KERNEL SHELLS	250.00RM/ton	3,800 kcal/kg	47.20 RM/ton steam
COCOA SHELLS	300.00 RM/ton	3,800 kcal/kg	56.60 RM/ton steam
RICE HUSKS	200.00 RM /ton	3,300 kcal/kg	43.50 RM/ton steam
WOOD CHIPS	160.00 RM /ton	2,500 kcal/kg	45.70 RM/ton steam
EEMPTY FRUIT BUNCHES	60.00 RM /ton	2,100 kcal/kg	20.70 RM/ton steam

CASE STUDY – BIOMASS EMPTY FRUIT BRUNCES VS NATURAL GAS

BIOMSS BOILER 30 t/h steam with 100% EFB

BOILER EFFICIENCY > 85% @ 100% EFB

BOILER AVAILABILITY > 8 000 hours/year

GAS BOILER 30 t/h steam with natural gas

BOILER EFFICIENCY (NCV) > 90% @ natural gas

BOILER AVAILABILITY > 8 000 hours/year

	BIOMASS SOLUTION	GAS FIRED BOILER
FUEL COST	100% EFB = 60.00 RM/ton	50.00 RM/mmBtu
COST PER TON OF STEAM	20.70RM/ton	142.00 RM/ton
YEARLY FUEL COST	30ton steam/hr x 8000hr x20.70RM/ton steam = 4,968,000.00 RM	30ton steam/hr x 8000hr x142.00RM/ton steam =34,080,000.00 RM
YEARLY SAVING ON FUEL COST	= 29,112,000.00RM	

ANY QUESTIONS?
RENEWABLE ENERGY SOLUTIONS

SINCE 1912

BIOMASS FEEDSTOCK IN THE MARKET

Presented By

MD ARFIZAL BIN MD ARIFFIN
Executive Director









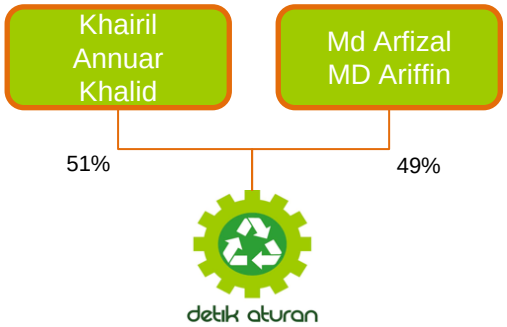
COMPANY OVERVIEW

17 years of experience in producing EFB pellets and Renewable Energy Engineering Solution

Introduction

- Incorporated in 2005 at Seri Kembangan.
- A premium EFB and coal switched pellet manufacturer and EPCC contractor for setting up compost / pellet related plants.
- A local market leader in production of biomass pellets / briquettes for power producers.
- Export markets include South Korea, China, and Japan.
- Proof of Concept (POC) result from EFB treatment system to produce premium EFB pellets.

Shareholdings



Key Products

Standard EFB Pellet

Premium EFB Pellet

Coal Switch EFB Pellet (COSEP)

EPCC for Pellet Plant

Factory

Annual capacity of 24,000MT

GLOBAL NETWORK | Key enablers for our strong growth and global reach

Investor

ventureTECH

Academia

Universiti Tenaga Nasional

ICEPCO ICEPRI

Ministries, Agencies & Regulators

EPU

MOSTI

MITI Malaysia

MiGHT Malaysian Industry-Government Group for High Technology

moa Incorporated Kementerian Pertanian dan Industri Asas Tani

Local Corporate Clients & Partners

Tenaga Nasional

KLK Oleo Excellence in Oleochemicals

EcoBed

MYBIOMASS

Sime Darby

FGV

SME Corp Malaysia

Agro Bank

Technology Partners

TNB Research

ICEPRI

SIRIM

Potential Global Clients & Industry Partners

ICEPCO

KOEN Korea South-East Power Co.

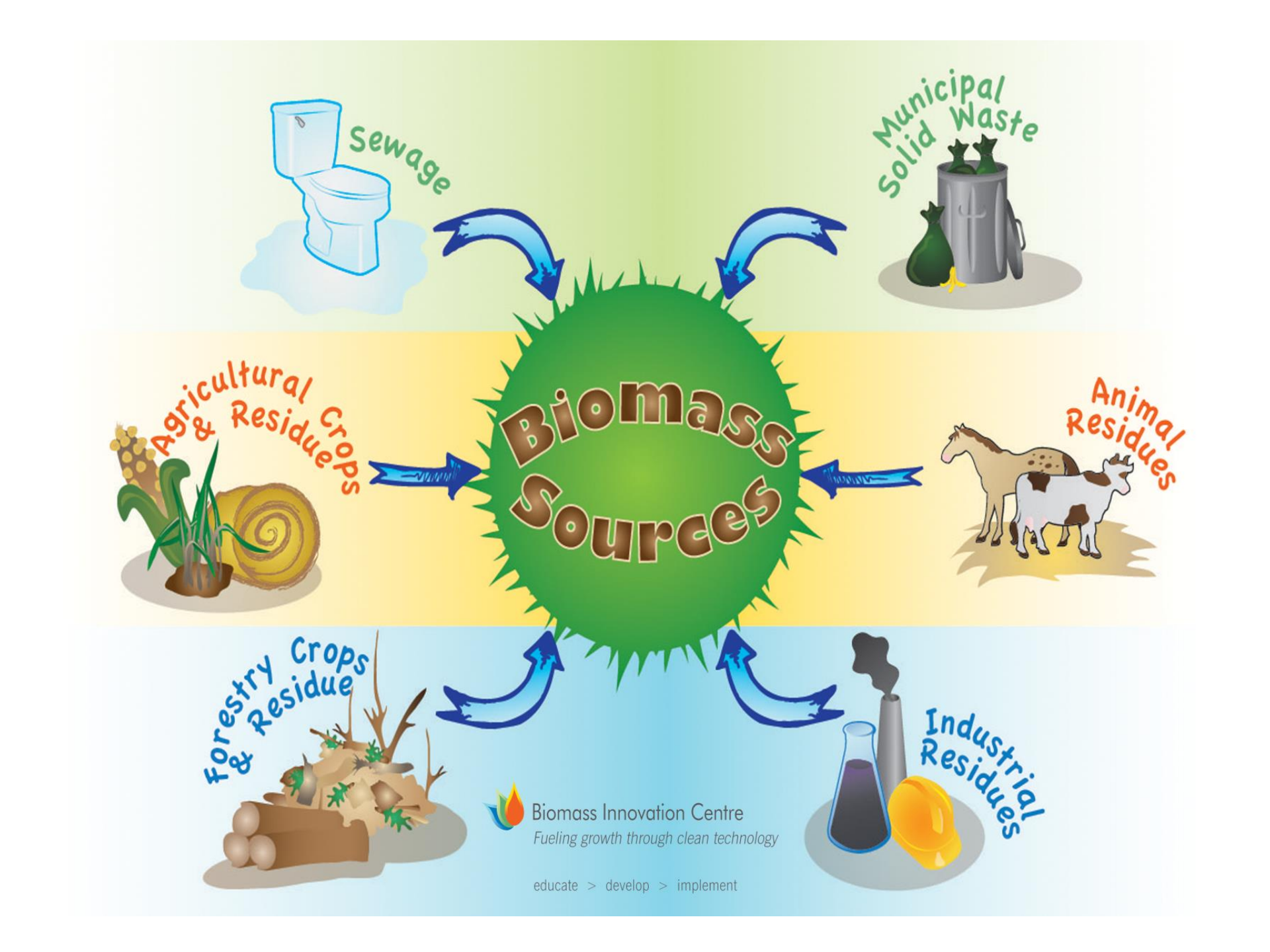
ENEOS

Tanaka Ai

TEPCO

WHAT IS BIOMASS

Biomass is biological material from living, or recently living organisms, most often referring to plants or plant-derived materials. As a renewable energy source, biomass can either be used directly, or indirectly—once or converted into another type of energy product such as biofuel. Biomass can be converted to energy in three ways: thermal conversion, chemical conversion, and biochemical conversion.


Sewage
Municipal Solid Waste
Biomass Sources
Agricultural Crops & Residues
Animal Residues
Forestry Crops & Residue
Industrial Residues
Biomass Innovation Centre
Fueling growth through clean technology
educate > develop > implement

MALAYSIA'S BIOMASS : A DIVERSE AND RENEWABLE ENERGY SOURCES

Biomass is a **cellulose material** which can be broadly classified as woody and non-woody



Oil palm



Wood



Agriculture residues



Waste


Energy crops

- The majority of biomass SMEs in Malaysia from **palm oil** and **timber** industry i.e. palm oil millers, saw millers – producers of biogas, pellets and briquette, wood composites and particle boards, pulp & paper, fertilisers
- Other biomass producers include rice millers, sugarcane & coconut plantations, energy crops, etc.

