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DAN PERUBAHAN IKLIM

MGTC

GREEN PRACTICES GUIDELINE FOR AGRICULTURE & PLANTATION SECTOR

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Publisher:
Malaysian Green Technology and Climate Change Corporation
No.2, Jalan 9/10, Persiaran Usahawan
Seksyen 9, 43650 Bandar Baru Bangi
Selangor Darul Ehsan.

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First published in October 2023 @ Malaysian Green Technology and Climate Change Corporation

ISBN: 978-967-5895-15-9

Printed in Malaysia by:
AVILA NIAGA SDN. BHD. (1406860-T)
No. 12-G Jalan Pinggiran Putra 4A/A,
Taman Desa Pinggiran Putra,
43000 Sg. Merab, Kajang, Selangor Darul Ehsan.

GREEN PRACTICES GUIDELINE FOR

AGRICULTURE & PLANTATION SECTOR

Malaysian Green Technology and Climate Change Corporation

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LIST OF ABBREVIATIONS

DASN	Dasar Alam Sekitar Negara
DOE	Department of Environment
DID	Department of Irrigation and Drainage
DOA	Department of Agriculture
DOF	Department of Fisheries
DOSM	Department of Statistics, Malaysia
DVS	Department of Veterinary Services
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FAMA	Federal Agriculture Marketing Authority
FAO	Food and Agriculture Organization of the United Nations
IPM	Integrated Pest Management
ISO	International Organization for Standardization
LKIM	Fisheries Development Authority of Malaysia
GAP	Good Agricultural Practices
Gg	Gigagrams
GHG	Green House Gas
GDP	Gross Domestic Product
GTFS	Green Technology Financing Scheme
KASA	Kementerian Alam Sekitar dan Air
LPP	Lembaga Pertubuhan Peladang
MAFI	Ministry of Agriculture and Food Industries
MARDI	Malaysian Agriculture Research and Development Institute
MGTC	Malaysia Green Technology and Climate Change Corporation
MPIB	Malaysian Pineapple Industry Board
NAFAS	National Farmers Organization
NRECC	Ministry of Natural Resources, Environment, and Climate Change
OECD	Organization for Economic Cooperation and Development
SDG	Sustainable Development Goals

ACKNOWLEDMENTS

The team wishes to express our appreciation to all stakeholders who have provided feedback and comments on the draft versions of this document.

Dato' Jana Santhiran a/l Muniayan (KASA)
Hidayu Hashim (EPU)
Datin Aznita Naziz (MBDC)
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LIST OF TERMINOLOGIES

ADAPTATION	The process of change by which an organism or species becomes better suited to its environment.
AGRI-BUSINESS	Agriculture conducted on strictly commercial principles.
BIOGAS	A renewable fuel produced by the breakdown of organic matter such as food scraps and animal waste.
CIRCULAR ECONOMY	The circular economy is a systems solution framework of production and consumption that tackles global challenges like climate change, biodiversity loss, waste, and pollution.
COMMODITY CROPS	Commodity crops are crops grown, typically in large volume and at high intensity, specifically for the purpose of sale to the commodities market (as opposed to direct consumption or processing.)
GREENHOUSE GAS	A gas that contributes to the greenhouse effect by absorbing infrared radiation. Carbon dioxide and chlorofluorocarbons are examples of greenhouse gases.
GREEN INVESTOR	Refers to investing activities aligned with environmentally friendly business practices and the conservation of natural resources.
INTERNET OF THING	The network of physical objects that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.
LOW CARBON TECHNOLOGY	Low-carbon technology means the sum of equipment's, methods, knowledge and other modalities for low-carbon or carbon-free.
LIFE CYCLE ANALYSIS	The systematic analysis of the potential environmental impacts of products or services during their entire life span.
LULUCF	A greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use such as settlements and commercial uses, land-use change, and forestry activities.
MITIGATION	Mitigation means reducing risk of loss from the occurrence of any undesirable event such as climate change.
NATURAL CAPITAL	The world's stocks of natural assets which include geology, soil, air, water and all living things.
PALM OIL MILL EFFLUENT	Wastewater generated from palm oil milling activities which requires effective treatment before discharge.
PAYBACK PERIOD	The time value of money and is determined by counting the number of years it takes to recover the funds invested.
SYSTEMIC	Systemic describes what relates to or affects an entire system. For example, a systemic disease affects the entire body or organism, and systemic changes to an organization have an impact on the entire organization, including its most basic operations.
SUSTAINABLE GROWTH	growth that is repeatable, ethical and responsible to, and for, current and future communities.

CONTENT

FOREWORD

Welcome to the Green Practices Guideline; a significant milestone in the ongoing implementation of the MyHIJAU Programme since 2012 as part of the Green Industry efforts outlined in the Twelfth Malaysia Plan. This programme is under the Ministry of Natural Resources, Environment and Climate Change (NRECC) and coordinated by the Malaysian Green Technology and Climate Change Corporation (MGTC).

Eight Green Practices Guidelines were developed for the following sectors: Agriculture & Plantation, Construction, Manufacturing, Mining, Fisheries (Aquaculture), Livestock, Forest Operation, and Services. These guidelines serve as a comprehensive resource for the green industry, providing guidance on the adoption and implementation of sustainable practices at every stage of a company's production and consumption.

The development of these guidelines aligns with the National Green Technology Policy (NGTP) and the Sustainable Consumption & Production (SCP) direction, aiming to promote the use of green technology among local manufacturers, producers, and suppliers, particularly small and medium enterprises (SMEs). By incorporating green practices, we can foster a culture of sustainability and contribute to the government's vision of green development in Malaysia.

These guidelines not only emphasize the importance of integrating green practices in an organisation's business operations but also provide a roadmap for industry players in their pursuit of green technology adoption. By adhering to these guidelines, businesses can tap into the potential of the green sector, explore green product and service offerings, and enhance their operations by incorporating sustainable practices.

In line with SDG 12.6, which advocates for the integration of sustainable practices and information sustainability into the reporting cycle, these guidelines outline the requirements that industries, companies, and organisations should follow. They are designed to be a valuable reference for all stakeholders, facilitating the government's objective of promoting and implementing green development initiatives.

As we embark on the Twelfth Malaysia Plan, with a strong focus on accelerating green growth, these guidelines emerge as a catalyst for practical and effective green practices across the industry. By prioritising environmental, social, and governance (ESG) elements in decision-making processes, companies can significantly reduce their negative impact on the environment while increasing productivity and long-term profitability.

Although Malaysia's contribution to greenhouse gas emissions stands at 0.7 percent, the government remains committed to reducing GHG emission intensity by 45 percent relative to GDP by 2030. This commitment aligns with our aspiration to become a low carbon nation. By embracing green practices and incorporating knowledge about the benefits and applications of green technology, the industry can play a pivotal role in achieving this goal.

We hope that these Green Practice Guidelines will serve as a foundation for industry-wide understanding and adoption of sustainable practices. By embracing the principles outlined within this guide, businesses can gain recognition as leaders in the green industry and contribute to a cleaner, greener, and more sustainable future for Malaysia.

Let us join hands in the pursuit of a thriving green industry and a better world for generations to come.

About the Guideline

The Green Practices Guideline was officially endorsed by the Ministry of Environment and Water in 2021 as part of the Twelfth Malaysia Plan (RMKe-12) under SDG 12.6. This particular goal aims to promote the adoption of sustainable practices and the integration of sustainability information into the reporting cycle of companies.

This governmental initiative strongly aligns with Malaysia's commitment to fostering green technology policies and driving sustainable development across various industries and organizations within the country.

The initial implementation of the Guideline primarily focuses on enhancing exposure, perception, knowledge, and capacity building regarding green resources, processes, and technologies. Collectively known as "green practices," these measures are intended to drive positive changes within the industry.

The envisioned outcome of implementing green practices in the industry is the promotion of cleaner, more efficient, and environmentally-friendly operations, processes, and premises throughout Malaysia.

Mandate: The Ministry of Environment and Water granted approval through the Twelfth Malaysia Plan (RMKe-12) in 2021.

Green Policy: The Guideline supports the advancement of green technology policies to facilitate sustainable development within industries and organizations in Malaysia.

Purpose: To provide guidance and recommendations for manufacturing industries in the implementation of green practices.

Approach: The Guideline emphasizes the optimization of natural resource consumption, energy usage, and water management, while concurrently reducing toxic emissions and waste generation.

Optimize: Focus on optimizing the consumption of natural resources, including raw materials, water, energy, and land use.

Circularity: Encourage the adoption of circular economy principles by increasing the reuse, recycling, and reduction of materials, energy, and water.

Reduce: Place emphasis on reducing the emissions of toxic or hazardous waste.

Implement: Promote the utilization of innovative green technologies to enhance processes and operations.

CHAPTER 1 : INTRODUCTION

1.1 ABOUT THE SECTOR

The agricultural sector holds a significant position in the economic growth of our nation, playing a crucial role in job creation, ensuring food security, and improving livelihoods. Malaysia's agriculture sector has been a key contributor to the country's Gross Domestic Product (GDP) and an active participant in international trade. According to data from the Department of Statistics Malaysia (2021), the agricultural sector contributed 7.4% to Malaysia's GDP in 2020. Furthermore, the sector has experienced positive growth in terms of exports, with total agricultural exports increasing from RM115.5 billion in 2019 to RM118.6 billion in 2020. However, it is important to address the challenges faced by the sector in terms of production and sustainability.

In recent years, there has been a growing emphasis on adopting green practices in the agricultural sector. With the increasing awareness of climate change and environmental sustainability, the industry has recognized the need to minimize its ecological footprint and transition towards more sustainable practices. The Green Technology Master Plan (GTMP) introduced by the Malaysian government provides a roadmap for the adoption and implementation of green practices across various sectors, including agriculture.

To align with the GTMP and achieve sustainable growth, the agricultural sector can leverage green technologies and practices. These include:

Precision Farming

Precision farming technologies, such as remote sensing, geographic information systems (GIS), and drones, enable farmers to monitor and manage their crops more efficiently. By utilizing real-time data on soil moisture, nutrient levels, and crop health, farmers can optimize the use of fertilizers, water, and pesticides, reducing waste and environmental impact.

Sustainable Irrigation Systems

Implementing water-efficient irrigation systems, such as drip irrigation or precision sprinklers, can significantly reduce water consumption in agriculture. These technologies ensure that water is applied directly to plant roots, minimizing evaporation and runoff. Additionally, integrating sensors and smart controls allows farmers to adjust irrigation schedules based on weather conditions and plant needs.

Organic Farming

Embracing organic farming practices reduces the reliance on synthetic fertilizers, pesticides, and genetically modified organisms. By promoting soil health and biodiversity, organic farming helps maintain ecological balance and reduces the risks of environmental pollution and ecosystem disruption.

Agroforestry

Agroforestry combines agriculture and forestry practices, integrating trees and crops on the same land. This approach offers multiple benefits, including soil conservation, carbon sequestration, and diversification of income sources for farmers. Agroforestry systems also provide habitats for wildlife, contribute to climate change mitigation, and promote sustainable land use.

Renewable Energy Integration

Incorporating renewable energy sources, such as solar panels or biogas digesters, can help agricultural operations become more energy-independent and reduce greenhouse gas emissions. Solar energy can power irrigation systems, lighting, and other farm equipment, while biogas digesters can convert organic waste into clean energy for cooking or electricity generation.

By adopting these green practices, the agricultural sector can enhance productivity, reduce resource consumption, mitigate environmental impact, and improve the resilience of farming systems. These efforts not only align with the goals of the GTMP but also contribute to the global sustainability agenda, including the United Nations Sustainable Development Goals (SDGs).

Furthermore, the Malaysian government has introduced various initiatives and support programs to encourage the adoption of green practices in the agricultural sector. For instance, financial incentives, research grants, and capacity-building programs are available to assist farmers and agricultural businesses in transitioning towards sustainable practices.

In conclusion, the agricultural sector in Malaysia plays a vital role in the nation's economy and food security. By embracing green practices and leveraging green technologies, the sector can enhance its sustainability, reduce environmental impact, and contribute to the goals outlined in the GTMP. With a concerted effort towards sustainable agriculture, Malaysia can ensure the long-term viability and resilience of its agricultural sector while preserving the natural resources and ecosystems that support it.

1.2 SCOPE AND APPLICATION

The agricultural sector in Malaysia holds great significance, driving the nation's economic growth, ensuring food security, creating employment opportunities, and improving livelihoods. However, it is crucial to address the challenges posed by conventional agricultural practices that have had adverse effects on the environment. The Green Practices Guidelines for the Agriculture Sector have been specifically developed to overcome these challenges and promote sustainable practices throughout the industry.

These guidelines aim to address the social, financial, and policy barriers that hinder the implementation of green initiatives in the agriculture sector. By encompassing a wide range of issues and involving both government and non-government stakeholders, these guidelines emphasize the need for strong institutional integration and supportive policies.

The scope of the Green Practices Guidelines covers various aspects of the agriculture sector, including crop production, livestock farming, irrigation, pest management, and soil conservation. The objective is to align these activities with green practices to ensure environmental sustainability and the long-term viability of the sector.

Implementing green practices in the agriculture sector can be guided by several indicators:

01

Materials

Green practices focus on the responsible use of materials in agriculture. This can include utilizing organic fertilizers, adopting integrated pest management techniques, and promoting the use of biodegradable packaging materials.

02

Waste

Efforts should be made to minimize waste generation and implement proper waste management practices in agricultural operations. Examples include composting organic waste, promoting recycling and reuse, and implementing responsible disposal methods for agricultural by-products.

03

Water

Sustainable water management is crucial in agriculture. Practices should aim to minimize water usage, optimize water quality, and reduce the discharge of pollutants into water bodies. Efficient irrigation systems and water-saving techniques can be employed to conserve water resources.

04

Energy

Green practices in agriculture focus on energy efficiency and the use of renewable energy sources. This can involve adopting energy-efficient machinery and equipment, utilizing solar-powered systems for irrigation or farm operations, and exploring bioenergy options such as biogas from agricultural waste.

05

Innovation

Embracing innovation is vital for the adoption of green practices in agriculture. This can include the use of precision agriculture technologies, remote sensing, and data analytics to optimize crop production, reduce chemical inputs, and improve resource efficiency.

06

Management

Effective management practices are essential for the implementation of green initiatives in agriculture. This includes promoting sustainable farming techniques, implementing soil conservation measures, adopting responsible water and pesticide management practices, and encouraging stakeholder engagement in decision-making processes.

By integrating these green practices into the agriculture sector, Malaysia can achieve its sustainability goals, protect natural resources, enhance biodiversity, and contribute to the overall objectives of the Green Technology Master Plan. The Green Practices Guidelines provide a framework for agricultural stakeholders to adopt and implement sustainable practices, ensuring the long-term viability and resilience of the agriculture sector while safeguarding the environment.

Through the implementation of green practices, the agriculture sector can enhance resource efficiency, reduce environmental impacts, and contribute to a more sustainable and resilient food production system in Malaysia. By prioritizing sustainable agriculture practices, Malaysia can meet the demands of a growing population, ensure food security, and preserve the environment for future generations.

1.3 MOTIVATION TO SUSTAINABILITY

Sustainability is of utmost importance in the agriculture sector as it plays a vital role in economic development and food security. It is imperative for companies in the agriculture sector to adopt sustainable practices that not only protect the environment but also unlock a range of benefits for long-term success and competitiveness.

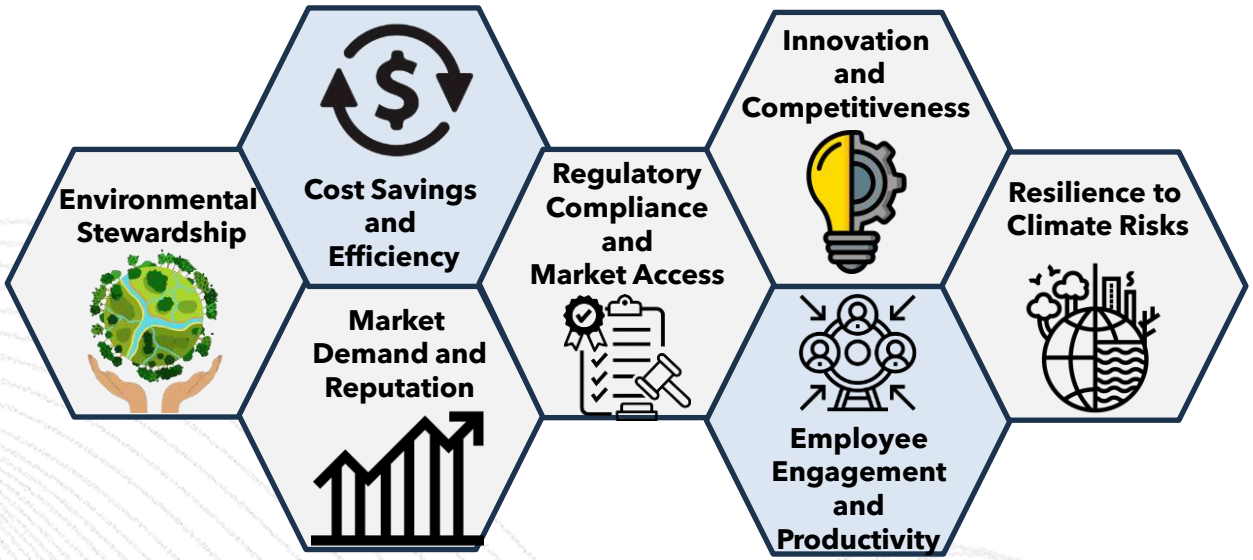


Figure 1 : Motivation to Sustainability

Environmental Stewardship

Adopting sustainable practices in agriculture allows companies to minimize their ecological footprint, preserve biodiversity, and protect natural resources. This includes implementing soil conservation techniques, practicing responsible water management, and promoting agroforestry to enhance ecosystem resilience.

Cost Savings and Efficiency

Sustainability practices in agriculture often result in cost savings and improved efficiency. Employing precision farming techniques, optimizing resource utilization, and adopting efficient irrigation systems can reduce input costs and enhance resource efficiency, leading to increased profitability.

Market Demand and Reputation

Consumers are increasingly demanding sustainably produced agricultural products. Embracing sustainable practices, such as organic farming, integrated pest management, and responsible water usage, allows companies to tap into the growing market demand for eco-friendly and ethically produced food. Obtaining certifications like organic or fair trade further enhances reputation and market access.

Regulatory Compliance and Market Access

Sustainability practices in agriculture ensure compliance with environmental regulations and standards. Adhering to sustainable farming practices, water quality regulations, and biodiversity conservation measures not only helps companies avoid legal issues and penalties but also facilitates market access to regions with stringent environmental requirements.

Innovation and Competitiveness

Sustainability drives innovation in agriculture, encouraging the development and adoption of new technologies and practices. This includes precision agriculture technologies, renewable energy applications, and sustainable packaging solutions. Investing in sustainable practices enhances competitiveness, fosters resilience to climate change, and positions companies as leaders in the industry.

Employee Engagement and Productivity

Commitment to sustainability in agriculture promotes employee engagement and productivity. Creating a work environment that values sustainability and supports responsible farming practices boosts employee morale and satisfaction. Companies can offer training and educational programs on sustainable agriculture, empowering employees to contribute to the organization's environmental goals.

Resilience to Climate Risks

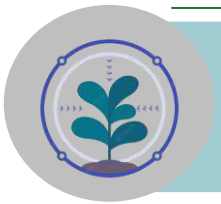
Incorporating sustainability practices in agriculture builds resilience to climate-related risks. This involves implementing climate-smart agricultural practices, such as drought-resistant crop varieties, water-efficient irrigation systems, and soil carbon sequestration. By adapting to climate change and mitigating its impacts, the agriculture sector can ensure the long-term viability of food production and safeguard the livelihoods of farming communities.

By embracing sustainable practices, the agriculture sector can contribute to environmental preservation, ensure the sustainable use of natural resources, enhance food security, and support the livelihoods of farming communities. It is through the adoption of sustainable practices that the agriculture sector can thrive and meet the challenges of a rapidly changing world while maintaining its long-term viability and competitiveness.

1.3.1 Climate Change

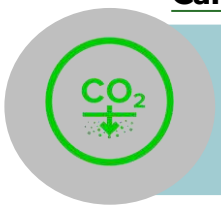
Climate change is a significant challenge, and the agriculture sector in Malaysia must adopt sustainable practices to mitigate its impacts. Examples of initiatives include:.

Sustainable Farming Techniques



Implementing agroecological practices, such as organic farming, agroforestry, and precision agriculture, reduces greenhouse gas emissions, enhances soil health, and promotes biodiversity.

Carbon Sequestration

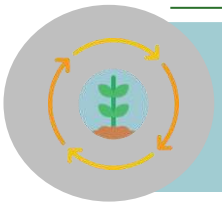


Implementing carbon sequestration strategies, such as planting cover crops, establishing windbreaks, and restoring degraded lands, helps capture and store carbon dioxide from the atmosphere.

Efficient Water Management

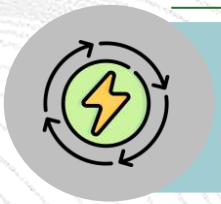
Employing water-saving irrigation techniques, such as drip irrigation and moisture sensors, reduces water consumption, conserves resources, and improves resilience to climate change.

Climate-Smart Crop Selection



Opting for climate-resilient crop varieties and utilizing crop rotation techniques helps mitigate climate risks, adapt to changing conditions, and maintain agricultural productivity.

Renewable Energy Adoption

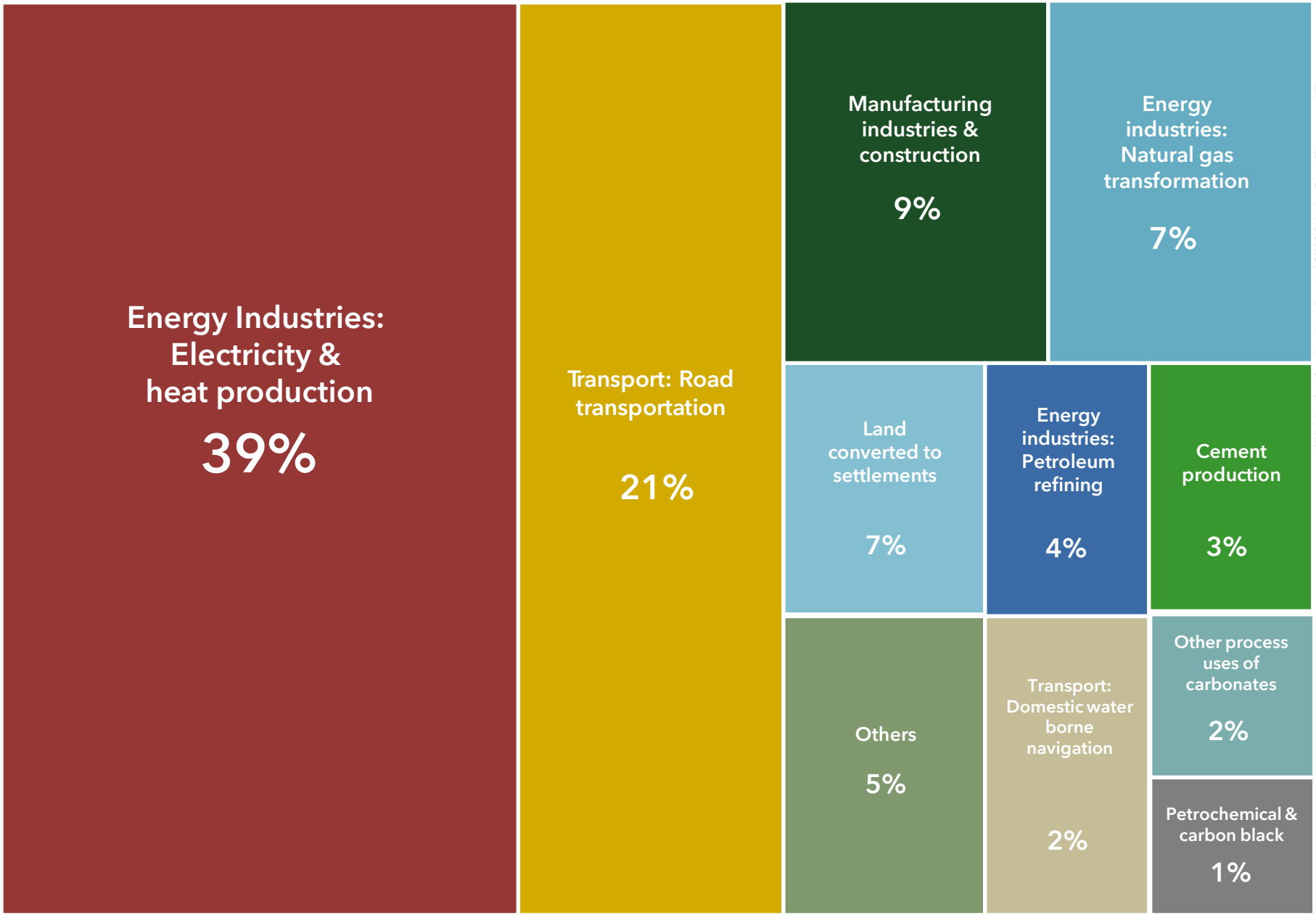


Integrating renewable energy sources, like solar panels or biomass energy, into agricultural operations reduces reliance on fossil fuels, decreases emissions, and contributes to a low-carbon economy.

Knowledge Exchange and Training

Promoting farmer education, providing training on sustainable practices, and facilitating knowledge sharing platforms enhance awareness, capacity, and adoption of climate-smart agriculture.

By embracing these sustainable practices, the agriculture sector in Malaysia can contribute to climate change mitigation, enhance environmental stewardship, and ensure the long-term viability of agricultural production. These actions align with Malaysia's commitment to becoming a low-carbon nation and contribute to global efforts in combating climate change.


Energy Industries: Electricity & heat production
39%
Transport: Road transportation
21%
Manufacturing industries & construction
9%
Energy industries: Natural gas transformation
7%
Land converted to settlements
7%
Energy industries: Petroleum refining
4%
Cement production
3%
Others
5%
Transport: Domestic water borne navigation
2%
Other process uses of carbonates
2%
Petrochemical & carbon black
1%

RENEWABLE ENERGY

Fit-in-Tariff

Mechanism under the Renewable Energy Policy & Action Plan to catalyse generation of Renewable Energy (RE) up to 30MW in size.

Emission avoidance
460.52 Gg Co2eq

Hydropower

Hydropower is posed to play an increasingly important role in meeting Malaysia's energy & climate goals.

Emission avoidance
6,535.99 Gg Co2eq

NATIONAL ENERGY EFFICIENCY ACTION PLAN (NEEAP)

This plan was introduced targeting the residential commercial & industrial sectors. Key initiatives under NEEAP:

- 5 star rated appliances
- Minimum Energy Performance Standard (MEPS)
- Co-generation
- Energy audits & energy management in buildings & industries
- Energy Efficient Building Desing

Emission avoidance
458.02 Gg Co2eq

ENERGY EFFICIENT VEHICLES (EEVs)

Malaysia aims to become a regional hub for energy efficient vehicles (EEVs) through strategic investments & adoption of high technology. The EEVs include fuel-efficient internal combustion engines (ICE) vehicles, electric vehicles, hybrid & alternative-fueled vehicles.

Related policy:
The National Automotive Policy 2024

Emission avoidance
90.65 Gg Co2eq

GREEN BUILDING RATING SCHEME

Focus on promoting natural-gas vehicles in the public transport sector, in particular for taxis and buses.

Existing Standards:

- Malaysian Carbon Reduction & Environmental Sustainability Tools (MyCREST)
- Green Performance Assessment System (PASS)

Green certification:

- Green Building Index (GBI)
- GreenRE

Emission avoidance
143.47 Gg Co2eq

URBAN RAILED-PUBLIC TRANSPORT

The implementation of public transport initiatives is important to reduce the use of private vehicles on the road.

Existing plan:
- National Land Public Transport Master Plan
- The Tenth and Eleventh Malaysia Plan

Emission avoidance
212.93 Gg Co2eq

NATURAL GAS VEHICLES

Focus on promoting natural-gas vehicles in the public transport sector, in particular for taxis & buses

Benefits of programs:
- Lower retail prices
- Incentives
- Road tax reduction
- Import duty & sale tax exemption

Emission avoidance
114.77 Gg Co2eq

BIODIESEL

Biodiesel has received great attention as an alternative fuel, considering its abundant resources & environmental benefits.

Related policy & Acts:
- The National Biofuel Policy
- Malaysian Biofuel
- Industry Act

Emission avoidance
1,127.34 Gg Co2eq

OIL & GAS OPERATIONS

PETRONAS, as the national oil & gas company of Malaysia is committed towards a lower carbon footprint.

Emission reduction in oil & gas operations can be achieved through:

- Zero continuous flaring & venting in all operations for fugitive emissions
- Continuous improvement & plant efficiency in natural gas transformation
- Enhance improvement in plant efficiency of oil refining industries.

WATER PAPER RECYCLING

Target of 40% waste redirection from waste disposal sites:

- 22% through recycling
- 18% through waste treatment

Impact:
Increasing of recycling rate materials from 17% in 2015 to 21% in 2017

Related Policy:

- National Solid Waste Management Policy 2006
- Eleventh Malaysia Plan

Emission avoidance
3,937.76 Gg Co2eq

BIOGAS RECOVERY FROM PALM OIL MILL EFFLUENT (POME)

Biogas plays a crucial role in driving Malaysia that is moving towards adopting renewable energy & environmental sustainability
Target include equipping mills with biogas entrapment facilities to generate electricity for supply to the grid or for self-consumption

Impact:
As of 2017, out of 454 palm oil mills, 104 of them were fully equipped with biogas capture facilities10

Related Projects:
Entry Point Project – Developing Biogas Facilities at Palm Oil Mills
Related Programs
Economic Transformation Programme 2012

Emission avoidance
2,377.84 Gg Co2eq

AGRICULTURE

Malaysian Organics Scheme (SOM) or Malaysia Organic (MyOrganic is a certification that recognizes farms that practices good agricultural practices & organics farming based on Malaysian Standard MS1529:2015

Impacts:
253 farms have been certified with MyOrganic certification with an area of 2,045.60 ha as for now

SUSTAINABLE MANAGEMENT OF FOREST

Forest certification scheme that allow the annual allowable cut it the Permanent Reserved Forest (PRF) is capped at 8m3/ha for the period of tenth & eleventh Malaysian Plan.

Related Certification:
Malaysian Criteria & Indicators for Forest Management Certification 2001

Emission avoidance:
20,307.50 Gg Co2eq

CONSERVATION OF BIODIVERSITY & ECOSYSTEM SERVICES

Relevant initiatives:
Malaysia's Protected Area (PA) Network

Target:
Increase the PA to at least 20% by 2025

Impact:
PA increased from 2.757 to 3.171 million ha between 2014 & 2016

FOREST ENRICHMENT PROGRAMMES

Aim:
Improve degraded forests sequestration capacity
Enhance connectivity between forests through two distinct initiatives

Examples:
Central Forest Spine (CFS) Programme in Peninsular Malaysia
Heart of Borneo (HoB) Programme in Sabah & Sarawak

1.3.2 Circular Economy

Climate change stands as one of the most formidable challenges of the 21st century. Central to addressing this challenge is the recognition that economic development must not come at the expense of the environment, and that controlling greenhouse gas (GHG) emissions is crucial to mitigating the impacts of climate change for the well-being of present and future generations.

Currently, the agriculture sector in Malaysia plays a significant role in contributing to the country's GHG emissions. It is important for the sector to recognize its responsibility in addressing climate change and adopting sustainable practices. Malaysia's commitment to becoming a low-carbon nation by 2050 presents an opportunity for the agriculture industry to contribute to this goal while ensuring its long-term viability.

Examples of initiatives and actions that can be taken by the agriculture sector in Malaysia include:

Sustainable Farming Techniques
Implementing sustainable farming practices, such as precision agriculture, organic farming, and agroecology, can reduce GHG emissions by optimizing resource use, minimizing chemical inputs, and promoting soil health.

Climate-Smart Crop Selection
Adapting crop choices to changing climatic conditions can help mitigate climate risks and reduce GHG emissions. This includes promoting drought-resistant crop varieties, implementing agroforestry systems, and supporting climate-resilient farming methods.

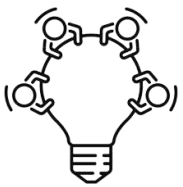
Efficient Water Management
Adopting water-efficient irrigation systems, such as drip irrigation or precision irrigation technologies, can reduce water usage, conserve resources, and lower energy consumption associated with pumping water.

Conservation Agriculture
Embracing conservation agriculture practices, such as minimum tillage, cover cropping, and crop rotation, can enhance soil carbon sequestration, improve water retention, and reduce the release of GHGs from agricultural soils.

Renewable Energy Integration
Exploring and adopting renewable energy sources for on-farm operations, such as solar panels for powering irrigation systems or biogas production from agricultural waste, can reduce reliance on fossil fuels and decrease on-farm GHG emissions.

Sustainable Livestock Management
Implementing sustainable livestock practices, including improved feed efficiency, methane capture from manure, and responsible grazing management, can reduce GHG emissions from the livestock sector.