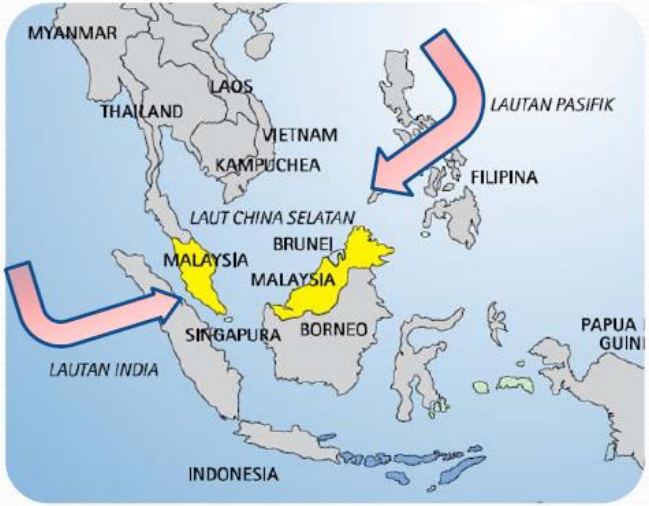
MALAYSIA'S BIOMASS SCENARIO

Advantages

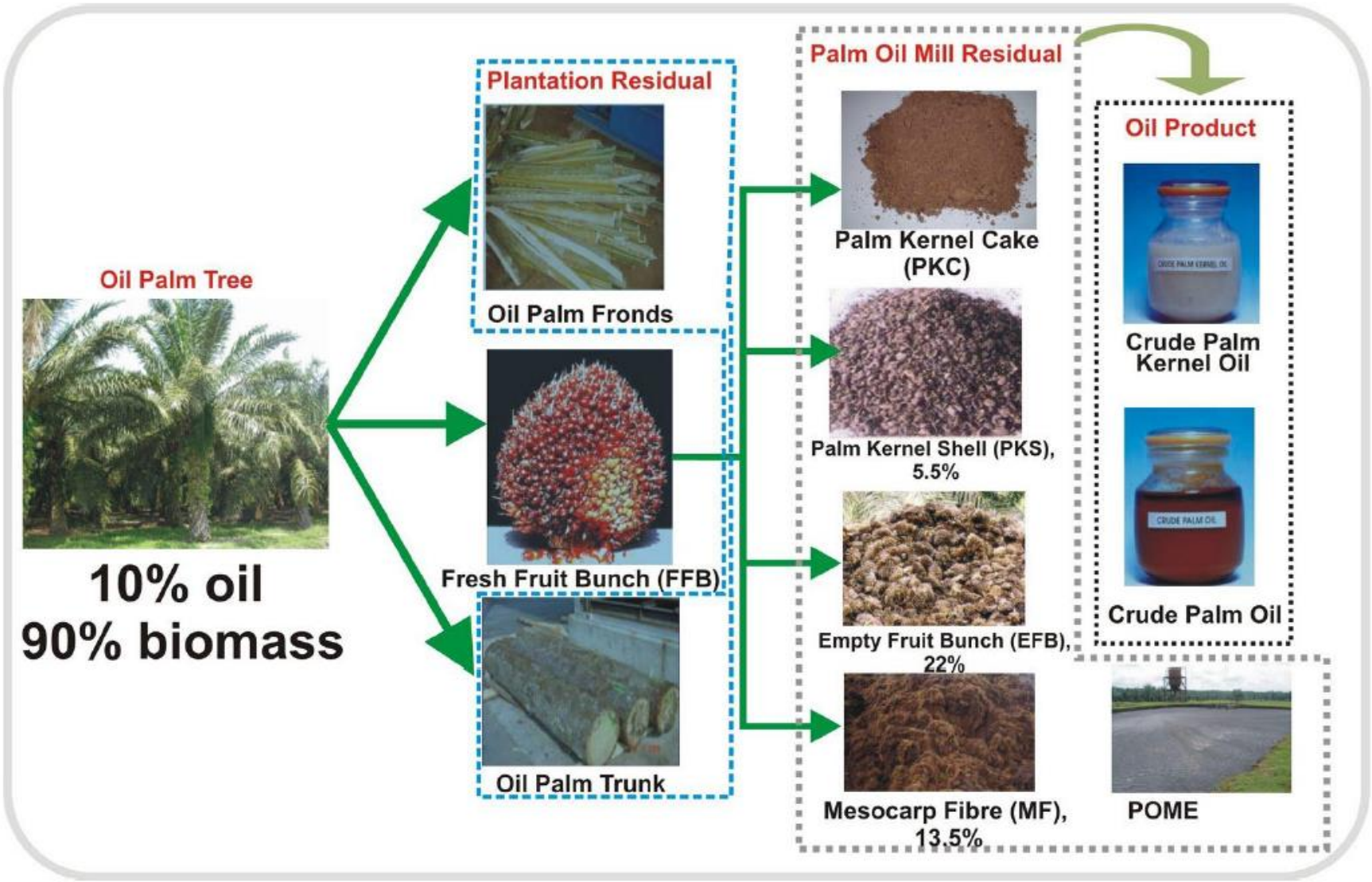
- Near equator → 12 / 13 hrs daylight
- Protected against trade winds
- Fertile agricultural land

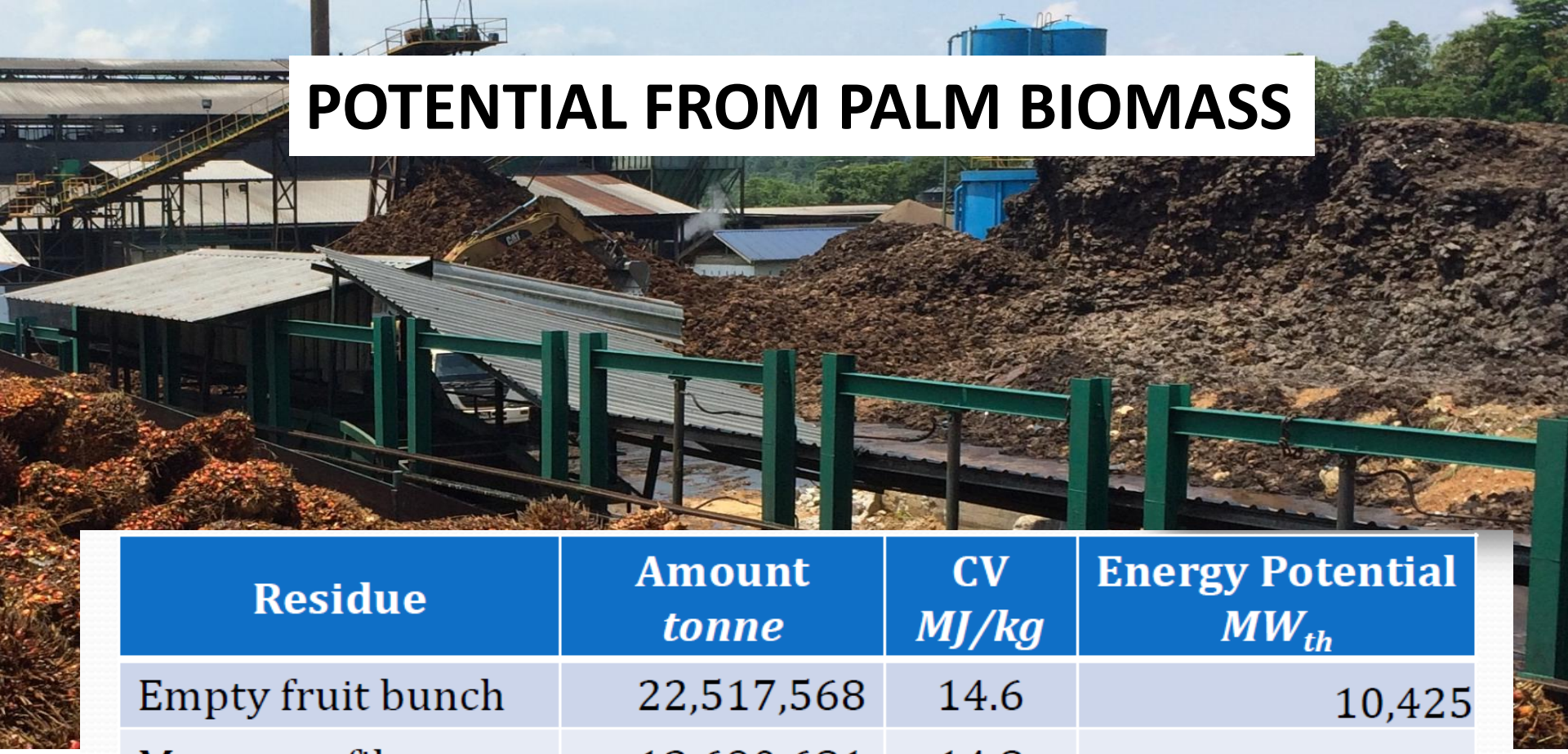
Issues

- Forest vs crops → Sustainable land use
- Food vs energy → biomass residues



BIOMASS FROM OIL PALM



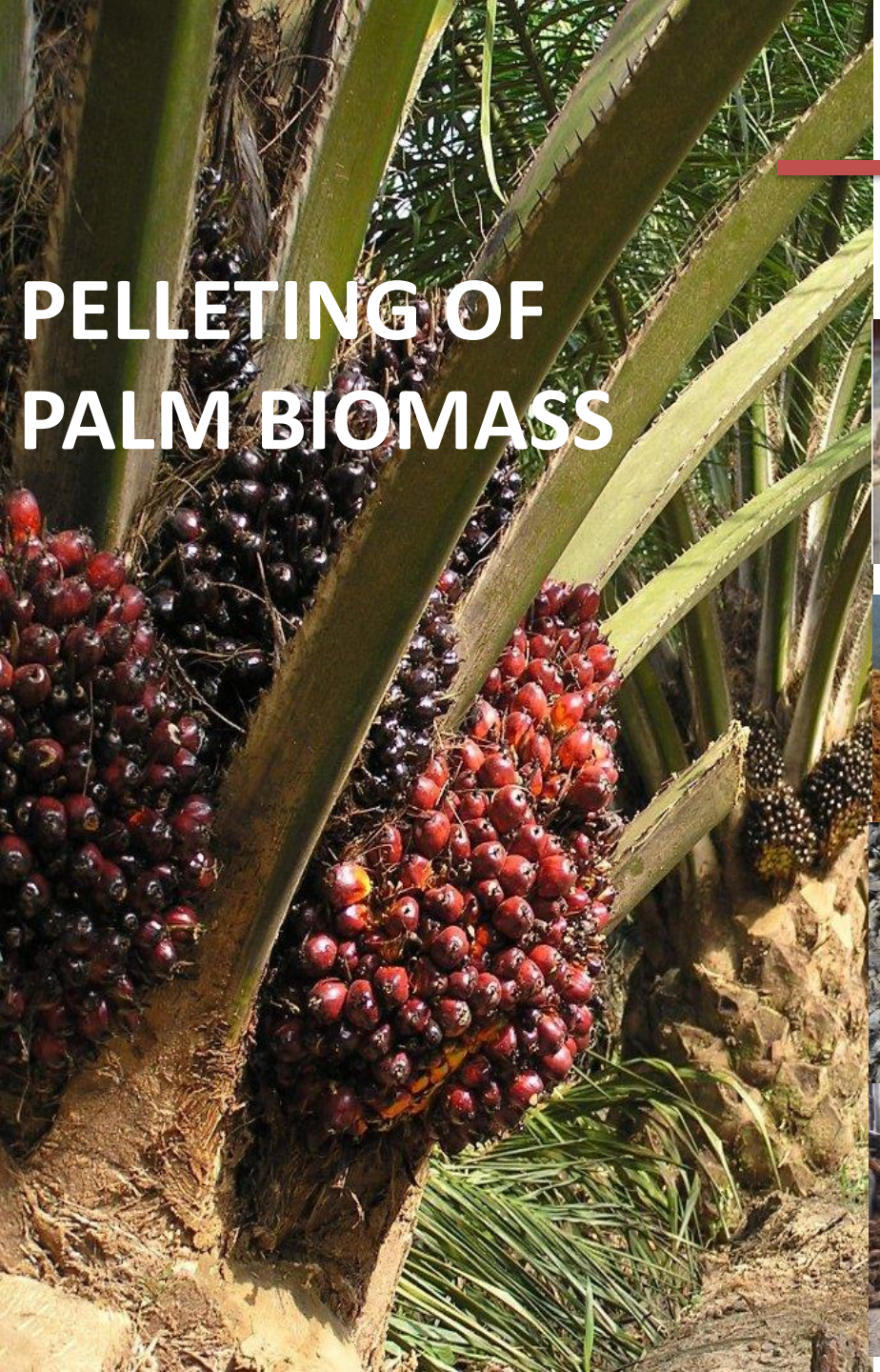


POTENTIAL FROM PALM BIOMASS

Residue	Amount *tonne*	CV *MJ/kg*	Energy Potential MW_{th}
Empty fruit bunch	22,517,568	14.6	10,425
Mesocarp fibre	13,690,681	14.8	6,425
Palm kernel shell	5,584,357	19.0	3,364
Effluent (dry wt)	3,422,670	-	