Forest Protection and Reforestation
Preserving existing forests and engaging in reforestation efforts can contribute to carbon sequestration, enhance biodiversity, and mitigate the impacts of deforestation on climate change.



Knowledge Sharing and Capacity Building
Promoting education and training programs on sustainable agricultural practices, climate-smart farming techniques, and climate change adaptation can empower farmers to make informed decisions and drive sustainable agricultural development.

By embracing these and other sustainable practices, the agriculture sector in Malaysia can play a crucial role in addressing climate change, reducing GHG emissions, and ensuring the long-term viability of the industry. Furthermore, these actions can contribute to Malaysia's broader sustainability goals, enhance the sector's reputation, and meet the expectations of environmentally conscious consumers and investors.

1.3.3 Impacts of ESG Towards the Industry

ESG (Environmental, Social, and Governance) criteria play a vital role in assessing the ethical and sustainability impacts of investments across various industries, including the agriculture sector. In Malaysia, the consideration of ESG factors is crucial for the long-term sustainability and success of agricultural businesses. Here are some specific examples of how ESG principles can be applied in the agriculture sector:

Environmental Responsibility

Agricultural companies can prioritize environmental responsibility by implementing sustainable farming practices that minimize the impact on ecosystems. This includes promoting soil health through practices like crop rotation and organic farming, reducing chemical pesticide and fertilizer use, and adopting efficient water management techniques such as drip irrigation. Implementing agroforestry systems or conservation agriculture methods can also contribute to biodiversity conservation and carbon sequestration.

Social Responsibility

ESG principles in the agriculture sector encompass social responsibility, which involves ensuring fair labor practices, supporting the well-being of farming communities, and respecting human rights. This can be achieved by providing safe and healthy working conditions for farmers, promoting gender equality and diversity in the workforce, and engaging with local communities through initiatives that enhance their social and economic development. Supporting small-scale farmers and promoting responsible land tenure practices also contribute to social sustainability.

Governance Practices

Good governance practices are essential for the sustainable management of agricultural operations. This includes transparent and accountable decision-making processes, compliance with regulations and standards, and effective monitoring and reporting systems. Implementing traceability systems to track the origin and sustainability of agricultural products can enhance governance practices and ensure responsible sourcing. Engaging with relevant stakeholders, such as farmers' associations, government agencies, and certification bodies, can strengthen governance mechanisms and promote sustainable agricultural practices.

Sustainable Financing

Access to sustainable financing is crucial for the growth and development of the agriculture sector. Companies can explore funding options aligned with ESG principles, such as impact investment funds that specifically support sustainable agriculture projects. Green bonds and loans can be utilized to finance initiatives that promote agroecology, climate-smart farming, and sustainable land management practices. Investing in research and innovation for sustainable agriculture can also attract financing and contribute to the sector's long-term viability.

Stakeholder Engagement

Engaging stakeholders is key to the successful implementation of ESG principles in the agriculture sector. This includes collaborating with farmers, local communities, NGOs, government agencies, and consumers. Stakeholder engagement can foster knowledge sharing, capacity building, and the development of collaborative initiatives that promote sustainable farming practices, responsible sourcing, and support for rural development. Engaging with consumers and providing transparent information about the environmental and social impact of agricultural products can build trust and support sustainable consumption patterns.

By embracing ESG principles, agricultural companies in Malaysia can enhance their environmental performance, social responsibility, and governance practices. This not only contributes to the sector's long-term sustainability but also aligns with global sustainability goals and meets the expectations of responsible investors and consumers. Embracing ESG principles ensures the agriculture sector's resilience and competitiveness in a sustainable-focused global landscape while safeguarding ecosystems, supporting rural communities, and addressing the challenges of food security and climate change.

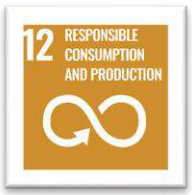
1.3.4 Sustainable Developments Goals

The agriculture sector in Malaysia also plays a significant role in contributing to the achievement of the United Nations Sustainable Development Goals (SDGs). By embracing sustainable practices, the agriculture sector can actively contribute to several SDGs, ensuring a more sustainable and resilient future. Here are specific examples of how the agriculture sector in Malaysia can align with and support the SDGs:

Zero Hunger - The agriculture sector can contribute to eradicating hunger by promoting sustainable and resilient farming practices. This includes implementing climate-smart agriculture techniques, improving agricultural productivity, and supporting small-scale farmers to enhance food security and nutrition for all.

Life on Land - Sustainable land management practices in agriculture can contribute to SDG 15. This involves promoting soil conservation, biodiversity protection, and sustainable land use practices. Implementing agroforestry systems, conserving natural habitats, and reducing deforestation for agricultural expansion are crucial steps toward preserving terrestrial ecosystems.

Clean Water and Sanitation - The agriculture sector plays a role in water resource management. By adopting water-efficient irrigation systems, reducing water pollution from agricultural activities, and implementing best practices in water management, the sector can contribute to SDG 6 and ensure the availability and sustainable management of water resources.



Responsible Consumption and Production - The agriculture sector can contribute to SDG 12 by promoting sustainable farming practices and responsible production methods. This includes reducing the use of chemical inputs, minimizing post-harvest losses, and adopting sustainable packaging and distribution practices. Promoting sustainable consumption patterns and educating consumers about the importance of supporting sustainable agriculture can further enhance the sector's contribution to this goal.

Climate Action - The agriculture sector is both impacted by and contributes to climate change. By adopting climate-smart agricultural practices, such as agroecology, precision farming, and conservation agriculture, the sector can reduce greenhouse gas emissions, enhance carbon sequestration in soils, and build resilience to climate change impacts.

Partnerships for the Goals - Collaboration among stakeholders is vital for achieving the SDGs in the agriculture sector. By fostering partnerships with government agencies, research institutions, NGOs, and local communities, the sector can share knowledge, leverage resources, and develop innovative solutions to address sustainability challenges and promote sustainable agriculture.


SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

1.4 THE NEED FOR GREEN PRACTICES

1.4.1 What are Green Practices (GP)?

Green Practices are any target or initiative set out by industries that is in line with target outlined in Green Technology Master Plan (GTMP).

Examples of green practices in agriculture sector are:

Adopt smart farming using big data and new technologies such as internet of thing (IoT), drone imagery and smartphone apps to harvest as much matter and products as possible, while consuming less energy and inputs (such as water and fertilizer).

Utilisation of biodiesel for machineries such as truck and tractor.

GREEN PRACTICES IN AGRICULTURE SECTOR

Utilisation of natural pest control such as pest predator technique or using biopesticides for pest management.

Use agricultural compost to improve soil properties, provides nutrients in a stable organic form, increases plant growth and health, and conserves water.

1.4.2 Green Practices in the Agriculture Sector

The agriculture sector in Malaysia recognizes the importance of adopting green practices to ensure the sustainability of its operations and contribute to global conservation efforts. In addition to the previously mentioned cleaner production, lean manufacturing, and circular economy principles, several other renowned approaches are being implemented in the agriculture sector. These approaches further exemplify the commitment of Malaysia's agriculture industry to environmental stewardship. Here are some notable examples:

1. Malaysia's agriculture sector is embracing internationally recognized certification programs such as Rainforest Alliance and Organic Certification. These certifications ensure that farming practices adhere to strict environmental standards, including soil and water conservation, biodiversity protection, and responsible pesticide and fertilizer use. By obtaining these certifications, farmers demonstrate their commitment to sustainable agriculture and gain access to markets that prioritize environmentally friendly products.

Sustainable Farming Certification

2. 

Agroforestry Systems

Agroforestry is a sustainable land-use system that combines agricultural crops with trees and shrubs. By integrating trees into agricultural landscapes, farmers can enhance soil health, prevent erosion, promote biodiversity, and sequester carbon. Agroforestry systems provide multiple benefits, including increased crop yields, improved water management, and habitat restoration.

3. Precision farming utilizes advanced technologies such as remote sensing, GPS mapping, and data analytics to optimize resource use and reduce environmental impact. Farmers can precisely manage inputs like water, fertilizers, and pesticides based on site-specific conditions, leading to improved efficiency and reduced waste. Precision farming techniques also help monitor soil health, crop growth, and disease management.

Precision Farming Techniques

4.

Water Conservation Practices

Water is a valuable resource in agriculture, and efficient water management is crucial for sustainability. Farmers can implement practices such as drip irrigation, rainwater harvesting, and water recycling to minimize water use and reduce water pollution. By optimizing water application and improving irrigation techniques, farmers can conserve water resources and minimize the impact on aquatic ecosystems.

5.

Crop rotation involves the systematic planting of different crops in a sequence to improve soil fertility, control pests and diseases, and reduce reliance on synthetic fertilizers and pesticides. Cover cropping involves planting non-cash crops during fallow periods to protect and enrich the soil. These practices contribute to soil conservation, nutrient cycling, and pest management, promoting sustainable agriculture.

Crop Rotation and Cover Cropping

6.

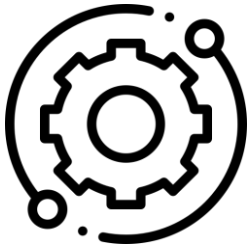
Farmer Field Schools and Knowledge Exchange

Farmer Field Schools provide a platform for farmers to learn and exchange knowledge on sustainable agricultural practices. These schools promote capacity building, information sharing, and the adoption of best practices in areas such as integrated pest management, soil conservation, and climate-smart agriculture. Farmers learn from experts and fellow farmers, enabling the dissemination of sustainable farming techniques throughout the agriculture sector.

By incorporating these various approaches alongside cleaner production, lean manufacturing, circular economy principles, and sustainable supply chain practices, Malaysia's agriculture sector is striving to achieve the objectives outlined in the Green Technology Master Plan (GTMP). These efforts not only contribute to environmental conservation but also enhance the sector's long-term viability, promote market access for sustainably produced agricultural products, and support the well-being of farming communities and the broader economy.

Why Green Practices ?

Due to **technological factors** where relative advantage and performance by adopting green practices would provide a better

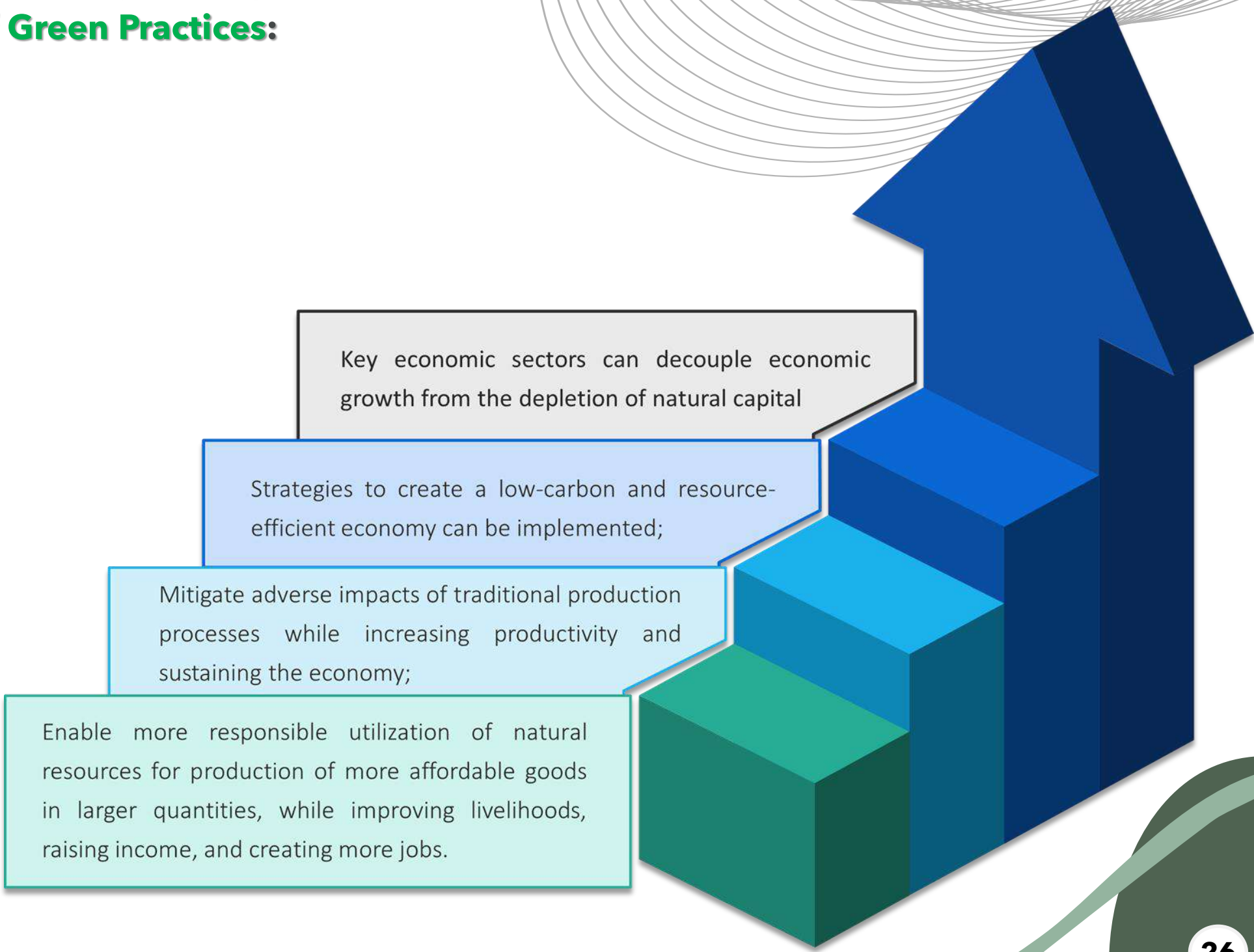


In response to the call for greater **sense of responsibility** towards the environment.

To secure **sustainable growth** in industry especially considering external environment in which an agriculture company conducts its business

Green Practices in the Agriculture Sector

Ultimately, through the utilization of **Green Practices**:



1.4.3 EXISTING NATIONAL POLICIES & GUIDELINES

The agriculture sector in Malaysia operates within a framework of national policies and guidelines that promote sustainable development and ensure the protection of land, water resources, and biodiversity. These policies and guidelines provide a regulatory foundation for responsible agricultural practices. Here are some key policies and guidelines relevant to the sector:

National Agricultural Policy

The National Agricultural Policy sets the strategic direction for sustainable agriculture in Malaysia. It aims to enhance food security, increase productivity, and promote the sustainable use of natural resources. The policy emphasizes the need for sustainable farming practices, soil and water conservation, and the adoption of modern technologies to improve agricultural efficiency.

This act serves as the primary legislation governing agriculture in Malaysia. It provides regulations for land use, farming practices, livestock management, and agricultural inputs. The act addresses issues such as pesticide use, soil erosion prevention, and the protection of water resources. It also promotes the adoption of sustainable farming methods to minimize environmental impacts.

Agricultural Act 1972

National Land and Forest Policy

The National Land and Forest Policy establishes guidelines for land use planning and forest management in Malaysia. It emphasizes the importance of maintaining ecological integrity, conserving biodiversity, and promoting sustainable land use practices. The policy encourages sustainable agriculture by promoting agroforestry, land conservation, and the protection of natural habitats.

Malaysia has developed and implemented Good Agricultural Practices guidelines for various crops, including fruits, vegetables, and palm oil. These guidelines provide standards and recommendations for sustainable farming practices, including soil management, water use efficiency, pesticide and fertilizer application, and waste management. Compliance with GAP ensures the production of safe, high-quality agricultural products while minimizing environmental impacts.

Good Agricultural Practices (GAP)

Sustainable Palm Oil Certification

Malaysia is a major producer of palm oil and has implemented the Malaysian Sustainable Palm Oil (MSPO) certification scheme. This scheme promotes sustainable practices in the palm oil industry, including responsible land use, biodiversity conservation, and social welfare. The MSPO certification ensures that palm oil production meets stringent sustainability criteria, addressing concerns related to deforestation, habitat destruction, and social issues.

The success of sustainable agriculture relies on collaboration among various stakeholders, including government agencies, farmers, NGOs, and research institutions. Malaysia encourages partnerships and engagement through platforms such as the National Agrofood Policy, agricultural extension services, and farmer field schools. These collaborations facilitate knowledge sharing, capacity building, and the development of sustainable farming practices tailored to local contexts.

Collaboration and Stakeholder Engagement

By adhering to these national policies and guidelines, the agriculture sector in Malaysia can ensure the responsible and sustainable management of agricultural resources. Compliance with these regulations is vital for the sector's long-term viability, conservation of natural resources, and the well-being of farming communities. Embracing sustainable practices and engaging stakeholders will enable the agriculture sector to contribute to global sustainability goals, such as the United Nations' Sustainable Development Goals (SDGs) and ensure a prosperous future for the sector and the nation as a whole.

1.4.4 Benefits of Green Practices

Green practices in the agriculture sector in Malaysia offer numerous benefits that contribute to improved efficiency, reduced resource consumption, and enhanced sustainability. By adopting these practices, the industry can achieve the following advantages:

Resource Conservation:
Green practices in agriculture focus on minimizing waste and optimizing resource use. For example, implementing precision agriculture techniques, such as using sensors and data analysis to optimize water and fertilizer application, can reduce resource consumption and improve crop yields.

Soil Health and Biodiversity:
Adopting regenerative agriculture practices, such as cover cropping and crop rotation, improves soil health, increases organic matter content, and enhances biodiversity. These practices promote natural pest control, reduce the need for synthetic inputs, and improve long-term agricultural productivity.

Efficient Waste Management:
Proper management of livestock waste materials, such as manure, bedding, and feed residues, through recycling and composting, reduces environmental impacts and contributes to nutrient cycling. This minimizes pollution risks and can provide valuable organic fertilizers for crop production.

Renewable Energy Generation:
Utilizing renewable energy technologies, such as solar panels or biogas digesters that convert agricultural waste into energy, reduces reliance on fossil fuels and mitigates greenhouse gas emissions. This promotes cleaner and more sustainable energy sources for agricultural operations.

Sustainable Crop and Livestock Selection:
Opting for crop varieties and livestock breeds that are well-suited to the local environment and require fewer chemical inputs or resources contributes to sustainable agriculture. This includes selecting drought-resistant crops or livestock breeds that are adapted to local conditions, reducing the need for excessive irrigation or intensive management practices.

Conservation of Water Resources:
Implementing water-saving techniques, such as drip irrigation or rainwater harvesting systems, reduces water consumption and enhances water use efficiency in agriculture. This ensures the sustainable use of water resources and minimizes the strain on water supplies.

By embracing these green practices, the agriculture sector in Malaysia can enhance environmental sustainability, conserve natural resources, promote biodiversity, and contribute to the achievement of national and global sustainability goals.

Benefits of Green Practices Towards the Agriculture Sector

Environmental Protection

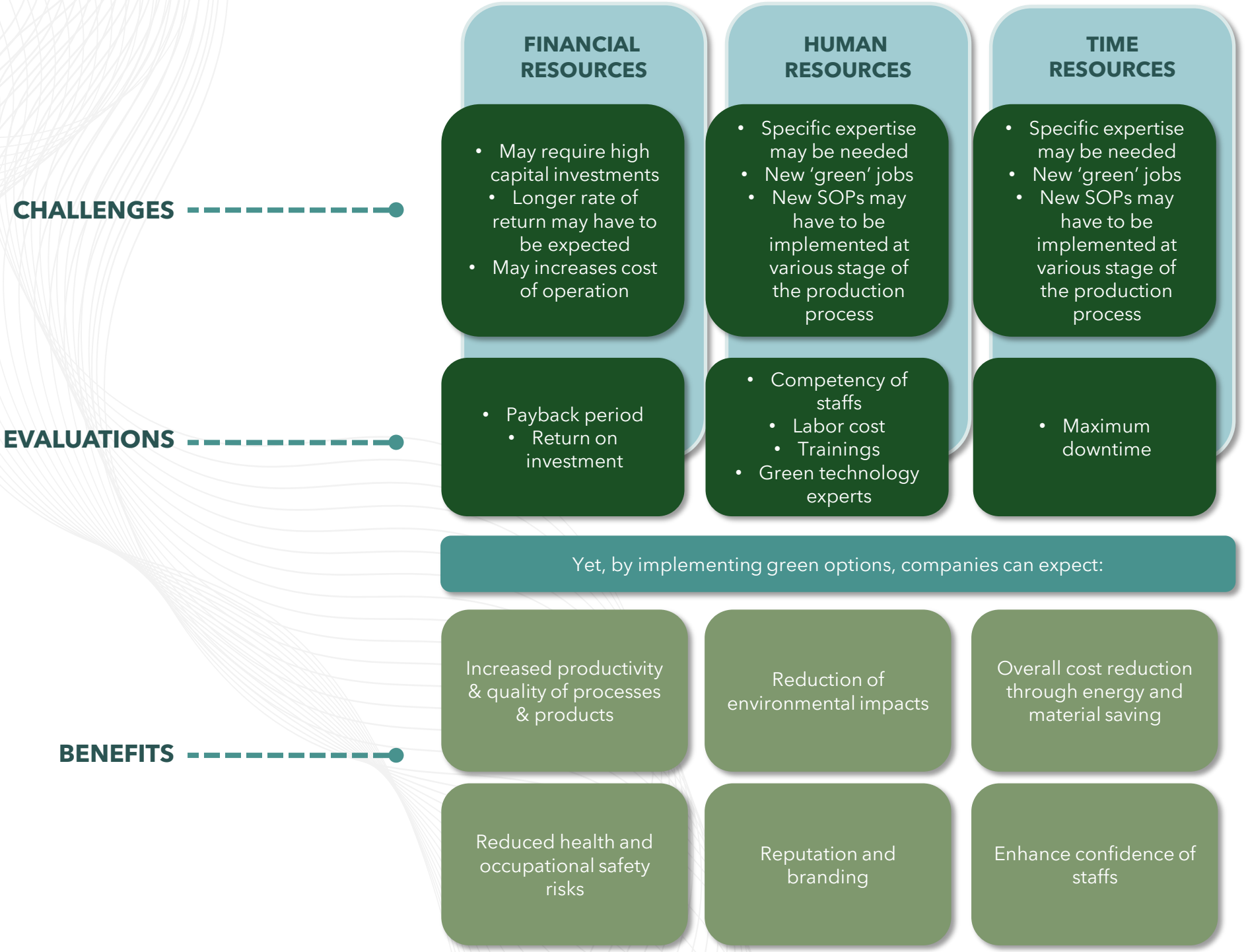
- Reduce erosion and natural resource degradation
- Improve air and water quality
- Increase biodiversity
- Decrease carbon emission

Public Health Improvement

Farmers can produce safer and healthier food for consumers and surrounding communities by opting out of hazardous pesticides

Socio-economic Wellbeing

- Provide decent income, jobs, goods and services
- Boost rural communities


FINANCIAL RESOURCES
HUMAN RESOURCES
TIME RESOURCES
CHALLENGES
• May require high capital investments
• Longer rate of return may have to be expected
• May increases cost of operation
• Specific expertise may be needed
• New 'green' jobs
• New SOPs may have to be implemented at various stage of the production process
• Specific expertise may be needed
• New 'green' jobs
• New SOPs may have to be implemented at various stage of the production process
EVALUATIONS
• Payback period
• Return on investment
• Competency of staffs
• Labor cost
• Trainings
• Green technology experts
• Maximum downtime
Yet, by implementing green options, companies can expect:
BENEFITS
Increased productivity & quality of processes & products
Reduction of environmental impacts
Overall cost reduction through energy and material saving
Reduced health and occupational safety risks
Reputation and branding
Enhance confidence of staffs

1.5 OUTCOME FROM GREEN PRACTICES

In order to determined level of GP implemented in an organisation, the initiatives related to GP shall be assessed according to the method described in Chapter 2 in the guideline and results from the assessment shall be translated into the following Star-Rating System:

1-Star	• Comply to all regulatory requirements • Demonstrate leadership in developing systematic environmental reporting practical		60% - 70%
2-Star	• Exhibit characteristics of being resource efficient • Demonstrating positive impacts from green practices • Incorporate and implement continuous quality improvement initiatives throughout business operations		71% - 80%
3-Star	• Demonstrate integration of governance framework related to sustainability and circular economy • Demonstrate capacity in contributing towards achieving national decarbonization targets • Demonstrate leadership in developing, expanding and applying new tech related to green practices		81% - 100%

CHAPTER 2 : ASSESSMENT

2.1 ABOUT THE ASSESSMENT OF GREEN PRACTICES

In the agriculture sector, green practices are essential for promoting sustainability, minimizing environmental impacts, and ensuring the long-term viability of farming operations. These practices encompass various aspects of agricultural production and management, with the goal of achieving responsible resource usage and environmental stewardship. Examples of green practices in the agriculture sector include:

Sustainable Crop Management
Implementing agroecological approaches, such as organic farming, crop rotation, and integrated pest management, reduces reliance on synthetic inputs, minimizes soil erosion, enhances biodiversity, and promotes soil health.

Efficient Water Management
Employing precision irrigation systems, water-saving techniques, and proper drainage systems helps conserve water, optimize water usage, and protect water resources from pollution and depletion.

Conservation Tillage
Adopting conservation tillage methods, such as no-till or reduced tillage, minimizes soil disturbance, improves soil structure, enhances water retention, and reduces greenhouse gas emissions.

Renewable Energy Adoption:
Integrating renewable energy sources, such as solar panels or biogas digesters, into farm operations reduces reliance on fossil fuels, decreases greenhouse gas emissions, and promotes a clean energy transition.

Nutrient Management
Implementing proper nutrient management practices, including balanced fertilizer application, precision nutrient timing, and use of organic amendments, ensures optimal nutrient utilization, minimizes nutrient runoff, and prevents water pollution.

Wildlife Conservation
Protecting and restoring natural habitats on farmland, creating wildlife corridors, and implementing biodiversity-friendly practices, such as planting native vegetation and providing nesting sites, promote ecological balance and support beneficial wildlife species.

By embracing these green practices, the agriculture sector can contribute to sustainable land use, protect natural resources, mitigate climate change impacts, and ensure the long-term productivity and resilience of farming operations. It also aligns with global sustainability goals, promotes environmental responsibility, and fosters a more sustainable future for agriculture.

2.2 GUIDELINE IMPLEMENTATION

To successfully integrate green practices into existing operations and processes, manufacturers in the agriculture sector are recommended to follow the following three steps:

Stage 1: Assessment

Understanding the Assessment Requirements:

Familiarize yourself with the assessment criteria outlined in the Green Practices Data Collection Form (Appendix 2) for the six indicators described in Section 2.3. For the agriculture sector, these indicators may also cover sustainable farming methods, resource conservation, waste management, community engagement, traceability, and responsible land use. Refer to the Indicator Instrument Factsheet (Appendix 3) for detailed information on each indicator, including goals, targets, terminologies, data sources, and collection methods specific to the agriculture sector.

Gathering Relevant Documents:

Collect the necessary documents and records as evidence of green practices implementation in the agriculture sector. These may include soil management plans, water usage records, waste management reports, community engagement activities, traceability documentation, and certifications such as organic or fair-trade certifications. These documents serve as proof of compliance with sustainable farming practices.

Conducting the Assessment:

Evaluate green practices according to the criteria established for each sub-indicator specific to the agriculture sector. Present the relevant documents as evidence of implementation during the assessment process. Assign scores based on the criteria and calculate the overall mark for each indicator by multiplying the sum of sub-indicator scores with their assigned weightage. The weightage reflects the applicability and importance of the indicator to the agriculture sector. The total score can be translated into a rating system, such as a star rating or a certification label, to communicate the level of sustainability achieved.

Stage 2: Set Targets for Improvement

Defining Clear Objectives:

Based on the assessment conducted in Stage 1, establish clear objectives that describe the desired outcomes of implementing green practices in the agriculture sector. These objectives may include enhancing soil health, conserving water resources, reducing waste generation, promoting biodiversity, and improving community livelihoods. Identify areas of improvement required to achieve the objectives based on the assessment results and stakeholder input.

Setting Realistic and Attainable Targets:

Align targets for each sub-indicator with the goals and targets outlined in the Indicator Instrument Factsheet and the scoring criteria in the Green Practices Data Collection Form specific to the agriculture sector. Assign deadlines or timelines to each target to ensure progress can be measured effectively. These targets may include reducing water usage by a certain percentage, implementing organic farming practices, or adopting regenerative agricultural techniques.

Stage 3: Implement Green Practices

Formulating an Action Plan:

Develop a detailed action plan that outlines the necessary steps and timelines for implementing green practices in the agriculture sector. Refer to the examples provided in Section 2.3 for guidance. Break down the goals into smaller, manageable tasks and assign responsibilities to individuals or teams. Include milestones and performance indicators to track progress effectively. Allocate resources, such as budgets and personnel, to support the implementation efforts, such as investing in sustainable irrigation systems, adopting agroecological practices, or supporting community-based agriculture initiatives.

Engaging Farmers and Stakeholders:

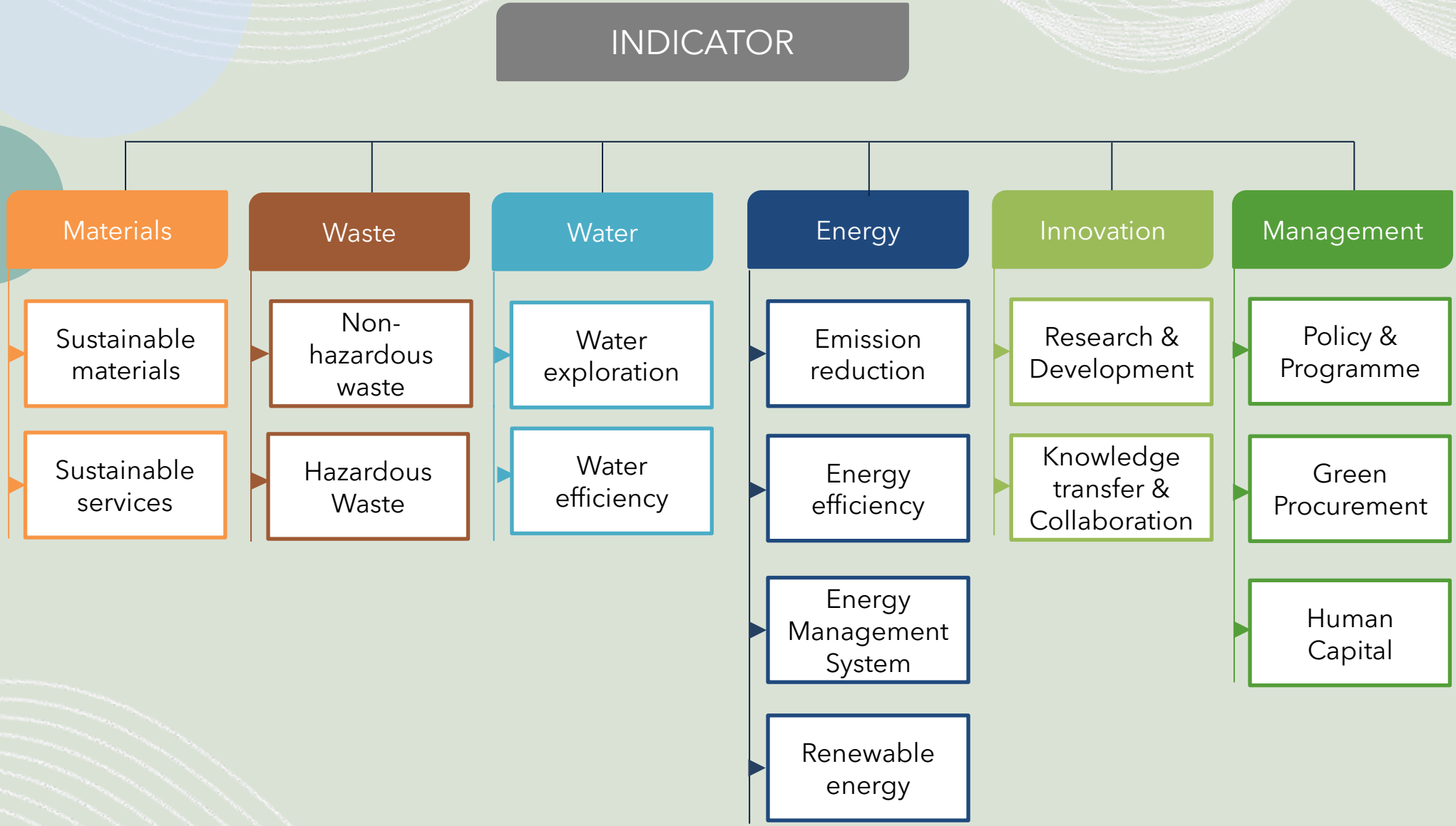
Foster engagement and collaboration with farmers, local communities, and other stakeholders in the agriculture sector to drive successful implementation of green practices. Raise awareness about the importance of sustainability in farming practices and provide training and education on sustainable agricultural techniques. Encourage farmers to contribute ideas and suggestions for improving sustainability efforts, such as implementing organic fertilization methods or participating in land restoration projects. Recognize and reward environmentally conscious behaviors and achievements to cultivate a culture of sustainability within the agriculture sector.