- Traditionally used for mill steam/electricity requirements at low efficiencies.
- Additional revenue source for mills

PELLETING OF PALM BIOMASS



BIOMASS FROM RICE PLANTATION

Paddy stalks

Rice husks

Rice Husks

- 22% of harvested paddy
- 2.38M tonne paddy /yr → 523,600 tonne/yr husks
- Traditionally burned

BIOMASS FROM RUBBER PLANTATION

Dried leaves

Dried Rubber Leaves

- CV ~ 18 MJ/kg
- Traditionally burned

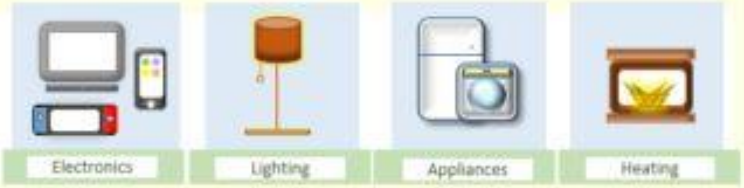
Rubberwood furniture

Sawdust

BAMBOO AS A NEW BIOMASS SOURCES

BAMBOO FOR BIOMASS ENERGY PRODUCTION

- Increasing energy consumption in human society causes a major concern about fulfilling energy demand while reducing reliance on fossil fuels.



- Bamboo-based biomass can be used as raw materials for bioenergy production.
- However, cultivation and harvesting operations must be performed efficiently to ensure sustainability of this biomass.
- Micropropagation technique has potential to increase and sustain bamboo production.

- Environmental impacts and economical risks remain challenges in bamboo cultivation and biofuel production.
- However, bamboo-producing country like Malaysia, has initiated strategic intents as ongoing change efforts at sustaining the bamboo industry that deserve commitment from all parties involved.

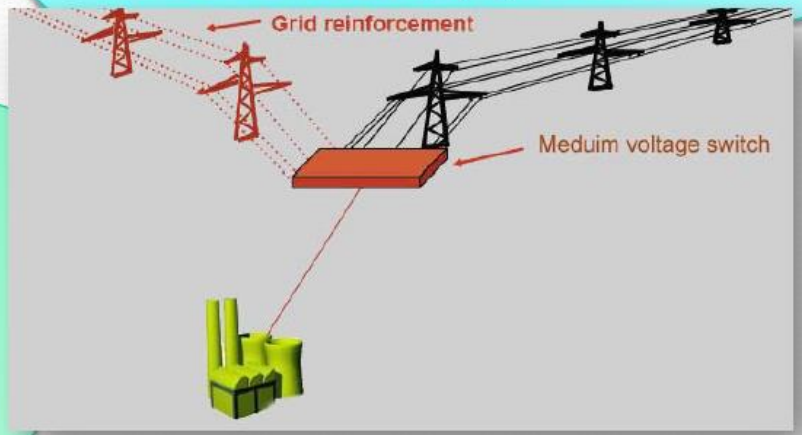
CHALLENGES IN BIOMASS UTILIZATION

Small volume

- Independent mills can be as small as 10 tonne/hr of FFB
- Lack of technical expertise
- Distributed over large area

Grid integration

- Rural, no grid access
- Medium/low voltage connection
- Local grid stability
- Grid availability / preference



Economic barriers

- Plant up costs ~RM60 - RM75 mil for 10 MW_e
- Connection costs
- Transportation and collection costs

Co-firing reduces almost all these issues
+ added benefit of reduced overall CO_2
+ reduced dependant of energy import

THANK YOU

03-89573973
0193529522 En Khairil Annuar
019-3271813 En. Arfizal Ariffin

inquiry@detikaturan.com

www.detikaturan.com

MIDF GOVERNMENT FINANCIAL ASSISTANCE

MALAYSIAN RUBBER COUNCIL (MRC) - FUND FOR AUTOMATION AND GREEN TECHNOLOGY

6 NOVEMBER 2023

OUR PRODUCTS – QUICK GLANCE

midf provides Shariah-based **financing**

- ✓ Project
- ✓ Fixed Assets
- ✓ Working Capital

to **Malaysian companies**

- ✓ Start-up enterprises
- ✓ SMEs
- ✓ Corporations

in **all economic sectors**

- ✓ Manufacturing
- ✓ Manufacturing Related Services (MRS)
- ✓ Services

for business development

- ✓ **Automation & Modernisation**
- ✓ **Digital & Technology** adoption
- ✓ **Sustainable & Green** technology utilisation
- ✓ Market expansion
- ✓ **Business diversification**
- ✓ High value-added activities upgrading
- ✓ Productivity & efficiency improvement

General Features

Financing Amount

RM30k ~ RM20mil

Financing Tenure

Up to **25 years**

Financing Rate

2% ~ 4% p.a. on monthly rest (SMEs)

Margin of Financing

85% ~ 100%

Grants

- ➢ High Value-added Programme
- ➢ Matching Grant for Medical Devices & Aerospace
- ➢ Matching Grant for Bumiputera Aerospace SME
- ➢ Aerospace and Electronic & Electrical Investment Fund
- ➢ Geran Inovasi & Pengkomersialan Vendor

Scheme Funds

Soft Financing Scheme

- ➢ Micro Biz Financing
- ➢ Automation & Modernisation
- ➢ Small & Medium Enterprises
- ➢ Digital & Technology
- ➢ Sustainable & Green
- ➢ Bumiputera Automotive Entrepreneurs
- ➢ Services
- ➢ Services Capacity Development
- ➢ Jumpstart
- ➢ SME Revitalisation
- ➢ Second Chance Financing

SOFT FINANCING SCHEME FOR AUTOMATION & MODERNISATION (SFSAM)

Assist **manufacturing companies** to

automate & modernise

processes

Minimise

labour dependency

Upgrade

production capability & capacity

MINISTRY OF INVESTMENT, TRADE AND INDUSTRY

RM20mil | **25 years** | **90%** | **4%**

FINANCING AMOUNT	FINANCING TENURE	MARGIN OF FINANCING	FINANCING RATE
RM50k ~ RM20mil	Up to 25 years	Up to 90%	SMEs: 4% Non-SME: 5%

- Commercial Property**
- Machinery & Equipment and other eligible expenses***
- Term Financing for Working Capital^
- Revolving Credit (purchase / sales)
- Research and Development (R&D)
- Export Enhancement

- ✓ At least **51%** equity held by Malaysian
- ✓ Registered with **SSM** & possess **valid business license**
- ✓ In operation for at least **2 years**
- ✓ For **start-up companies** in operation for **at least 6 months** with director / shareholder / key management having 5-year experience in similar industry or relevant field.
- ✓ **Manufacturing** and **Manufacturing Related Services (MRS) sector**

*Note: including grace period of up to ^6 months | **2 year | ***3 years |*

SOFT FINANCING SCHEME FOR SMES (SFSME)

Promote

SME

development

Assist

New & existing

enterprises

RM5mil **25 years** **90%** **4%**

FINANCING AMOUNT	FINANCING TENURE	MARGIN OF FINANCING	FINANCING RATE
RM50k ~ RM5mil	Up to 25 years	Up to 90%	SMEs: 4%

- Commercial Property**
- Machinery & Equipment*
- IT Hardware & Software*
- Working Capital^

Note: Re-financing of existing credit/ financing facilities is not allowed.

- ✓ At least **60%** equity held by Malaysians
- ✓ Registered with **SSM** & possess **valid business license**
- ✓ **In operation** for **more than 6 months**
- ✓ **SMEs** in **all Manufacturing & Services sectors**
  (excluding financial and insurance services)

*Note: including grace period of up to ^6 months | *1 year | **2 years |*

SOFT FINANCING SCHEME FOR DIGITAL & TECHNOLOGY (SFDT)

Accelerate

SMEs

In adoption of

e-commerce

&

digital technologies

Assist

New & existing

enterprises

MINISTRY OF INVESTMENT, TRADE AND INDUSTRY

RM1mil	5 years	90%	4%
FINANCING AMOUNT	**FINANCING TENURE**	**MARGIN OF FINANCING**	**FINANCING RATE**
RM30k ~ RM1mil	Up to 5 years	Up to 90%	SMEs: 4%

- Machinery & Equipment*
- IT Hardware & Software*
- Commercial Vehicles*
- Working Capital^

- ✓ At least **60%** equity held by Malaysians
- ✓ Registered with **SSM** & possess **valid business license**
- ✓ In operation for more than **6 months**
- ✓ **All sectors**

*Note: including grace period of up to ^6 months | *1 year |*

SUSTAINABLE & GREEN BIZ FINANCING (SGBF)

Utilisation of

green & energy efficient technology

Encourage

'greener' manufacturing processes

MINISTRY OF INVESTMENT, TRADE AND INDUSTRY

RM5mil | **25 years** | **100%** | **2%**

FINANCING AMOUNT	FINANCING TENURE	MARGIN OF FINANCING	FINANCING RATE
RM50k ~ RM5mil	Up to 25 years	Up to 100%	SMEs: 2% Non-SMEs: 5%

- Commercial Property***
- Machinery & Equipment*
- IT Hardware & Software*
- Term Financing for Working Capital^
- Revolving Credit (purchase / sales)

✓ At least **51%** equity held by Malaysians
✓ Registered with **SSM** & possess **valid business license**
✓ In operation for more than **6 months**
✓ **Manufacturing & services sectors**

*Note: including grace period of up to ^6 months | *1 year | ***3 years |*

SME REVITALISATION FUND (SMERF)

Assist

viable SMEs

constrained by

financial difficulties

and

underserved sectors

Ease

cashflow

blockage

SME CORP MALAYSIA

RM250k	7 years	90%	3%
FINANCING AMOUNT	**FINANCING TENURE**	**MARGIN OF FINANCING**	**FINANCING RATE**
RM50k ~ RM250k	Up to 7 years	Up to 90%	SMEs: 3%

- Machinery & Equipment
- IT Hardware & Software
- Commercial Vehicles
- Working Capital

Note: The Scheme must not be used for re-financing of existing credit/ financing facilities.