Collaborating with Suppliers and Buyers:

Engage with suppliers, buyers, and food distributors to promote sustainable practices throughout the agriculture supply chain. Encourage them to source from farms that follow responsible farming practices and prioritize suppliers with strong sustainability credentials, such as organic or fair-trade certifications. Collaborate on initiatives such as sharing best practices, supporting traceability systems, and promoting consumer education on sustainable food choices.

Measuring, Evaluating, and Improving:

Establish a system for measuring and evaluating the effectiveness of green practices in the agriculture sector. Monitor key performance indicators (KPIs) specific to sustainable farming, such as soil organic matter content, water use efficiency, waste diversion rates, and farmer satisfaction surveys. Regularly review and analyze data to identify areas for improvement and track progress towards sustainability goals. Use this information to refine strategies and adjust implementation plans as needed, ensuring continuous improvement in the agriculture sector's green practices.


INDICATOR
Materials
Sustainable materials
Sustainable services
Waste
Non-hazardous waste
Hazardous Waste
Water
Water exploration
Water efficiency
Energy
Emission reduction
Energy efficiency
Energy Management System
Renewable energy
Innovation
Research & Development
Knowledge transfer & Collaboration
Management
Policy & Programme
Green Procurement
Human Capital

2.3 INDICATORS

Indicators are crucial for evaluating and comparing the performance of industries in adopting green practices. These indicators provide a standardized framework for assessing the environmental sustainability efforts across various sectors. In order to ensure a comprehensive and meaningful evaluation, a set of six indicators and sixteen sub-indicators have been identified based on three key requirements: applicability, measurability, and representativeness.

The selected indicators and sub-indicators were carefully chosen to capture the key aspects of green practices and their impact on sustainability. Applicability ensures that the indicators are relevant and applicable to a wide range of industries, allowing for consistent evaluation across different sectors. Measurability ensures that the indicators can be quantified or assessed using objective criteria, enabling meaningful comparisons between industries. Representativeness ensures that the indicators encompass a comprehensive set of factors that reflect the overall performance of green practices.

By utilizing these indicators, stakeholders can effectively gauge the extent to which industries are implementing green practices and contributing to sustainable development. The indicators provide a structured approach to measure and monitor progress in key areas such as resource conservation, emissions reduction, waste management, and sustainable operations.

These indicators serve as a valuable tool for decision-making, enabling industries to identify areas for improvement, set targets, and track their performance over time. Furthermore, they facilitate benchmarking exercises, allowing industries to compare their performance against sector peers and best practices.

The use of indicators promotes transparency and accountability, enabling stakeholders to assess the environmental performance of industries and make informed choices. It also provides an opportunity for recognition and incentives, as industries that demonstrate strong performance in adopting green practices can be acknowledged and rewarded for their efforts.

MATERIALS

2.3.1 Materials

The Material Indicator for Green Practices focuses on the **responsible and sustainable management of materials utilized across industries.** Industries use various types of materials in their processes, with some relying exclusively on virgin materials while others incorporate recycled materials. The efficient consumption of materials is essential for the long-term survival and success of industries, as it directly impacts resource availability and overall material efficiency.

The Material Indicator within the Green Practices framework encompasses two sub-indicators:

Sustainable Materials:

This sub-indicator assesses the demonstration of purchasing and utilization practices related to sustainable materials within industries. It requires industries to showcase a clear direction and vision towards sustainable material utilization, along with the implementation of self-regulation measures that align with sustainability goals. Additionally, recognition or certification from reputable third-party entities or certification bodies further validates the commitment to sustainable material practices.

Sustainable Services:

This sub-indicator evaluates the purchase and utilization of sustainable services within industry operations. It encourages industries to demonstrate a specific direction and vision regarding the use of sustainable services. The implementation of self-regulation measures that align with sustainability goals should be evident, and recognition or certification from reputable third-party entities or certification bodies can further validate the adherence to sustainable service practices.

By addressing the Material Indicator and its sub-indicators, industries can enhance their material management practices, promoting the use of sustainable materials and services. This not only supports environmental conservation and resource preservation but also aligns with industry-wide sustainability goals. It demonstrates a commitment to responsible material utilization and contributes to the long-term viability and success of industries across diverse sectors.

The scope for Material in Agriculture sector includes two (2) sub-indicators; Sustainable Materials and Sustainable Services.

MATERIAL			
Sub-indicator	**Requirement**	**Objective Evidence for Assessment**	**Example Green Practices**
Sustainable Materials	Demonstration on purchase or use of sustainable materials	• Company sustainability report • Organisation sustainability policies • Sustainability monitoring activity • Certification or recognition of sustainable material	• Reduce, reuse, recycle resources and materials in operations. • Prioritize certified and regionally available resources. • Encourage the use of local resources to minimize environmental impacts from transportation. • Increase the usage of organic matter for soil nutrients, microbial activity, and buffering properties.
Sustainable services	Demonstration on purchase or use of sustainable services	• Company sustainability report • Organisation sustainability policies • Sustainability monitoring activity • Certification or recognition of sustainable services	• Integrate IoT services for smart farming management using robots, drones, sensors, and computer imaging. • Utilize sustainable supply chain services for efficient movement of goods.

WASTE

2.3.2 WASTE

Waste refers to any material that is **discarded or released** by the generator or holder, posing various environmental risks based on its chemical composition and physical state. In green practices, the focus is on prevention or reduction of waste at its source, employing strategies and approaches distinct from end-of-pipe treatment.

The definition of industrial waste, as stated in **Section 2 of the Environmental Quality Act 1974 (Act 127) and Regulations,** encompasses matter prescribed as scheduled wastes or any solid, semi-solid, liquid, gas, or vapor emitted, discharged, or deposited in the environment in quantities, compositions, or manners that cause pollution.

Implementing an effective waste management plan necessitates strategic measures that encompass all stages of waste management. Manufacturers should conduct a thorough analysis of the current collection, handling, treatment, and disposal processes to identify existing or potential issues. Based on this assessment, specific goals and action plans can be developed and implemented, with regular monitoring and review to ensure progress.

The waste management plan should also prioritize the enhancement of stakeholders' knowledge through the effective dissemination of technical information and research findings concerning the environmental impacts of the waste generated. By promoting awareness and understanding, stakeholders can actively participate in waste reduction and proper waste management practices.

To guide waste management efforts, the following goals and targets have been established:

- By **2030**, achieve 100% recycling of sludge.
- By **2030**, recycle 33% of treated effluent.
- By **2025**, achieve a 40% recycling rate of solid waste from total non-hazardous waste generated.
- By **2030**, achieve a 50% recycling rate of hazardous waste from the total hazardous waste generated.
- By **2025**, completely eliminate waste disposal in landfills.
- By **2030**, establish 180 biogas capture facilities.

These goals provide clear targets for waste reduction, recycling, and resource recovery, contributing to the overall objective of sustainable waste management. By striving to meet these targets, manufacturers can significantly reduce their environmental impact, conserve resources, and promote a circular economy approach in the handling of waste.

The scope for Waste in Agriculture sector includes two (2) sub-indicators;

Non-hazardous Solid Waste **Hazardous Waste**

WASTE			
Sub-indicator	**Requirement**	**Objective Evidence for Assessment**	**Example Green Practices**
Non-hazardous waste	• Targeted percentage of non-hazardous waste recycled achieved by the business • Number of biogas capture facility within the business	• Records on monitoring non-hazardous waste generated and recycled in the business • Number of biogas facility	• Re-use, recycle, and repurpose crop residue for energy, fertilizers, food, animal feed, bioplastics, and more. • Re-use, recycle, and repurpose non-hazardous waste like bags, packaging, containers, pallets, tires, and glass items. • Implement proper storage and transportation facilities to prevent crop spoilage.
Hazardous waste	• Targeted percentage of hazardous waste recycled achieved by the business	• Records on monitoring hazardous waste generated and recycled in the business	• Manage waste products according to relevant acts such as Environmental Quality Act 1974 and Poison Act 1952. • Avoid overbuying chemicals and purchase the right amount needed. • Reduce the use of chemical-based pesticides and opt for organic alternatives. • Recycle hazardous waste with proper permissions from DOE. • Re-use or repurpose contaminated protective gear and clothing.

WATER

2.3.3 WATER

Water scarcity and quality issues are prevalent despite water covering over two-thirds of the Earth's surface and being renewable on a global scale. Local shortages and degradation of water bodies occur frequently, posing significant challenges. With increasing demand, the withdrawal of water for industrial processes without returning it to the same water source in its original quantity and quality can lead to severe depletion of rivers, lakes, and groundwater tables.

Certain industrial processes and products necessitate the use of water, which may vary in quality requirements. While water may not be directly consumed in the production process, it is often indirectly utilized for cooling, heating, or washing purposes. **Enhancing the rate of recirculation and minimizing evaporation can substantially reduce the overall water consumption, lessening the reliance on municipal water supplies, groundwater sources, or surface waters**. It is recommended that facilities accurately measure and monitor the amount of water being recycled or recirculated within their operations.

By prioritizing water conservation measures, industries can mitigate the impact on local water resources and contribute to sustainable water management. **Implementing efficient water usage practices, such as optimizing recirculation systems, reducing water losses, and implementing technologies that minimize water requirements, can help decrease water consumption and preserve water resources**. Additionally, adopting water management strategies that prioritize water reuse and recycling can further contribute to sustainable water practices.

Considering the finite nature of freshwater resources, industries play a crucial role in promoting responsible water stewardship. By implementing measures to reduce water demand, enhance recycling and recirculation, and monitor water usage, industries can contribute to the conservation and sustainable management of this vital resource, ensuring its availability for future generations.

The scope for Water in Agriculture sector includes two (2) sub-indicators; Water Efficiency and Water Exploration

WATER			
Sub-indicator	**Requirement**	**Objective Evidence for Assessment**	**Example Green Practices**
Water Exploration	Targeted percentage of alternative water used by the business	Records on monitoring city water and alternative water use	• Install rainwater harvesting system for irrigation. • Utilize alternative water sources for irrigation purposes.
Water Efficiency	Targeted percentage of water consumption reduction achieved by the business	Records on monitoring city water use	• Implement fertigation farming for controlled water uptake. • Adopt efficient water usage techniques. • Utilize automated micro irrigation and tube well for water efficiency.

ENERGY

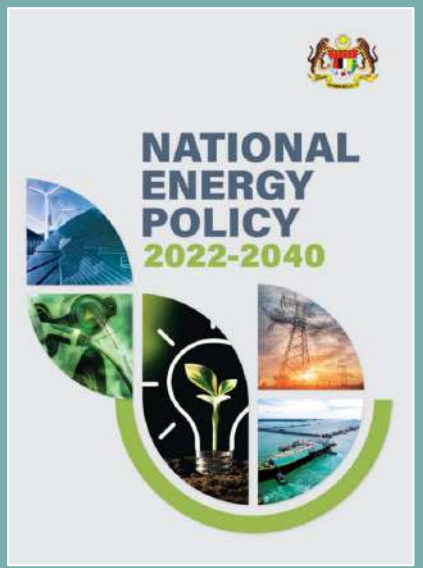
2.3.4 ENERGY

Energy consumption plays a pivotal role in achieving decarbonization and driving green practices in industries. Globally, electricity and power generation continue to be major contributors to greenhouse gas (GHG) emissions. Therefore, focusing on energy efficiency and transitioning to low-carbon energy sources is crucial for sustainable development.

Renewable energy sources:

- Solar
- Wind
- Hydro
- Geothermal

The adoption of electrification is gaining momentum in numerous decarbonization efforts. By shifting from traditional fossil fuel-powered systems to electric alternatives, industries can significantly reduce their carbon footprint. Electric vehicles (EVs), for instance, offer a greener transportation solution compared to internal combustion engine (ICE) vehicles. Furthermore, **integrating renewable energy sources** such as solar, wind, hydro, and geothermal power into electricity generation is essential for reducing reliance on fossil fuels and achieving a cleaner energy mix.

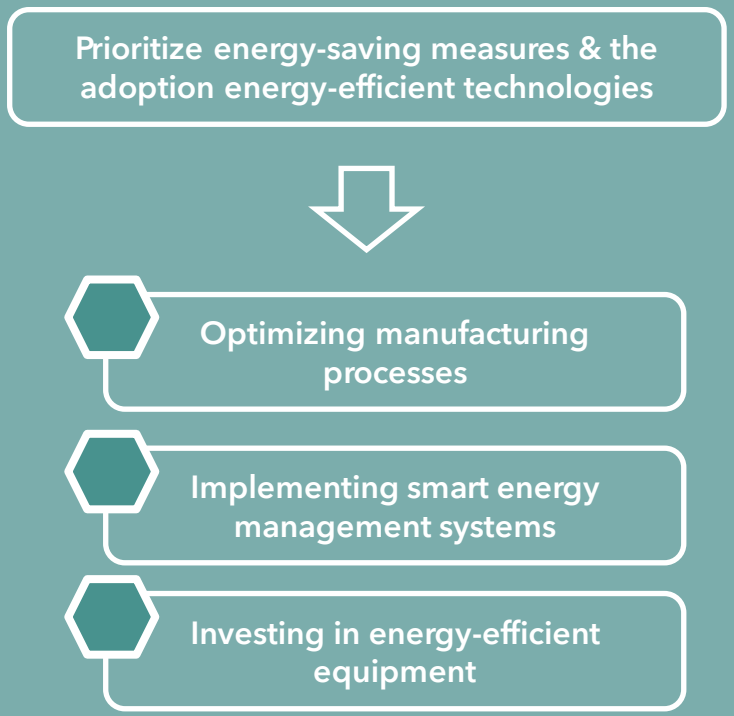


In Malaysia, the planned **National Energy Policy** includes ambitious targets to increase the generation of renewable energy from sources like solar, biomass, and biogas. This renewable energy capacity expansion aligns with the nation's commitment to reducing carbon intensity and achieving sustainable energy practices.

To drive decarbonization and achieve long-term environmental sustainability, industries must prioritize energy-saving measures and the adoption of energy-efficient technologies. This includes **optimizing manufacturing processes, implementing smart energy management systems, and investing in energy-efficient equipment.** Additionally, exploring innovative solutions like energy recovery systems, waste heat utilization, and energy conservation initiatives can contribute to significant energy savings and emissions reduction.

By setting clear goals and targets, such as those outlined in the **Nationally Determined Contribution (NDC),** industries can actively contribute to the national and global efforts of reducing carbon intensity. Meeting the NDC target of carbon intensity reduction by a certain percentage compared to a baseline year demonstrates the commitment to sustainable practices and aligns with the broader goals of the Paris Agreement.

Energy plays a critical role in decarbonization and achieving green practices in industries. By embracing electrification, adopting renewable energy sources, and implementing energy-saving measures, industries can drive the transition to a low-carbon economy, reduce GHG emissions, and contribute to a sustainable and resilient future.



The scope for Water in Agriculture sector includes two (2) sub-indicators; Water Efficiency and Water Exploration

ENERGY			
Sub-indicator	**Requirement**	**Objective Evidence for Assessment**	**Example Green Practices**
Energy Efficiency	Targeted percentage of electricity and fuel consumption reduction achieved by the business	• Meter energy usage readings • Bills of quantities for fuels • COA for fuels	• Adopt energy-efficient lighting and equipment for consistent crop quality in greenhouse fertigation farming.
Renewable Energy	Targeted percentage of renewable energy used by the business	• Meter energy usage readings • Bills of quantities for fuels • COA for fuels	• Install solar panels to reduce electricity consumption. • Utilize biomass waste as an alternative energy source within the plantation. • Use biofuels or electric vehicles to reduce emissions from transportation within the plantation.
Energy Management System	Demonstration of an Energy Management System setup within the business	Records supporting the setup, operation, and performance achieved by the Energy Management System	• Develop systematic energy management procedures to identify and adopt energy-saving technologies.
Emission Reduction	Targeted percentage of emissions reduction achieved by the business	GHG Inventory reports	• Utilize biofuels or electric vehicles for transportation to reduce emissions. • Implement greenhouse gas inventory for fuel use in the plantation.

INNOVATION

2.3.5 INNOVATION

Innovation plays a crucial role in driving green practices within the industry as manufacturers strive to adapt their business processes and activities to meet the demands of a competitive global market. By prioritizing innovation, businesses can develop marketable, viable, and effective products that align with sustainability objectives.