- ✓ At least **60%** equity held by Malaysians
- ✓ Registered with **SSM** & possess **valid business license**
  However, exclusion can be considered on case-to-case basis, subject to approval
- ✓ Must have **viable proposal**
- ✓ Start-up company must be **in operation** for **more than 6 months**
- ✓ **SMEs** in **all economic sectors**

Note: including maximum moratorium of 6 months and/ or grace period of up to 6 months

SECOND CHANCE FINANCING (2CF)

Offer **financial assistance** and **guidance** to **SMEs**

Providing SMEs with **a fresh start after crises** and **avoid business wound- up/** declared a **bankrupt**

MINISTRY OF INVESTMENT, TRADE AND INDUSTRY

RM5mil | **10 years** | **100%** | **3%**

FINANCING AMOUNT	FINANCING TENURE	MARGIN OF FINANCING	FINANCING RATE
RM50k ~ RM5mil	Up to 10 years	Up to 100%	SMEs: 3%

1. Debt Financing
- Machinery & Equipment
- Commercial Motor Vehicle
- IT Hardware & Software
- Working Capital

2. Equity Financing

- ✓ Registered with **SSM** or **statutory bodies** for professional service providers
- ✓ At least **51%** equity/ownership held by Malaysians
- ✓ Facing **financial problem and having difficulties to obtain financing** from financial institutions
- ✓ Having **new viable project/ business** or to continue with the existing project/business
- ✓ must not have any **winding-up action/order** against the company or bankruptcy action/judgements against proprietors/partners
- ✓ **Manufacturing & services sectors**

Note: including grace period of up 12 months

SYARIKAT JAMINAN PEMBIAYAAN PERNIAGAAN (SJPP)

To support

SMEs

in Malaysia by providing

Government Guarantee Schemes

to strengthen

collateral requirements

SJPP

Wholly owned by Minister of Finance Incorporated

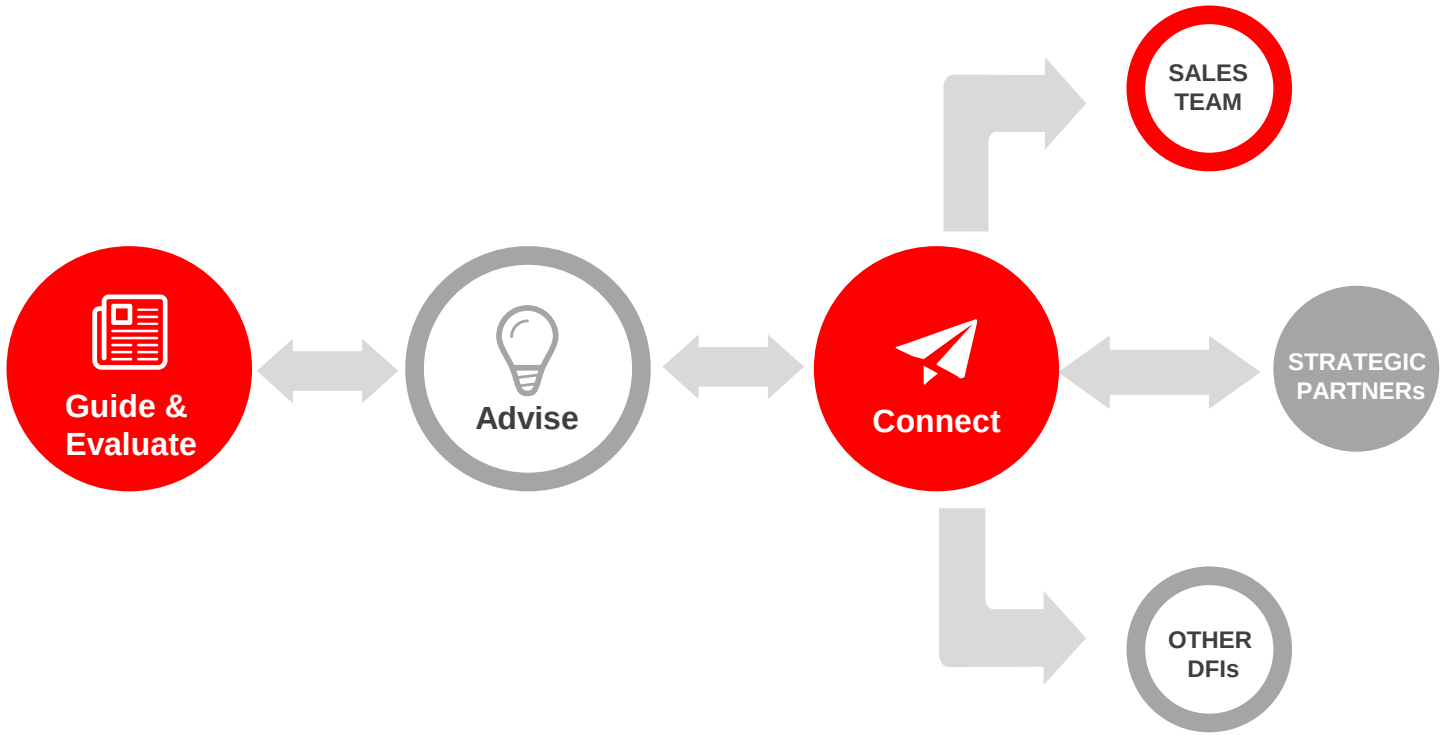
RM10mil **15 years** **80%** **1%**

FINANCING LIMIT	FINANCING TENURE	GUARANTEE COVERAGE	GUATANTEE FEE
RM100k ~ RM10mil	Up to 15 years	Up to 80%	SMEs: Up to 1%

- Working Capital
- Capital Expenditure

- ✓ At least **51%** equity held by Malaysians
- ✓ Registered with **SSM** & possess **valid business license**
- ✓ In operation for more than **6 months**
- ✓ **Manufacturing & services sectors**

ONE-STOP ADVISORY CENTER

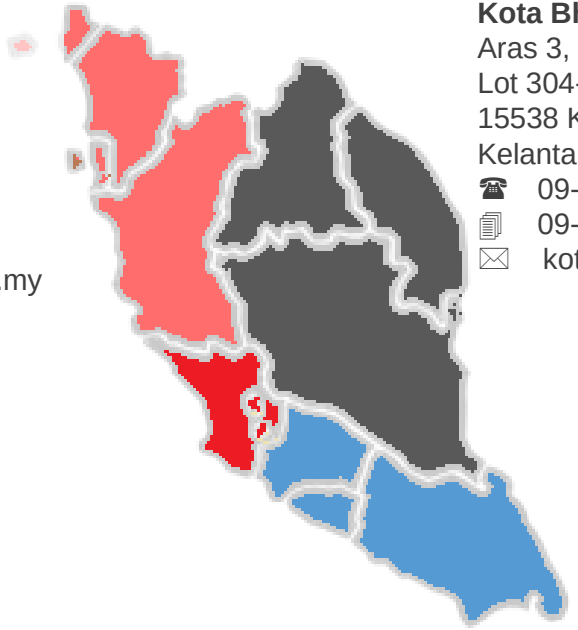


☎ 1-300-88-6433
✉ GrowYourBusiness@midf.com.my
🌐 www.growyourbusiness.com.my

MIDF REGIONAL OFFICES

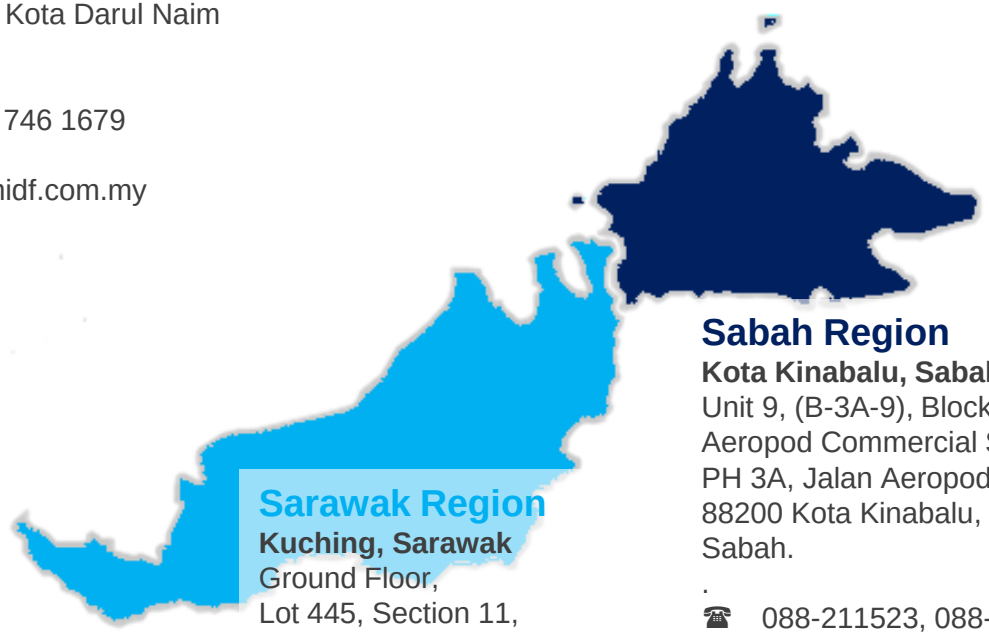
Northern Region
Penang
Ground Floor,
No.4, Jalan Todak 1,
Pusat Bandar Sunway
13700 Seberang Jaya,
Pulau Pinang.
☎ 04-383 8296
🗐 04-383 0686
✉ penang@midf.com.my

HEAD OFFICE
Central Region
Kuala Lumpur
15th Floor, Menara MIDF
No. 82, Jalan Raja Chulan
50200 Kuala Lumpur.
☎ 03-2173 8888
🗐 03-2173 8877
✉ GrowYourBusiness@midf.com.my



Eastern Region
Kota Bharu, Kelantan
Aras 3, Wisma PERKESO
Lot 304-307, Jalan Kota Darul Naim
15538 Kota Bharu,
Kelantan.
☎ 09-748 3546 / 746 1679
🗐 09-747 0389
✉ kotabharu@midf.com.my

Southern Region
Johor Bahru, Johor
Lot 15-6, Tingkat 15
Menara TH, Jalan Ayer Molek
80000 Johor Bahru,
Johor.
☎ 07-223 2727
🗐 07-223 5578
✉ johor@midf.com.my



Sarawak Region
Kuching, Sarawak
Ground Floor,
Lot 445, Section 11,
KTLD Jalan Kulas,
93400 Kuching,
Sarawak.
☎ 082-254 533 / 254 203
🗐 082-246 343
✉ sarawak@midf.com.my

Sabah Region
Kota Kinabalu, Sabah
Unit 9, (B-3A-9), Block B, Level 3A,
Aeropod Commercial Square,
PH 3A, Jalan Aeropod Off Jalan Kepayan,
88200 Kota Kinabalu,
Sabah.
.
☎ 088-211523, 088-211633
☎ 088-211 940
✉ sabah@midf.com.my

midf

Applying for SME financing just got easier and faster

Getting SME Business financing is just a click away.

MORE INFO →

CONTACT US AT:

1-300-88-6433

GrowYourBusiness@midf.com.my

www.growyourbusiness.com.my

THANK YOU

www.midf.com.my

MALAYSIAN GREEN TECHNOLOGY
AND CLIMATE CHANGE CORPORATION

Workshop on Biomass Energy

Green Financing & Incentives

- **Briefing on GTFS 4.0 & Tax Incentives**

Siti Fatimah Noor Saidin
Senior Executive
Green Incentives
sitifatimah@mgtc.gov.my

OUTLINE

- Green Technology Tax Incentive
  - Introduction
  - Category & Details of Green Technology Tax Incentive
  - GITA GITE Performance (2016-2023)
  - Tax Computation
- Green Technology Financing Scheme (GTFS) 4.0
  - History of GTFS
  - Overview of GTFS 4.0
  - Structure & Features of GTFS 4.0

Introduction

Budget 2014, the Government has announced that:

*"to strengthen the development of green technology, the Government will provide **investment tax allowance** for the **purchase of green technology equipment** and **income tax exemption** on the **use of green technology services**".*

In the Budget 2019, the Government has announced that:

*"Additionally, to promote the use of green technology, the Government will expand the list of green assets which qualifies for the Green Technology Investment Allowance (GITA) from 9 assets to **40 assets** which will be listed in the **MyHIJAU directory**."*

In the Budget 2020, the Government has announced that:

*"The GITA and Green Income Tax Exemption (GITE) incentives will be **extended to 2023**."*

*"Government will study and enhance the Green Investment Tax Allowance (GITA) Package and Green Income Tax Exemption (GITE)" – **Budget 2023***

Category of Green Technology Tax Incentive

CATEGORY	SCOPE
Green Investment Tax Allowance (GITA) Asset	Applicable for companies that acquire qualifying green technology assets and listed under the MyHIJAU Directory.
Green Investment Tax Allowance (GITA) Project	Applicable for companies that undertake qualifying green technology projects for business or own consumption.
Green Income Tax Exemption (GITE) Services	Applicable for qualifying green technology service provider companies that are listed under the MyHIJAU Directory.

Green Investment Tax Allowance (GITA)

Companies that undertake investments in a specific asset or project which promotes sustainability and green environment

GUIDELINES ON
GITA PROJECT

List of Qualifying Projects

No.	Qualifying Project	Remarks
1.	**Renewable Energy**	Commercial and industrial business entities which undertake generation of energy by using renewable energy resources such as: • **Biomass, Biogas, Mini hydro, Geothermal & Solar power**
2.	**Energy Efficiency**	Companies investing in **energy efficient equipment** or technologies and / or to replace old inefficient equipment and invest in energy saving equipment.
3.	**Green Building**	Building owners of the commercial / industrial building that **have obtained Provisional Green Building Certificate** from locally developed rating tool/certification body approved by the Government.
4.	**Green Data Centre**	Companies that purchased any energy efficient product or solution for data centre which have been awarded **green building certificate** from locally developed rating tool/certification body approved by the Government.
5.	**Waste Management**	Companies which undertake / invest in waste recycling or waste recovery or waste treatment and additional activities such as composting or store or collection or disposal.

Verification on GITA Projects

- MGTC's role is to **verify the technical requirement** including the main equipment/assets as major components for the performance and green impact from the project.

- The verification for GITA Projects will be based on the following requirement:-
  - Main equipment/assets in the GITA Projects must be recognised and registered under the **MyHIJAU Mark** or have **Product Certification (Consist of Safety, Quality & Performance Compliances)** that is recognised and accepted by MGTC.

  - Project's impacts to the environment i.e. GHG emission reduction, waste reduction, fuel savings, environmental improvement, energy consumption savings and water consumption savings.

Guidelines on GITA Projects

Eligibility

- Companies which undertakes a qualifying green technology project and complying ALL of the following criteria:-

  a)minimise the degradation of the environment or reduce greenhouse emission;

  b)promotes health and improvement of environment; and

  c)conserves the use of energy, water and/or other forms of natural resources or promote the use of renewable energy or able to recycle waste material resources.

- Application must be **submitted to MIDA before first qualifying capital expenditure incurred.**
- Projects must obtain a Conditional Approval Letter from MIDA.

Guidelines on GITA Projects

Eligibility	For Green Building: • Company is allowed to submit application after receiving **Provisional Certificate** and not later than having been awarded by the Final Green Building Certificate. • The qualifying capital expenditure can be backdated not earlier than 3 years from the date of application received by MIDA but not earlier than 1 January 2020.

Guidelines on GITA Projects

Rate of incentive	• Green Investment Tax Allowance (GITA) of 100% of qualifying capital expenditure incurred on green technology project **from the date of first qualifying capital expenditure incurred** after application received by MIDA. The allowance can be offset against 70% of statutory income in the year of assessment. • Unutilised allowances can be carried forward until they are fully absorbed.

Guidelines on GITA Projects

Commencement Date	• For application date to MIDA from 1 January 2020 until 31 December 2023, the incentive period is for **3 years starting from the first date of the qualifying capital expenditure incurred** as verified by MGTC. • **The first date of the qualifying capital expenditure incurred shall not be earlier than date of application received by MIDA.**

Guidelines on GITA Projects

Conditions	• Equipment/assets in the GITA projects must be owned by the company. • Main equipment/assets in the GITA projects must be recognised and **registered under the MyHIJAU Mark** or **have product certification** that is recognised and accepted by MGTC. • Annual verification will be conducted by MGTC throughout the incentive period. • Once Verification Letter is issued, claim may be made in the tax return form and all supporting documents must be kept and produced to IRBM upon request.

GITA Project – Process Flow (Application to MIDA)

Applicant need to check the eligibility to facilitate claim on GITA Project

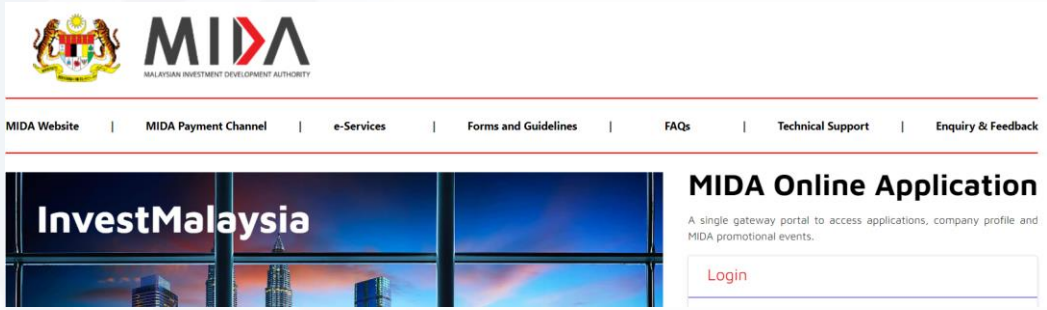
Applicant must submit application to MIDA (online submission) https://investmalaysia.mida.gov.my/EIP/InvestMalaysia.aspx)

MIDA will receive a complete application from applicant

Yes

MIDA shall prepare evaluation report

Approval by National Committee on Investment (NCI) and MIDA will issue a Interim Approval Letter



No

MIDA will request further information and verification

MIDA
MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

GITA Project – Process Flow (Application to MGTC)

a) Determination of Effective Date

Applicant need to prepare the required documents:
- Copy of MIDA Interim Approval Letter
- Copy of MIDA Notification Letter
- Certified True Copy (CTC) of First Invoice

↓

MGTC will provide the Application Form on Determination of Effective Date

↓

Applicant to Fill-up and submit together with:
- Invoices for the approved project (verified by External Auditor)

→ No → MGTC request further information and verification → (back to the required documents)

↓ Yes

MGTC will verify the information provided by applicant

↓

MGTC will issue the Letter on Effective Date

1

The company must complete the project
within the tax incentive period as set by the MGTC.

Proof of Project Completion:

Solar Project – **TNB NEM Welcome Letter**
Biogas/ Biomass/ Mini Hydro – FiTCD Letter
Energy Efficiency Project – **Testing & Commissioning Report**
Green Building Project – **Final Green Building Certificate**

GITA Project – Process Flow (Application to MGTC)

b) Project Technical Evaluation

Applicant submits application to MGTC together with:
- GITA Project Technical Description Form
- MyHIJAU Certificate/Product Certification
- Other Supporting Documents

↓

MGTC validate the project that complies with the GT project criteria

→ No → MGTC request further information and verification → (back to application)