One of the key indicators of innovation in green practices is research and development (R&D) efforts focused on green technology. Manufacturers invest in R&D to explore and develop innovative solutions that improve environmental performance and reduce the ecological footprint of their operations. This includes **advancements in energy-efficient processes, waste reduction techniques, sustainable materials, and eco-friendly manufacturing methods.**

Additionally, innovation in green practices encompasses the product development phase, which involves incorporating green product design principles. Manufacturers aim to create products that have minimal environmental impact throughout their lifecycle, from sourcing and production to use and disposal. This involves considering factors such as **energy efficiency, recyclability, reduced resource consumption, and the use of environmentally friendly materials.**

Setting goals and targets for innovation in green practices can drive organizational progress. Establishing robust research and development processes, output, and policies enables organizations to streamline their innovation efforts and focus on sustainable solutions. Increasing investment and incentives to support innovation in green practices further promotes the commercialization of environmentally friendly products. This can involve **securing intellectual property rights, receiving awards and recognition, and fostering a culture of innovation within the organization.**

Strategic partnerships, collaborations, joint ventures, and knowledge transfer programs are also vital for fostering innovation in green practices. By collaborating with other organizations, sharing knowledge and expertise, and leveraging collective resources, manufacturers can accelerate the development and implementation of sustainable solutions. These partnerships can lead to the commercialization of innovative green products, technologies, and practices.

In conclusion, innovation is a critical measure of green practices in the industry. By prioritizing research and development efforts, incorporating green product design principles, and establishing strategic partnerships, manufacturers can drive the adoption of sustainable solutions, reduce their environmental impact, and contribute to a greener and more sustainable future.

The scope for Innovation in Agriculture sector includes two (2) sub-indicators; Knowledge Transfer and Collaboration and Research and Development (R&D).

Sub-indicator	Requirement	Objective Evidence for Assessment	Example Green Practices
Knowledge Transfer and Collaboration	Demonstration of knowledge transfer and strategic collaboration occurring in the business	Records and documentations such as MOUs, MOAs, IPs, etc.	• Engage national and international field experts as mentors for a mentoring system. • Create platforms for knowledge sharing through forums, seminars, workshops, and discussions.
Research and Development (R&D)	Demonstration of R&D activities occurring in the business	Records and documentations such as organisation chart, procedures, blueprints, proposals, etc.	• Collaborate with research institutions to convert agricultural waste into value-added products. • Increase agricultural R&D through resource collaboration and grants.

MANAGEMENT

2.3.6 MANAGEMENT

Management plays a crucial role in driving and implementing green practices within the industry. The administration of an organization, company, or business is responsible for creating forward-thinking policies and strategies that support the development of a more sustainable form of business. By embracing environmentally responsible practices, businesses can minimize the negative impacts of their manufacturing processes on the environment and contribute to a greener future.

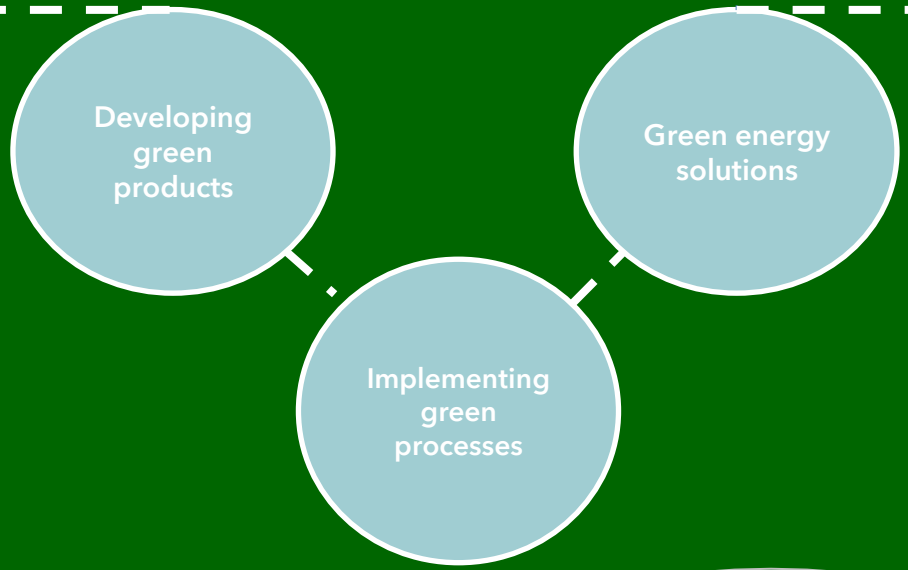
Going beyond compliance with legal requirements, being environmentally responsible means investing in human capital and adopting management practices that actively contribute to the industry's green initiatives. This involves fostering a culture of sustainability within the organization, where all stakeholders, including employees and customers, are engaged in reducing environmental impacts. Effective management practices focus on **integrating sustainable principles into decision-making processes, resource allocation, and operational strategies.**

The global shift towards a green economy, driven by ESG frameworks and investment systems, is transforming the landscape of job creation, skills development, and job quality. Businesses that prioritize green practices and demonstrate commitment to environmental sustainability are better positioned to thrive in this evolving economic landscape. By proactively adopting green manufacturing principles, manufacturers can align their initiatives with the goal of achieving a greener future.

Effective management practices:

- **Integrating sustainable principles**
- **Decision-making processes**
- **Resource allocation**
- **Operational strategies**

Manufacturers have the flexibility to choose and prioritize their initiatives within the realm of green manufacturing based on their level of readiness and business objectives. This includes focusing on **green energy solutions, developing green products, and implementing green processes.** By incorporating renewable energy sources, reducing carbon emissions, and optimizing resource usage, manufacturers can enhance their environmental performance while improving operational efficiency.



The government has developed various initiatives to support and propel the adoption of green practices in the industry. Programs such as the **MyHijau SME & Entrepreneur Development Program, Energy Audit Grant for the industrial sector, Energy Management Gold Standard (EMGS), Enhanced Time of Use tariff (EToU), and ISO14001 certification** provide valuable resources and incentives for businesses to embrace sustainability. These initiatives encourage manufacturers to actively engage in green practices, implement energy-saving measures, adopt environmentally friendly technologies, and strive for continuous improvement in their environmental performance.

In conclusion, effective management practices are essential for driving green practices within the industry. By adopting forward-thinking policies, fostering a culture of sustainability, and embracing green initiatives, businesses can minimize their environmental footprint, meet the demands of a changing economic landscape, and contribute to a more sustainable future.

The scope for Management in Agriculture sector includes three (3) sub-indicators; Green Procurement, Policy & Programme and Human Capital.

Sub-indicator	Requirement	Objective Evidence for Assessment	Example Green Practices
Green Procurement	Demonstration of green procurement practices occurring in the business	Records and documentations such as policies and standards, agreements, purchase records, etc.	• Promote sustainable options for purchasing organic fertilizers and pesticides. • Utilize Life Cycle Costing (LCC) for sustainable product selection in farm operations.
Policy and Programme	Demonstration of policies and programs practices occurring in the business that support Green Practices	Records and documentations such as MOUs, MOAs, IPs, etc.	• Implement Good Agricultural Practice policy to improve yield and reduce food loss. • Integrate waste management and wastewater management policies into farm operations. • Establish site-specific agricultural Waste Management Plan with regular monitoring and improvement. • Develop a comprehensive plan for circular economy in agriculture waste management. • Promote Life Cycle Analysis (LCA) in Extended Producer Responsibility along the supply chain.

Sub-indicator	Requirement	Objective Evidence for Assessment	Example Green Practices
Policy and Programme			• Adopt cost-effective water, nutrient, pest, and disease management through Good Agricultural Practices (GAP). • Facilitate collaboration for green technology transfer and best practices among stakeholders. • Preserve high biodiversity areas for ecosystem services.
Human Capital	Demonstration of a human capital development program in the business that support Green Practices	Records and documentations such as policies and standards, records of training, etc.	• Conduct awareness programs and training for staff on adopting green practices. • Establish health and safety policies for staff handling hazardous chemicals. • Implement policy instruments for social well-being of workers based on Act 446.

CHAPTER 3 : IMPLEMENTATION OF GREEN PRACTICES

3.1 INDICATOR ALIGNMENT

In this section, a framework is introduced to help industries in recognizing the various certificates, recognitions and benefits that exists within Malaysia. Using this framework, organization can refer to the specific guidelines and best practices that support the application of green practices in the industry. Organization can also refer to the indicators that align with the various existing initiatives.

Existing Initiatives	Agency/ Institutions	Description	Criteria for Assessment	Green Practices indicator	Benefits	Reference (Scan for link)
Green Investment Tax Allowance (GTA)	MIDA	Incentive for companies that undertake Green Technology projects involving capital investments	Renewable Energy (RE); Energy Efficient (EE); Green Building; Green Data Centre; Integrated Waste Management		Tax allowance	
Green Income Tax Exemptions (GITE)	MIDA	Incentive for companies that carry out services which support the implementation and operation of Green Technology projects.	Renewable Energy (RE); Energy Efficient (EE); Green Building; Green Data Centre; Green Certification and Verification; Green Township; Electrical Vehicle		Tax exemptions	
MyHIJAU Mark	MGTC	A government initiative to promote the sourcing and purchasing of green products and services in Malaysia	Existing Green Label Certification, or Performance Standard Compliance report from an independent certification body that meets the minimum standards recognized by MGTC		Eligibility for Government Green Procurement (GGP), Green Private Purchasing (GPP), and may be eligible for GITA or GITE	
Eco-labelling Scheme	SIRIM	This labelling gives eco-friendly products a competitive advantage over similar products	Compliance with products standards or specifications and the criteria, as well as relevant provisions in the Environmental Quality Act		Boost acceptance of products in international 'green markets' that favour green products with price premium	
Anugerah Industri Hijau	DOE	An initiative by the DOE to provide special recognition and encouragement to SMEs for the efforts of implementing green industry practices	Green activities and initiatives on water usage, electricity, fuel, raw materials, packaging materials, waste production, product lost, raw materials lost and wastewater production		Improved reputation and branding	

Existing Initiatives	Agency/ Institutions	Description	Criteria for Assessment	Green Practices indicator	Benefits	Reference (Scan for link)
National Energy Awards	MGTC	A platform to provide recognition and rewards to Malaysia's industry leaders in the growing green technology related products, services and energy services sectors for adopting and implementing sustainable energy practices	Renewable Energy (RE); Energy Efficient (EE);		International recognition and eligible to represent Malaysia at the annual ASEAN Energy Awards, Southeast Asia's highest energy awards	
Prime Minister's Hibiscus Awards	ENSEARCH, FMM & MICCI with recognition from KASA	Provide an opportunity for public recognition of businesses and industry's environmental commitment, management and performance	Leadership; Priority and commitment; Managing environmental issues; Training and communication; Legal and other compliance; Environmental emergencies; Employee participation; Supply chain; Environmental social programme; Environmental accounting; Eco-designs; Carbon footprint		National recognition with a Plague and Certificate of Participation, and eligibility to include award's logo for promotional activities	
National Green Technology Policy (NGTP)	KASA *previously developed under KeTTHA	This policy recognises green technology as a driver to accelerate the national economy and promote sustainable development	Energy sector; Building sector; Water and waste management sector; Transportation sector		Reduction in the rate of GHG emission	
Low Carbon Cities Framework (LCCP)	KASA	Provide framework to achieve sustainable development that will help in reducing carbon emissions by measuring the impact of development decisions in terms of carbon emissions and abatement	Urban Environment; Urban Transport; Urban Infrastructure, Building		Reduction performance will be awarded an environmental performance rating.	

Existing Initiatives	Agency/ Institutions	Description	Criteria for Assessment	Green Practices indicator	Benefits	Reference (Scan for link)
Feed-in-Tariff	SEDA	Mechanism under the Renewable Energy Policy to catalyse generation of Renewable Energy (RE) up to 30 MW in size,	Biogas; biomass; small hydropower; solar photovoltaic		Reduce CO2 emissions and secure domestic energy supply, and guarantee investment security for renewable energy investors.	
Green Electricity Tariff (GET)	KeTSA	Encourage the use and purchase on green electricity from large scale solar and hydroelectric plants along with supporting the nation aspiration in reducing the net-zero GHG emission by 2020	Residential customer (100kWh per block); Non-residential customer (100kWh per block)		Subscribes able to receive Malaysia Renewable Energy Certificate (MREC) based on international REC standards and exempted from ICPT charge	
Malaysia Electricity Supply Industry Trust Account (MESITA)	KeTSA	Funding for programs or projects that support the development of national power industry including renewable energy R&D, human resource and energy efficiency	Electricity supply		Funding for programs and projects	
Energy Management Gold Statement (EMGS)	MGTC	Certification system delivered under the ASEAN Energy Management Scheme (AEMAS) based on excellence in energy management	Energy management		Recognized as a leader in energy management	

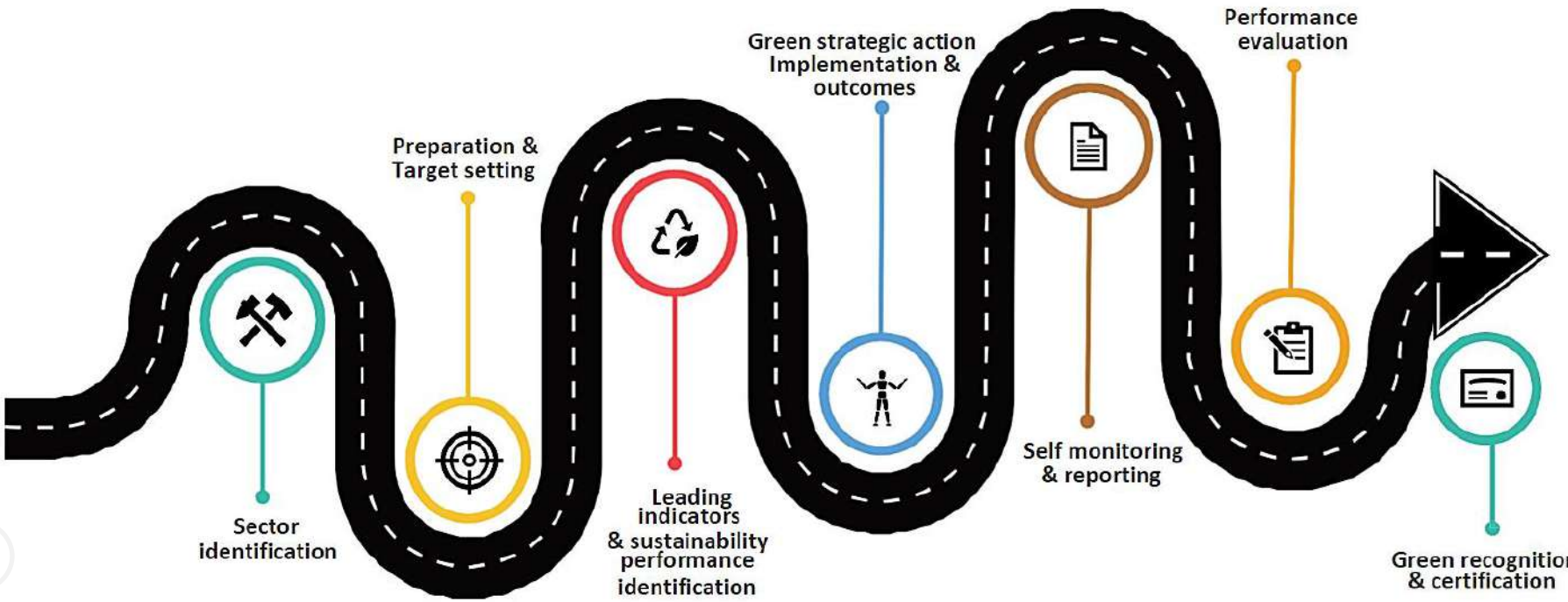
3.2 TOWARDS GREEN RECOGNITION

This guideline presents recommendations and proposed actions for the agriculture sector to implement green practices in their daily operations. It is driven by the vision of establishing a Sustainable Agriculture Certification that recognizes and rewards sustainable practices within the industry.

To support the agriculture industry in implementing green practices, a comprehensive Sustainable Agriculture Certification Roadmap has been developed. This roadmap serves as a strategic guide, assisting farmers and agricultural businesses in adopting and implementing sustainable practices within their operations. It provides a structured approach to ensure that the industry is equipped with the necessary knowledge and resources to effectively integrate green practices.

The long-term goal is to enable agricultural players who have successfully implemented green and best practices to apply for the Sustainable Agriculture Certification. This certification would serve as a formal recognition of their commitment to sustainability and environmental stewardship. As part of the proposed roadmap, agricultural players meeting the eligibility criteria for the Sustainable Agriculture Certification may also benefit from proposed financing incentives and support.

By establishing the Sustainable Agriculture Certification and associated benefits, the industry is encouraged to prioritize and embrace sustainable practices. This initiative not only acknowledges the efforts of the agriculture industry in adopting green practices but also serves as a catalyst for knowledge sharing and collaboration across the sector. Ultimately, the Sustainable Agriculture Certification aims to drive widespread adoption of sustainable practices, promote environmental protection, and contribute to the overall sustainability goals of the agriculture sector in Malaysia.