↓ Yes

Applicant to proceed with payment for processing fee

↓

MGTC issue a Validation Letter to applicant

↓

Applicant submits tax form to IRB together with the Validation Letter from MGTC

2

Example of Supporting Documents for Biomass Project

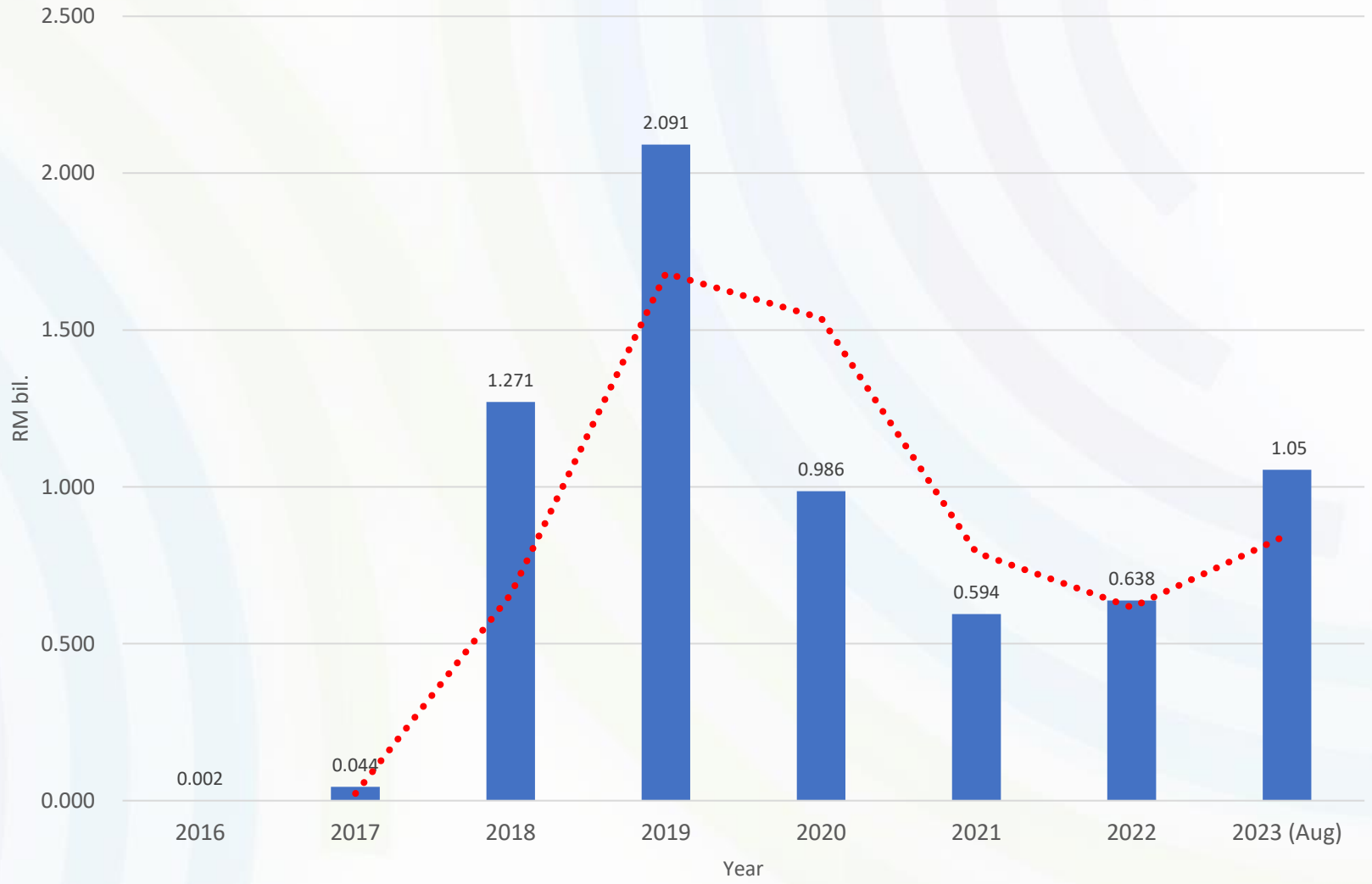
1. Copy of **MIDA Online Application Form**;
2. Completely-filled **GITA Project Technical Description Form** - Please declare the qualifying capex and also the services cost (Installation/Design & Consultancy/Preliminary/other services cost) in Section C2;
3. Copy of **valid MyHIJAU Certificate/ Product Certificate** for Biomass Boiler;
4. Testing & Commissioning Report;
5. Copy of FiAH certificate (if any);
6. Technical Datasheet for Biomass Boiler
7. As built Drawing;
8. 12 months Diesel Bills prior to project implementation;
9. EIA Report and related Approval from State Government;
10. Copy of invoices;
11. Company **Declaration Letters** to comply with the conditions in MIDA Interim Approval Letter;
12. *And other required additional supporting documents that will be advised later.*

Green Technology Tax Incentive

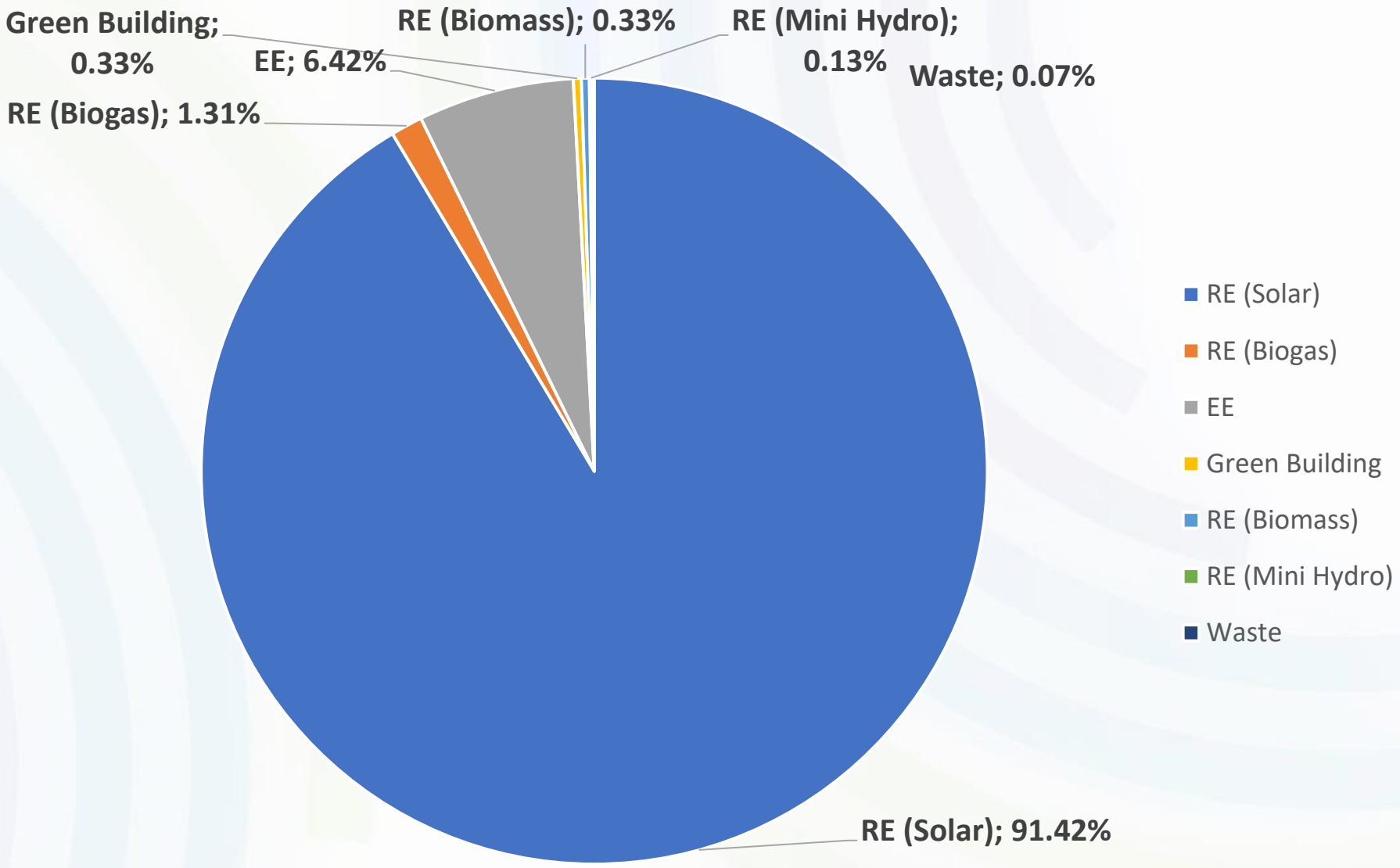
Please note that the capital expenditure for both GITA Asset & GITA Project must be incurred in different year of assessment or after ITA period ended.

GITA GITE PERFORMANCE (2016 – 2023)

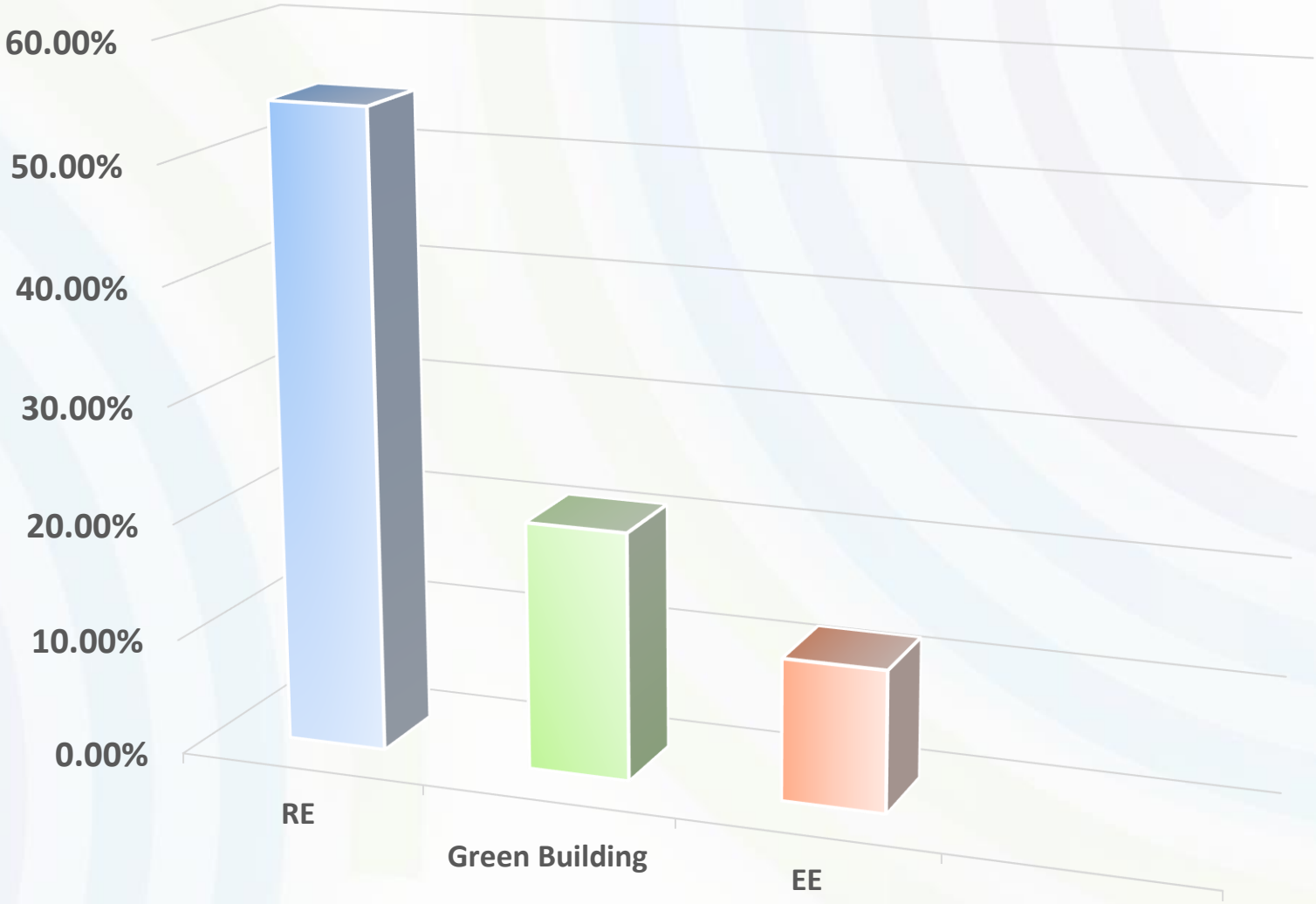
Investment Value of GITA GITE 2016-2023 (RM bil.)
As of Aug 2023



GITA Project Performance By Sector (2016-2023)
As of Aug 2023



Performance of GITE Services By Sector (2016-2023)
As of Aug 2023



Processing Fee

Type of Tax Incentives	Description	Processing Fee (RM)
GITA Asset	For each green technology asset	1,000
GITA Project	Less than 500,000	2,500
- Total Cost for Equipment/Machinery	500,000 – 1,000,000	4,000
	1,000,001 – 5,000,000	7,000
	More than 5,000,000	10,000
GITE Services	For each application	2,000