Examples of green practices and ESG factors in the agriculture sector include:

01

Sustainable Farming Methods:
Encouraging the use of organic farming practices, precision agriculture techniques, and integrated pest management to reduce reliance on chemical inputs and minimize environmental impacts.

Soil Health Management:
Implementing soil conservation measures, such as cover cropping, crop rotation, and composting, to improve soil fertility, reduce erosion, and enhance long-term agricultural productivity.

02

03

Water Conservation:
Adopting efficient irrigation systems, implementing water-saving techniques, and promoting responsible water management practices to minimize water usage and reduce the strain on water resources.

Biodiversity Conservation:
Preserving and restoring natural habitats, establishing wildlife corridors, and implementing agroforestry practices to enhance biodiversity, promote pollination, and support natural pest control.

04

05

Responsible Fertilizer and Pesticide Use:
Employing precision application techniques, using organic and slow-release fertilizers, and adopting integrated pest management strategies to minimize the environmental impact of fertilizer and pesticide use.

Community Engagement:
Collaborating with local communities, supporting farmer cooperatives, and promoting fair trade practices to enhance social and economic well-being, foster local food systems, and strengthen connections between farmers and consumers.

06

By adopting these green practices, the agriculture sector in Malaysia can enhance environmental sustainability, protect natural resources, promote biodiversity, support rural communities, and contribute to the achievement of national and global sustainability goals.

3.3 WAY FORWARD

To remain competitive and contribute to environmental protection in today's rapidly evolving global markets, businesses must proactively stay ahead of emerging trends and market requirements. In the manufacturing sector, adopting circular business models, embracing ESG disclosure, transitioning to renewable energy sources, decarbonization efforts, and exploring green financing and investment opportunities are critical steps forward.

The integration of green practices within a business's operations is not only essential for fulfilling its environmental responsibilities but also a crucial component of the broader ESG framework. Increasingly, investors are incorporating ESG factors into their decision-making processes, recognizing the value of sustainable and responsible business practices. Bursa Malaysia, the country's stock exchange, has also introduced requirements for listed companies to disclose their ESG practices and initiatives, reinforcing the importance of ESG in the business landscape.

By incorporating ESG disclosure, companies have the opportunity to communicate their environmental initiatives, such as implementing energy-efficient operations, implementing waste reduction measures, utilizing renewable energy sources, and undertaking efforts to mitigate climate change. Effective ESG disclosure can enhance a company's reputation, attract socially conscious investors, comply with regulatory requirements, and contribute to long-term value creation.

Moving forward, it is imperative for the manufacturing sector to consider ESG factors alongside financial performance when evaluating the long-term sustainability and resilience of their businesses. This holistic approach enables businesses to assess their environmental impact, social responsibility, and governance practices, ensuring alignment with sustainable development goals, investor expectations, and Bursa Malaysia's requirements.

Embracing ESG factors and integrating green practices not only positions businesses as responsible environmental stewards but also provides them with a competitive edge in the market. By staying ahead of evolving trends and proactively addressing environmental challenges, businesses can secure their long-term viability, attract investment, comply with regulatory obligations, and contribute positively to the transition towards a sustainable and resilient economy.

Examples of recommended green practices for the agriculture sector include:

Sustainable Farming Practices :
Implementing organic farming methods, practicing crop rotation, utilizing integrated pest management, and minimizing the use of synthetic fertilizers and pesticides to reduce environmental impact and promote soil and water health.

Resource Conservation:
Adopting efficient irrigation systems, implementing water-saving techniques, employing precision agriculture methods, and optimizing fertilizer usage to minimize resource depletion and reduce carbon emissions.

Biodiversity Protection:
Preserving natural habitats, creating wildlife-friendly landscapes, promoting pollinator-friendly practices, and conserving biodiversity through agroforestry or habitat restoration initiatives.

Responsible Waste Management:
Implementing proper waste management practices, including recycling and composting, to reduce waste generation and promote a circular economy approach in the agriculture sector.

Social Responsibility:
Ensuring fair labor practices, supporting the well-being of farmers and farmworkers, promoting gender equality and diversity, and engaging with local communities to foster sustainable agricultural development and enhance social resilience.

Renewable Energy Adoption:
Transitioning to renewable energy sources, such as solar or wind power, for farm operations, including powering irrigation systems, farm equipment, and processing facilities, to reduce reliance on fossil fuels and lower carbon emissions.

By adopting these green practices and integrating ESG factors, the agriculture sector can enhance environmental sustainability, protect natural resources, promote biodiversity, support rural communities, and contribute to the achievement of national and global sustainability goals.

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CASE STUDY

CASE STUDY: AN AIR AND RAINWATER HARVESTING PLANTATION APPARATUS TO PLANT TREES IN ARID AND WATER STRESSED AREAS

The drive towards anti desertification and carbon sequestration is becoming increasingly important due to wide scale climatic shift and disastrous effects. Tree plantation has been deemed one of the promising solution to fight against unexpected climatic actions and carbon sequestration, however, the use of irrigable land for carbon sequestration would create food crisis. Therefore, it is necessary to utilize arid and/or water stressed areas for afforestation.

Growing in arid environments is still a big challenge because of high loss of soil water due to evaporation and less rains. Moreover, deep penetration of rainwater has been restricted due to soil surface characteristics which further add to already challenging weather conditions.

Utopier is proud to present it's AIPA technology which is a passive water harvesting and management system. The apparatus consists of three main components i.e., (1) base water reservoir, (2) upper box to contain hygroscopic material and (3) top glass cover. The system has been provided with water collection channels to harness water from air. All the components have been so designed to make a hollow tube-like structure to plant young trees.

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In principle, the technology stems from solar still effect, moisture absorbing materials and siphon action. In brief, the hygroscopic material absorbs moisture from air, the direct sunlight evaporates the water from the hygroscopic material to regenerate the material. The vapors when come into contact with inclined top cover, have been converted to water droplets due to temperature difference and trickled down to water reservoir through specially designed channel. The rainwater falling on the surface have also been collected to water reservoir through another channel. Exhibit 1 represents the working principle of the technology.

The apparatus retains water in the base container and provide water drop-by-drop to tree through capillary action.

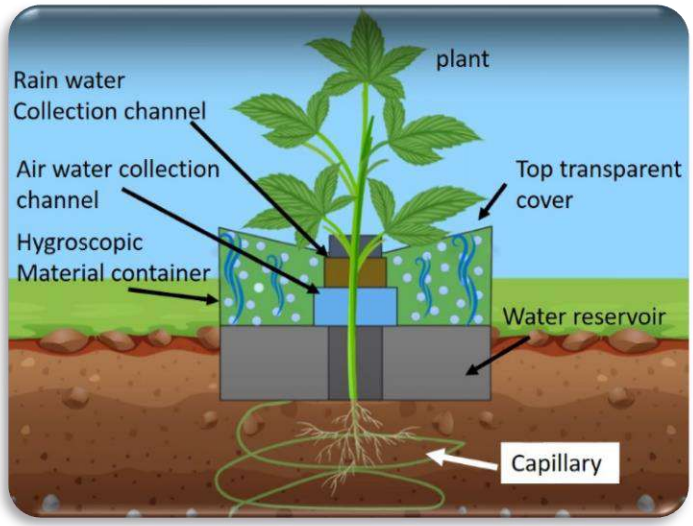

Exhibit 1: Schematic illustration of planter box

The air water harvesting ability of apparatus replenishes the water levels in the water reservoir and minimize the laborious refilling exercises.

The patented technology (being filled in USA and Malaysia) have been put to trial for a chili plant. The first prototype has been demonstrated in University of Malaya as shown in Exhibit 2. The plant survived the very hot weather of May, June and July 2023 in Kuala Lumpur (heatwave) without external irrigation means.

7 days

Enable harvesting water from thin air and rain

60 days

Moisture being captured from the air and stored in the reservoir underneath

120 days

Subject to the moisture content and humidity level, a channel can be built to prevent overflowing and drain excess water for use with other purposes

Exhibit 2: photographic illustration of air water harvesting

Exhibit 3: Rooftop plantation of miracle fruit tree

What Utopia offer

A cost-effective plant-and-forget type of apparatus with virtually limitless plantation options. The planter box can be made in multiple designs, sizes and colors. Utopia is the only product in the world providing this technology which enables you to plant your trees anywhere without worrying about watering and irrigation. The system provides you the freedom to plant anywhere, even in deserts. The technology will further provide free water security and improve the plantation-water nexus.

Contact for more information:
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CASE STUDY: IMPLEMENTATION OF GREEN PRACTICES IN THE INDUSTRY

There are many ways of implementing green technology within the operations, resources, or processes of an industry. The decision to go 'green' may come from requirement to reduce carbon footprint, utilization of green resources, compliance with regulations, or contribution to society and the environment, but it is a decision that may well lead to increased revenues, global recognition, improved performance of operations and higher productivity.

FGV Palm Industries Sdn Bhd

FGV Holdings is a major palm plantation company that owns 28 biogas power plants and had developed a commercial-scale palm-based natural gas plant in Malaysia. It supports the Malaysian sustainable agenda through initiatives in green energy and resources.

Core Business

Manufacturer of vegetable oils, cake and meal

Achievement

Won the National Energy Awards (NEA) three years consecutively (2018-2020) under the Renewable Energy Cogeneration Category

Approach

Utilizing waste-to-energy technologies from the palm waste. Empty fruit bunches (EFB) were used to produce steam and electricity at FGVPI's Sahabat Biomas Cogeneration Plant in Lahad Datu, Sabah

Added value

The complex generated 7.2 megawatt (MW) of electricity equivalent to powering 4,000 houses. The rural mini grid was supported through initiative, enabling more than 1,500 homes to enjoy clean renewable electricity with lower cost of energy around16 metric tonnes (MT) of steam per hour was also generated for the refinery operations.

Revenue

This activity generated approximately RM12 million per year for the company

Benefits

Increased revenue, energy savings and reduced carbon footprint

28,816MWh Energy generated in 2018 and 2019

177,035 MT CO2 saved in 2018 and 2019

76,829 GJ energy sold from biogas and IPP Sahabat

CASE STUDY: IMPLEMENTATION OF GREEN PRACTICES IN THE INDUSTRY

Federal Land Development Authority (Felda) and Concord Green Energy Sdn Bhd (CGE) biogas projects involves setting up biogas plants at 14 of Felda's palm oil mills with the early stage of the project focusing on four "green-field" palm oil mills, two located in Pahang and two in Johor.

The CGE's biogas projects generate electricity from palm oil mill effluent discharged by Felda's palm oil mills where millers have their biogas system in place, rather than just managing the waste, through the FiT incentive. Under this project, millers are able to generate income as the produce from the biogas can be converted to electricity where it will be transferred to the nearest substation from the biogas plant. This lead to increased revenues, global recognition and higher productivity for these companies.

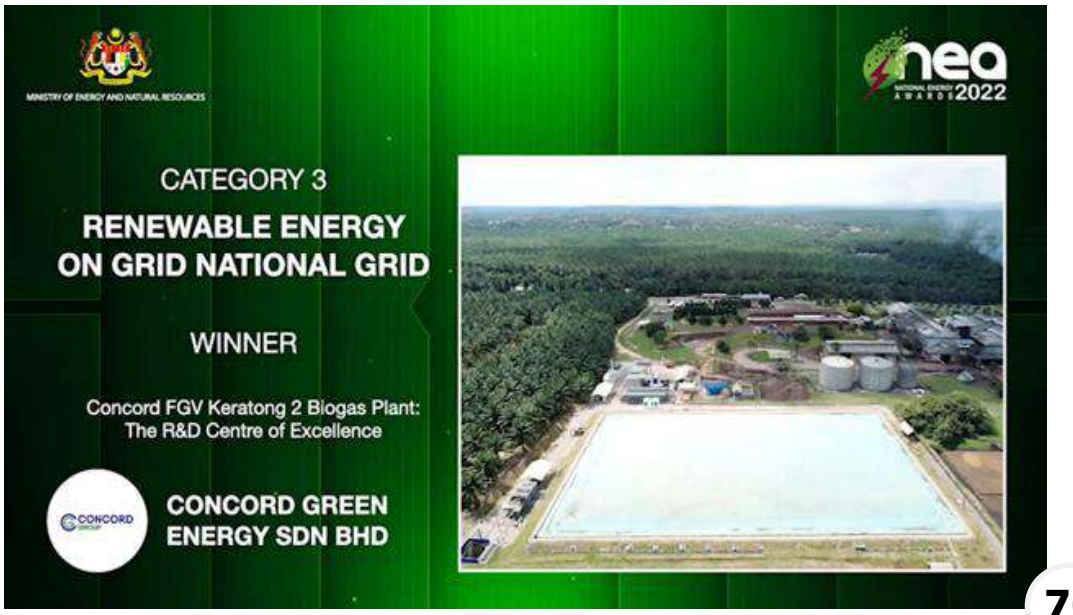
Approach

Captured biogas from the palm oil mill effluent (POME) would be used for combustion in boiler and convert the biogas for electricity generation using the most cost effective methods. The revenue garnered from providing electricity to the grid will be a revenue shared between CGE and Felda.

Achievement

Concord FGV Keratong 2 Biogas Plant in Pahang has been recognised by the Ministry of Energy and Natural Resources Malaysia as Winner of the National Energy Awards (NEA) 2022 under the category "Renewable Energy - On Grid National Grid".

Concord Group has also won the National Energy Awards for 3 consecutive years under the same category – in 2020 for Concord FGV Lepar Hilir Biogas Plant in Pahang and in 2021 for Concord FGV Adela Biogas Plant in Johor.



SUCCESS STORY: IMPLEMENTATION OF GREEN PRACTICES IN THE INDUSTRY

Cargill Inc. is a leading provider of products and services in the food and agricultural commodities including specialty edible oil throughout the Asia Pacific region. Specialty fats are incredibly popular due to their versality and functionality. The decision to go **'green'** has led Cargill to install dry palm fractionation capacity, enabling the production of a range of specialty fats for use in chocolates, coatings, fillings and compounds, spread, bakery fats, and other applications.

The green practices initiatives by Cargill includes responsibly sourced palm oil supply chain making make it possible for the company to offer specialty fats made from segregated palm oil certified by the Roundtable for Sustainable Palm Oil (RSPO).

Cargill places a high priority on using palm oil that has been certified by the RSPO, which is has been a member of since 2004, in addition to following the Malaysian Sustainable Palm Oil (MSPO) certification plan with regard to palm oil sourced in country.

Cargill® Helping the world *thrive*

Core Business

Provides food, agricultural, financial and industrial products all around the world.

Approach

Cargill is committed to producing and sourcing palm oil in an economical, environmentally sustainable and socially responsible manner while working toward a transparent, traceable sustainable palm supply chain.

Achievement

Cargill has always focused on taking long term and sustainable approaches to tackling some of the world's most challenging issues across food system, such as low agricultural productivity, poor nutritional status, lack of access to formal markets, and limited economic opportunities.

Impact

Cargill operates 17 refineries, 12 mills and five palm plantations where their plantations work with nearly 22,000 smallholder farmers (who have plantations of 2 hectares each). More than 95% of their palm oil volume comes from third parties (about 1,700 mills). Cargill sources palm oil from more than 10 countries and delivers it to hundreds of customers worldwide

APPENDIX

GLOSSARY

Assessor

An individual or a group of people being assigned to conduct a green practices assessment to measure level green practices performance of an organisation.

Circular economy

A circular economy is an economic system in which resources are used, reused, and recycled in a closed loop, rather than being extracted, used, and then discarded as waste. It is based on the principles of reducing, reusing and recycling, and it is designed to minimize waste and pollution while conserving natural resources.

Environmental, Social and Governance

Set of criteria that measures the ethical and sustainability impacts of an investment in a company or business.

Green Practices Guideline

A document that provides guide for the industry in implementing green practices within their operations.

Green Practices

Environmentally friendly actions, which promote environment protection and sustainable development.

Greenhouse Gas

Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), ozone (O_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). See *carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbon, ozone, hydrofluorocarbon, perfluorocarbon, sulfur hexafluoride*.

Indicator

A metrics concerning energy, water, waste, material, innovation and management that measures level of green practices of an organisation.

Instrument

A tool comprises of data collection form, instrument factsheet and rubric that is used by assessor to evaluate level of green practices in an organisation.