Tax Computation "With" Or "Without" Tax Incentive

Example 1: Assumption: ITA: RM10 million

	WITHOUT TAX INCENTIVE (RM Million)	WITH TAX INCENTIVE (RM Million)	
Profit before tax	20,000,000		20,000,000
add/less tax adjustments	12,000,000		12,000,000
Adjusted income	32,000,000		32,000,000
Less: Capital allowances	(5,000,000)		(5,000,000)
Statutory income	**27,000,000**		**27,000,000**
Percentage (%)		70%	30%
		18,900,000	8,100,000
(-) ITA	Nil	10,000,000	-
		8,900,000	8,100,000
Chargeable income	27,000,000		17,000,000
Tax liability @ 24%	6,480,000		4,080,000

Tax Computation "With" Or "Without" Tax Incentive

Example 2: Assumption: ITA: RM10 million

	WITHOUT TAX INCENTIVE (RM Million)	WITH TAX INCENTIVE (RM Million)	
Profit before tax	10,000,000	10,000,000	
add/less tax adjustments	2,000,000	2,000,000	
Adjusted income	12,000,000	12,000,000	
Less: Capital allowances	(5,000,000)	(5,000,000)	
Statutory income	7,000,000	7,000,000	
Percentage (%)		70%	30%
		4,900,000	2,100,000
(-) ITA	Nil	10,000,000	-
		0	2,100,000
Chargeable income	7,000,000	2,100,000	
Tax liability @ 24%	1,680,000	504,000	
Balance to be carried forward to next year of assessment		5,100,000	

GREEN TECHNOLOGY FINANCING SCHEME (GTFS) 4.0

History of Green Technology Financing Scheme (GTFS)

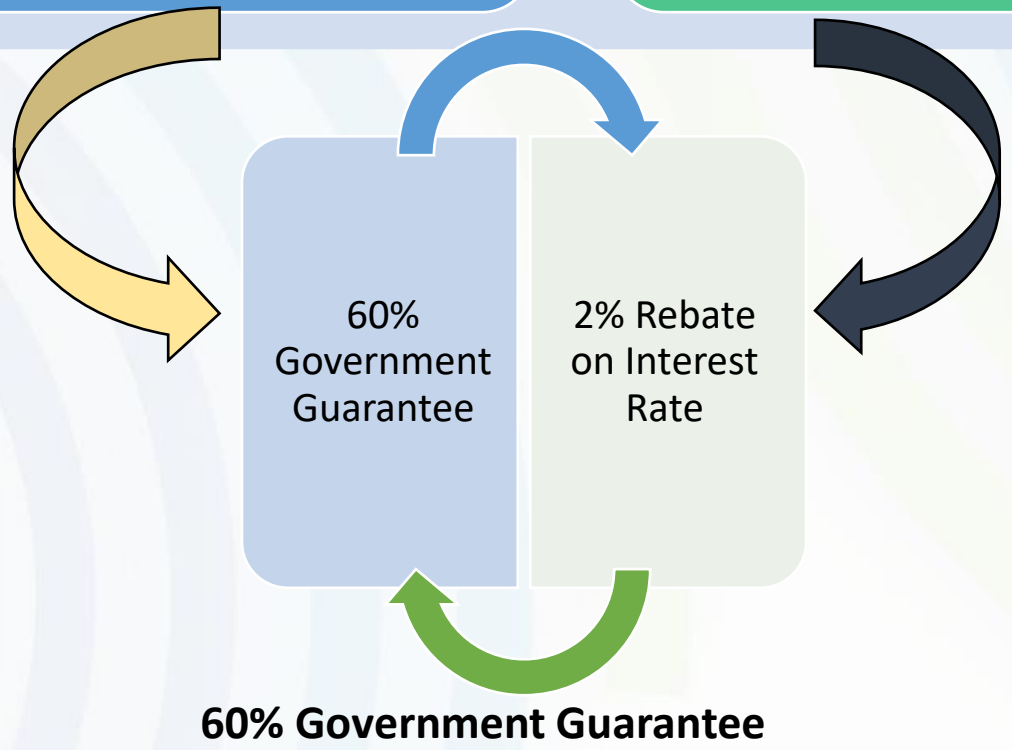
Soft Loan

Sukuk/Bond

GTFS 1.0
(2010-2017)
RM3.5 Billion

GTFS 2.0
(2019-2020)
RM2.0 Billion

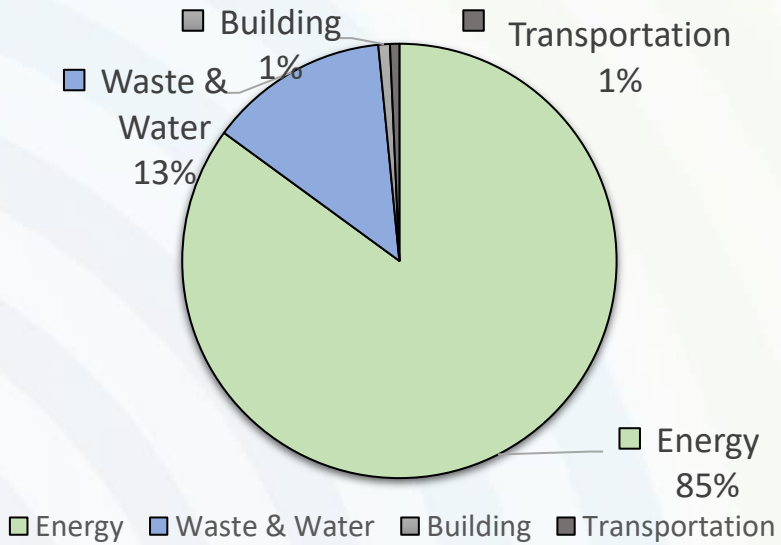
GTFS 3.0
(2021-2022)
RM2.0 Billion



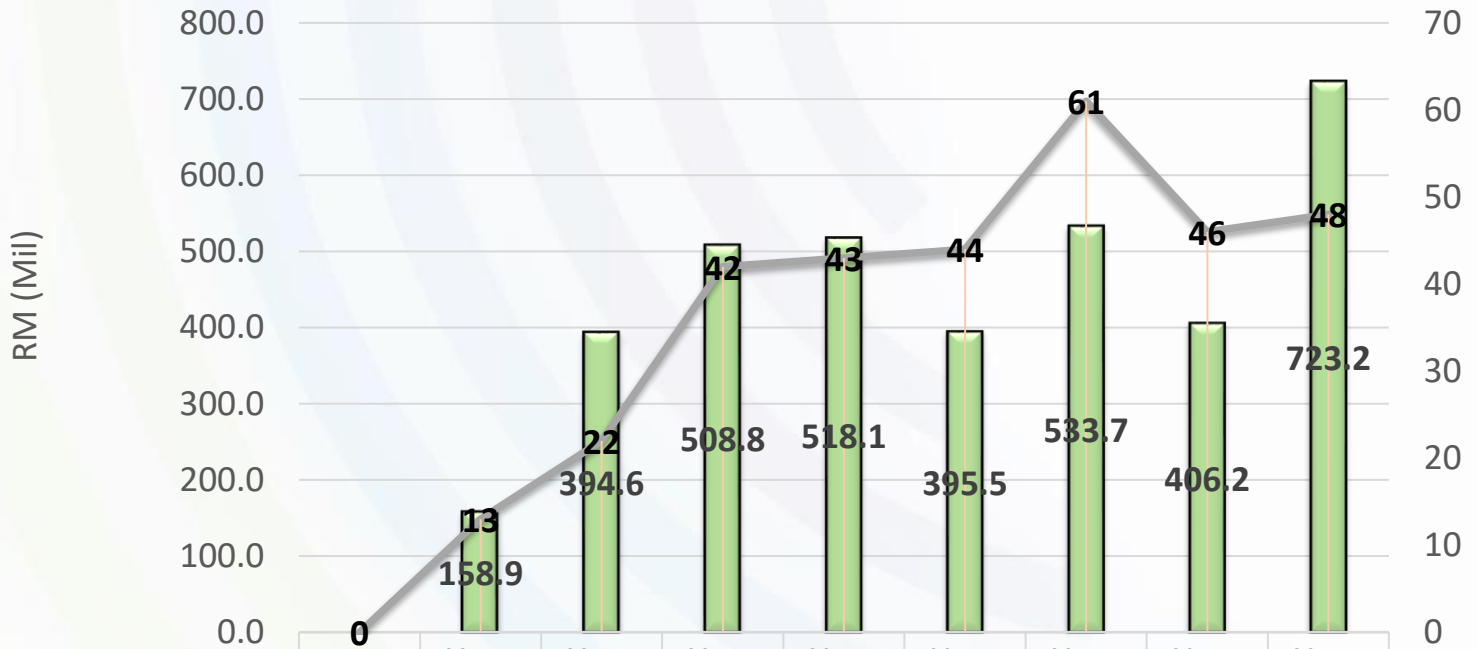
"to promote green investments by providing easier access to financing and at a lower financing costs"

GTFS 1.0 Performance (2010-2017)

By Sector



Financing Offer from Participating Financial Institutions



	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014	Year 2015	Year 2016	Year 2017
Total Loan	158.9	394.6	508.8	518.1	395.5	533.7	406.2	723.2
No. of Projects	13	22	42	43	44	61	46	48

GTFS 1.0 Performance

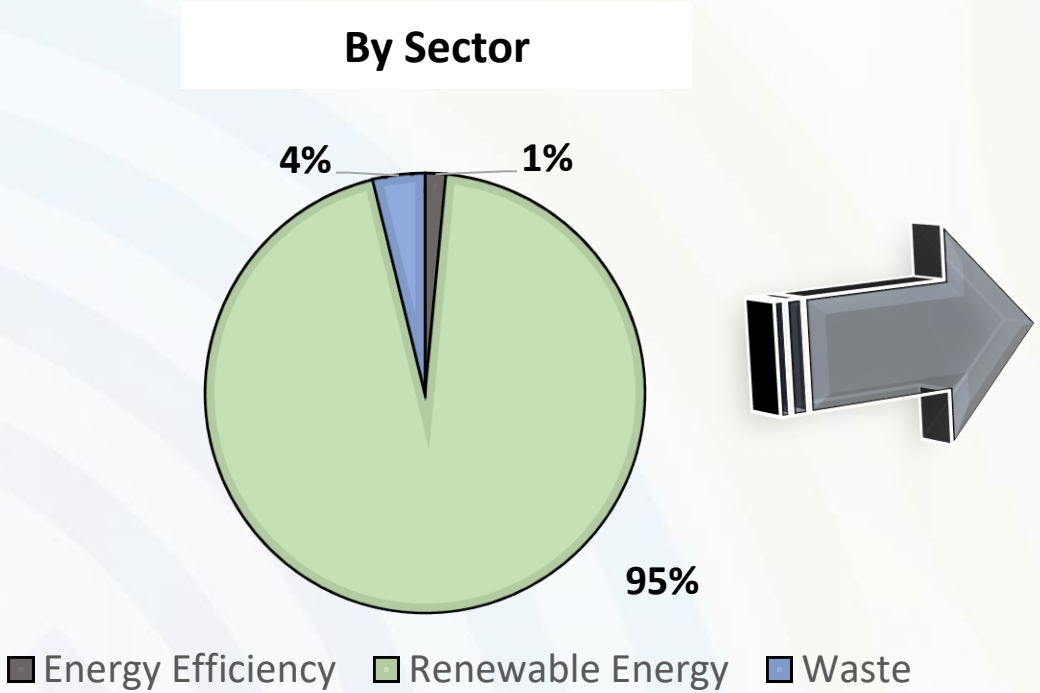
As of 31st December 2017, 319 projects have received financing offer by 28 Participating Financial Institutions (PFIs) amounting to RM3.638 Billion

Green Investment:
RM7.053 Billion

Social:
4,909 Jobs Created

Environment:
3.784 Million tCo2/yr

GTFS 2.0 Performance (2019-2020)



Sector	Green Projects Approved	Projects With Secured Financing	Financing Amount Offered (RM)	Green Investment (RM)
Energy Efficiency	2	1	28,000,000.00	32,000,000.00
Renewable Energy	125	109	1,884,000,000.00	2,340,000,000.00
Waste	5	2	6,000,000.00	8,000,000.00
TOTAL	**132**	**112**	**1,918,000,000.00**	**2,380,000,000.00**

GTFS 2.0 Performance

As of 31st December 2020, 112 projects have received financing offer by 29 Participating Financial Institutions (PFIs) amounting to RM1.918 Billion

Green Investment:
RM2.380 Billion

Social:
491 Jobs Created

Environment:
1.315 Million tCo2/yr

Overview of GTFS 4.0

Announced during 2023 Budget by YAB Dato' Seri Anwar Ibrahim

Approval by MOF (17 July 2023)

- RM1.0 billion for the period until 31 December 2025, or until fully utilised (whichever is earlier)
- 1.5% rebate on interest/profit for 5 or 7 years
- 60% to 80% Government Guarantee on green technology cost

- 2 additional categories Housing Developer and Low Carbon Mobility Infrastructure
- Waste sector to be given up to 80% guarantee

Structure of GTFS 4.0

Promotions, Certifications, Monitoring

MGTC

GREEN PROJECT CERTIFICATE

Participating Financial Institutions (PFIs)

FINANCING

PROJECT COMPANY

Producer: Max RM100 m for max. 15 years
User: Max. RM50m for max 10 years
ESCOs: Max. RM25m for max 10 years
Housing Developer: RM100 m for max. 5 years
Low Carbon Mobility Infrastructure: RM50 m for max 5 years

CGC

60% - 80% GOVERNMENT GUARANTEE

Administer Rebates & Guarantee

1.5% P.A REBATE

Features of GTFS 4.0

Features	Producer of Green Technology	User of Green Technology	ESCOs	Housing Developer	Low Carbon Mobility Infrastructure
Purpose	To finance investment for the production of green products. **excluding large scale solar projects and rooftop solar PV system	To finance investment for the utilization of green technology project. **excluding projects under Net Energy Metering (NEM) Scheme and Self-Consumption (SELCO)	To finance investment or assets related to energy efficient project and/or energy performance contracting	To finance the construction of green building which focus on residential development with the selling cost of maximum RM350,000	Finance electric vehicle Charge Point Operator
Financing Size	Maximum: RM100 million per group of company	Maximum: RM50 million per group of company	Maximum: RM25 million per group of company	Maximum: RM100 million per group of company	Maximum: RM50 million per group of company
Financing Tenure	Up to 15 years	Up to 10 years	Up to 10 years	Up to 5 years	Up to 5 years
Eligibility	Legally registered Malaysian companies that have at least 60% Malaysian shareholding	Legally registered Malaysian companies that have at least 60% Malaysian shareholding	Legally registered Malaysian companies that have at least 60% Malaysian shareholding Registered with Energy Commission as ESCO	Legally registered Malaysian companies that have at least 60% Malaysian shareholding	Legally registered Malaysian companies that have at least 60% Malaysian shareholding
Participating Financial Institutions (PFIs)	All Commercial Financial Institutions, Islamic Financial Institutions and Development Financial Institutions as per BNM				
Government Guarantee	Up to maximum 60% for the green cost of the finance amount for energy, manufacturing, transport, building and water while for waste sector is up to maximum 80% for the green cost of the finance				
Government Incentives	Rebate of 1.5% per annum on interest/profit rate				

Features of GTFS 4.0

Features	Producer of Green Technology	User of Green Technology	ESCOs	Housing Developer	Low Carbon Mobility Infrastructure
Period of Rebate	Up to 7 years	Up to 7 years	Up to 7 years	Up to 5 years	Up to 5 years
Interest/Profit Rate	Determine by Participating Financial Institutions (PFI's) for financing				
Source of Fund	Participating Financial Institutions (PFI's)				
Implementation Agencies	Ministry of Natural Resources, Energy, and Climate Change (NRECC) and MGTC				
Application Method	All application must be submitted to MGTC for green project certification. The successful applicant then proceeds to forward application for financing to any Participating Financial Institutions (PFI's)				
Application Date	The Scheme will be opened until 31 December 2025 or until the allocation is fully utilised (whichever is earlier)				
Processing Fee	• 0.25% - Financing tenure of 10 years and less • 0.5% - Financing tenure of more than 10 years The above processing fee is subject to green component cost apply or approved, subject to a minimum processing fee of RM8,000 (payable upfront upon submission of the application), payable to Malaysian Green Technology and Climate Change Corporation. • A processing fee of RM4,000 is payable for request to extend the validity of the project certificate (for 2nd and 3rd extension). Each extension on the validity is only for a period of not more than 6 months. • A processing fee of RM8,000 is payable for any request to vary the information on the certificate. Note: Processing fee paid shall be refunded should; 1. The application for green project certificate rejected by the Technical Committee. 2. The applicant company fail to secure financing under the scheme after the 3rd extension of the certificate validity. The amount to be refunded shall be after deduction of minimum RM8,000 processing fee and plus any other expenses incurred during the technical assessment.				

New Categories under GTFS 4.0

Housing Developer	Low Carbon Mobility Infrastructure
• Eligible for real estate or housing developer companies that implement green building projects. • Focus will be given to residential development with the selling cost of maximum RM350,000. • The developer must includes following elements: i. Energy Efficiency & Renewable Energy ii. Indoor Environmental Quality iii. Water Efficiency and Waste Management iv. Materials & Resource v. Construction Site Management	• Eligible for Charge Point Operator (CPOs) that operates, manages and sets up a network of EV charging infrastructure.

Supported Sectors and Criteria under GTFS 4.0

Energy

- Application of green technology to improve efficient supply of energy and in the energy supply side management, including co-generation by the industrial and commercial sectors.
- Application of green technology in all energy utilization sectors and in demand side management programmes.

Manufacturing

Manufacturer company that practices sustainable methods/ activities with the goal for a better environment and economy.

Transportation

- Incorporation of green technology in the transportation infrastructure and vehicles, in particular, bio-fuels and public road transport and to encourage the use of energy efficient vehicle for private and public sector.
- **Charge Point Operator**

Building

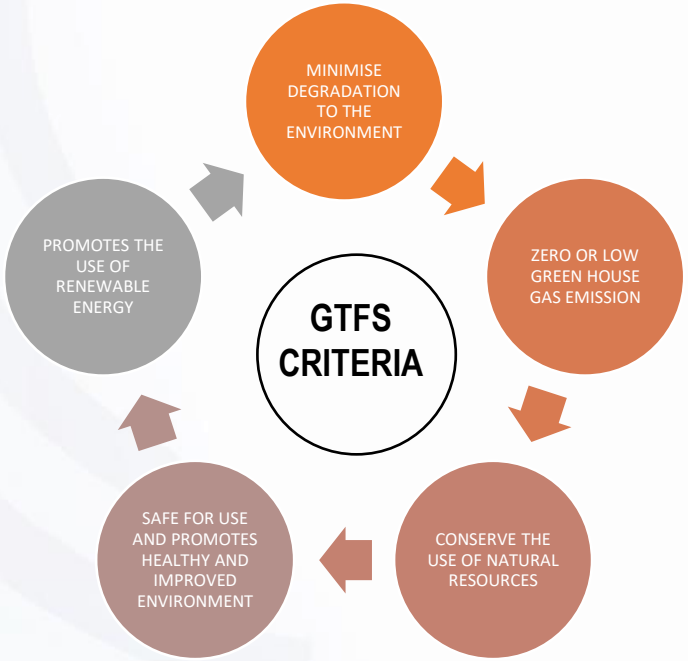
- Adoption of Green Technology in the construction, management, maintenance and demolition of buildings.
- **Development of green housing project**

Waste

Technology in the management and utilization of waste water treatment, solid waste and sanitary landfill.

Water

Technology in the management and utilization of water resources and water treatment.



Flowchart of GTFS 4.0

CERTIFICATION PROCESS

21 Working Days
*upon complete documentation

APPLICATION (PROJECT PROPOSAL) via www.gtfs.my

TECHNICAL EVALUATION AND RISK ASSESSMENT

APPROVAL BY GTFS TECHNICAL COMMITTEE (GTC)

ISSUANCE OF THE GREEN PROJECT CERTIFICATE

SUBMISSION TO FINANCIAL INSTITUTIONS FOR FINANCING / LOAN

FINANCIAL INSTITUTION SUBMISSION TO CGC FOR GUARANTEE APPROVAL

FINANCING DOCUMENTATION AND DISBURSEMENT BY PFIs

PROJECT COMMENCEMENT AND COMMISSIONING. YEARLY M&V AUDIT CONDUCTED BY MGTC

Responsibility of Project Company

Green Project Certificate holders are required to submit **GTFS Quarterly Report** until project commissioning

GTFS recipients are to submit GTFS M&V Audit Report 6 months upon commissioning.

MGTC's Roles:

- Evaluate and verify projects meet the Scheme criteria
- Monitor and audit the success of the projects

Financial Institution's Role:

- Credit evaluation and assess viability of the project
- Provide financing

Credit Guarantee Corporation's Role:

- Administer the Guarantee and 1.5% Rebate

TERIMA KASIH

MALAYSIAN GREEN TECHNOLOGY AND CLIMATE CHANGE CORPORATION [99801006110 (462237-T)]

No.2, Jalan 9/10, Persiaran Usahawan, Seksyen 9, 43650 Bandar Baru Bangi, Selangor Darul Ehsan, Malaysia.

+603-8921 0800
+6019-308 8175
info@mgtc.gov.my
www.mgtc.gov.my

mgtc.my mgtc_my mgtc live