Rubric

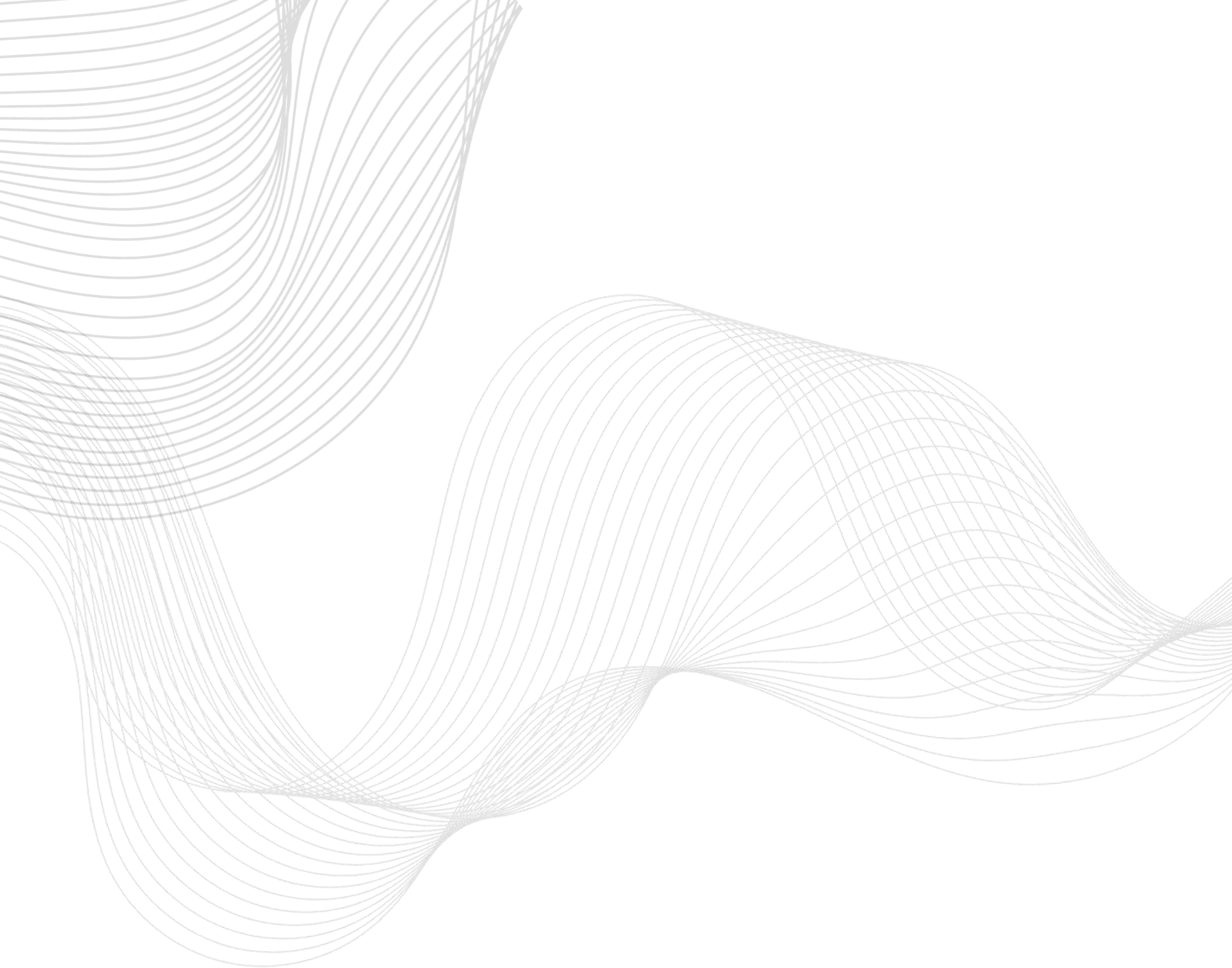
A set of sustainable criteria for assessing level of green practices in an organisation.

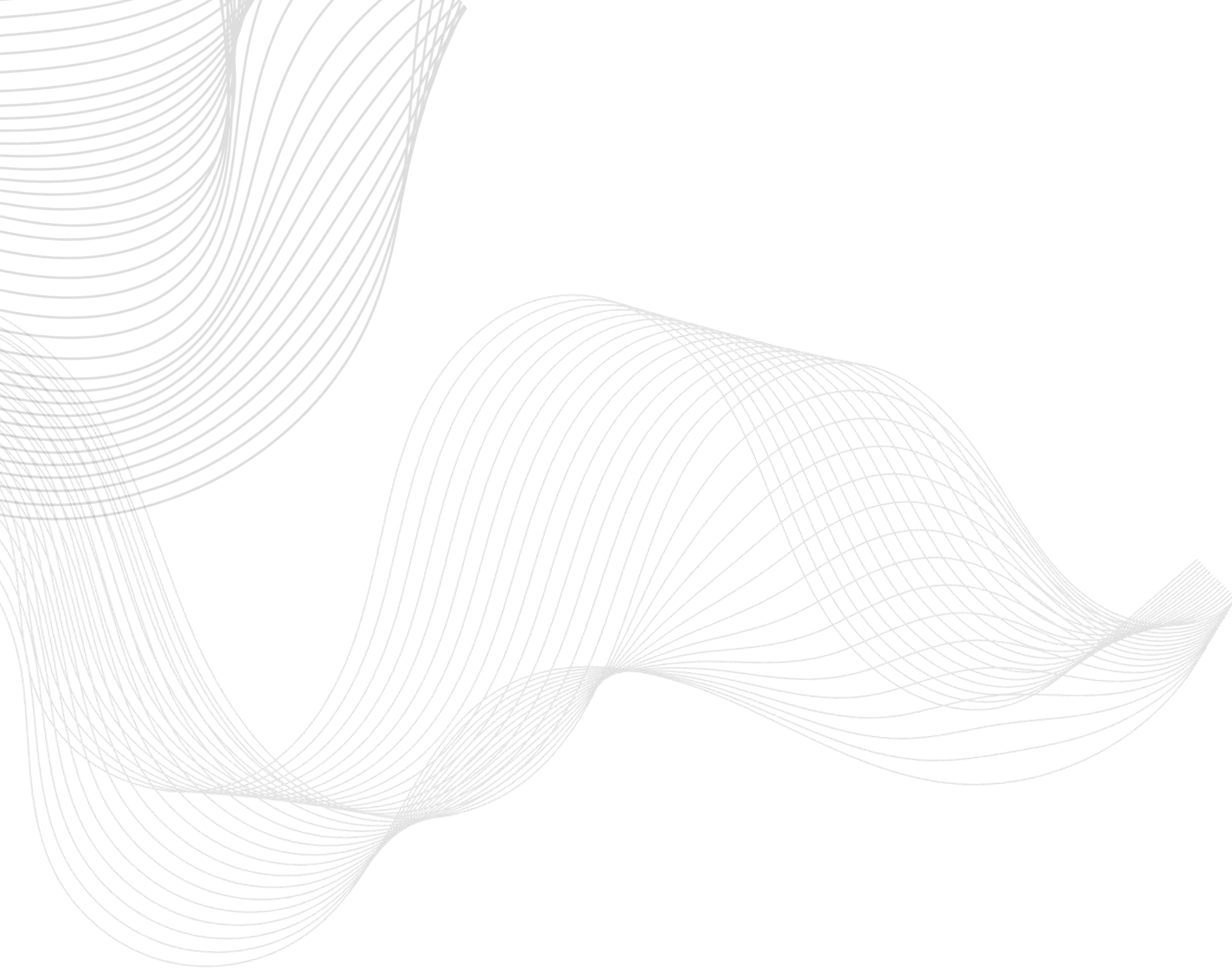
Sustainable Development Goals

A universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity

ACRONYMS

3R	Reduce, reuse, recycle
CO_2	Carbon dioxide
COP26	The 2021 United Nations Climate Change Conference
CQI	Continuous Quality Improvement
DSTIN	Dasar Teknologi dan Inovasi Negara
ESG	Environmental, Social and Governance
FGD	Focus Group Discussion
GDP	Gross Domestic Product
Gg	Gigagrams
GHG	Greenhouse Gas
GP	Green Practice
GT	Green Technology
GTMP	Green Technology Master Plan
IPCC	The Intergovernmental Panel on Climate Change
LCA	Life Cycle Analysis
LCC	Life Cycle Costing
MGTC	Malaysian Green Technology and Climate Change Corporation
NDC	Nationally Determined Contribution
SDG	Sustainable Development Goals
SME	Small Medium Enterprise
SOP	Standard Operating Procedure
SPAN	Suruhanjaya Perkhidmatan Air Negara
TE	Technical Expert
UN	United Nation
UNFCC	The United Nations Framework Convention on Climate Change





DATA COLLECTION TEMPLATE

GENERAL INFORMATION			
AUDIT INFORMATION			
No.	**ITEMS**		**DESCRIPTION**
1	Objective	:	
2	Scope	:	
3	Auditor's Name	:	

INFORMATION OF PREMISE

No.	**ITEMS**		**DESCRIPTION**
1	Name of Premise	:	
2	Address	:	
3	Total No. of Employee	:	
4	Operation Hours	:	
5	Type of Sector	:	
6	Year of Operation	:	
7	History of DOE Enforcement Involvement	:	

INDICATOR MATRIX			
INDICATOR -SUB INDICATOR		**WEIGHTAGE BY SUB-INDICATOR**	**WEIGHTAGE BY INDICATOR**
Materials	Sustainable materials	50	**10**
	Sustainable services	50	
Waste	Non-Hazardous	90	**20**
	Hazardous waste	10	
Water	Water Efficiency	50	**20**
	Water Exploration	50	
Energy	Emission Reduction	30	**30**
	Energy Efficiency	30	
	Energy Management System	10	
	Renewable Energy	30	
Innovation	Research and Development	50	**10**
	Knowledge transfer & Collaboration	50	
Management	Policy & Programme	30	**10**
	Green Procurement	40	
	Human Capital	30	
TOTAL			**100**

EVALUATION INDICATOR MATRIX

INDICATOR	SUB INDICATOR	WEIGHTAGE BY SUB-INDICATOR	MARK BY SUB-INDICATOR (A)	INPUT MARKS HERE	WEIGHTAGE BY INDICATOR (B)	MARK BY INDICATOR ∑(A)*(B)/100
Materials	Sustainable materials	50	x / 4 * 50	x	10	
	Sustainable services	50	x / 4 * 50	x		
Waste	Non-Hazardous	80	x / 4 * 90	x	20	
	Hazardous waste	20	x / 4 * 10	x		
Water	Water Efficiency	50	x / 4 * 50	x	20	
	Water Exploration	50	x / 4 * 50	x		
Energy	Emission Reduction	30	x / 4 * 30	x	30	
	Energy Efficiency	30	x / 4 * 30	x		
	Energy Management System	10	x / 4 * 10	x		
	Renewable Energy	30	x / 4 * 30	x		
Innovation	Research and Development	50	x / 4 * 50	x	10	
	Knowledge transfer & Collaboration	50	x / 4 * 50	x		
Management	Policy & Programme	30	x / 4 * 30	x	10	
	Green Procurement	40	x / 4 * 40	x		
	Human Capital	30	x / 4 * 30	x		
				TOTAL	**100**	
				STAR RATING (***Please tick based on the star rating assessment criteria)***	**1-Star**	
					2-Star	
					3-Star	

STAR RATINGS (ASSESSMENT CRITERIA)

1 Star

- Comply to all regulatory requirements
- Demonstrate leadership in developing systematic environmental reporting practical

2 Star

- Exhibit characteristics of being resource efficient
- Demonstrating positive impacts from green practices
- Incorporate and implement continuous quality improvement initiatives throughout business operations

3 Star

- Demonstrate integration of governance framework related to sustainability and circular economy
- Demonstrate capacity in contributing towards achieving national decarbonization targets
- Demonstrates leadership in developing, expanding and applying new tech related to green practices

Marks	Star Rating
0	No Star
60	1 Star
71	2 Star
81	3 Star
100.1	Invalid

DATA COLLECTION FORM

MATERIAL INDICATOR

INDICATOR: Material

Indicator: Sustainable Materials

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Demonstration on purchase/utilisation of sustainable materials utilisation with specific direction/vision;with self-regulation implementation (evidence of correlation on sustainability goals); and received recognition/certification from third party/ies/certificate body	Company Sustainability Report: A report published by a company or organization about environmental, social, and governance (ESG) impacts containing specific policy statements or guidelines or instructions for green material application as well as the practice of self-regulation on the application (through monitoring) to show the correlation with the sustainability goal and to provide evidence of related certificate or proof of recognition.	
	3	Demonstration on purchase/utilisation of sustainable materials utilisation with specific direction/vision;with self-regulation implementation (evidence of correlation on sustainability goals)	Company Sustainability Report: A report published by a company or organization about environmental, social, and governance (ESG) impacts containing specific policy statements or guidelines or instructions for green material application as well as the practice of self-regulation on the application (through monitoring) to show the correlation with the sustainability goal.	
	2	Demonstration on purchase/utilisation of sustainable materials utilisation with specific direction/vision	Company Sustainability Report: A report published by a company or organization about environmental, social, and governance (ESG) impacts containing specific policy statements or guidelines or instructions for green material application.	
	1	Demonstration on purchase/utilisation of sustainable materials utilisation	Company Sustainability Report: A report published by a company or organization about environmental, social and governance (ESG) impacts.	
	0	None	No initiative at all	

INDICATOR: Material

Sub-Indicator: Sustainable Services

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Demonstration on purchase/utilisation of sustainable services utilisation with specific direction/vision;with self-regulation implementation (evidence of correlation on sustainability goals); and received recognition/certification from third party/ies/certificate body	Company Sustainability Report: A report published by a company or organization about environmental, social, and governance (ESG) impacts containing specific policy statements or guidelines or instructions for green services application as well as the practice of self-regulation on the application (through monitoring) to show the correlation with the sustainability goal and to provide evidence of related certificate or proof of recognition.	
	3	Demonstration on purchase/utilisation of sustainable services utilisation with specific direction/vision;with self-regulation implementation (evidence of correlation on sustainability goals)	Company Sustainability Report: A report published by a company or organization about environmental, social, and governance (ESG) impacts containing specific policy statements or guidelines or instructions for green services application as well as the practice of self-regulation on the application (through monitoring) to show the correlation with the sustainability goal.	
	2	Demonstration on purchase/utilisation of sustainable services utilisation with specific direction/vision	Company Sustainability Report: A report published by a company or organization about environmental, social, and governance (ESG) impacts containing specific policy statements or guidelines or instructions for green services application.	
	1	Demonstration on purchase/utilisation of sustainable services utilisation	Company Sustainability Report: A report published by a company or organization about environmental, social and governance (ESG) impacts.	
	0	None	No initiative at all	

WASTE INDICATOR

INDICATOR: Waste Sub-Indicator: Non-hazardous				
Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Initiative/technology available (e.g., biogas capture facility and etc.); implemented; WITH monitoring in place; WITH ≥ 40% recycle rate; WITH certification/ recognition/ validation	*Validation/ certification/ recognition*: Refers to document issued by third party that confirms performance and achievement in meeting certain standard or *criteria*.	
	3	Initiative/ technology available (e.g., biogas capture facility and etc.); implemented; WITH monitoring in place; WITH recycle rate ≥ 40 %	*Monitoring records*: Refers to documents/ records used as evidence and primary data for the purpose of calculating the intended goals and targets. Examples of records that can be referred to are record of waste generated, recycled, reused, repurposed, disposed. Example of continuous quality improvement (CQI) evidence including positive outcome to cost saving; OR profit generation; OR reduce environmental impact.	
	2	Initiative/ technology available (e.g., biogas capture facility and etc.); implemented; WITH monitoring in place;	*Relevant contract agreements:* Documents referred to as evidence for indicating mutual obligations between the parties. Examples are agreement made by the organization with the intention to manage hazardous waste in a sustainable manner.	
	1	Initiative/ technology available (e.g., biogas capture facility and etc.)	*Purchasing records and documents:* Documents that serve as evidence of the organization acquiring services or/ and products/ system.	
	0	NO initiative of waste diversion to disposal	*Installation/ maintainance records*: Documents that serve as evidence for installation of technologies in the organization.	

INDICATOR: Waste

Sub-Indicator: Hazardous Waste

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Initiative/technology available; implemented; WITH monitoring in place; ≥ WITH 50% recycle rate; and WITH validation/ certification/ recognition	*Validation/ certification/ recognition*: Refers to document issued by third party that confirms performance and achievement in meeting certain standard or *criteria*.	
	3	Initiative/ technology available; implemented; WITH monitoring in place; WITH ≥ 50% recycle rate	*Monitoring records*: Refers to documents/ records used as evidence and primary data for the purpose of calculating the intended goals and targets. Examples of records that can be referred to are record of waste generated, recycled, reused, repurposed, disposed. Example of continuous quality improvement (CQI) evidence including positive outcome to cost saving; OR profit generation; OR reduce environmental impact.	
	2	Initiative/ technology available; implemented; WITH monitoring in place;	*Relevant contract agreements:* Documents referred to as evidence for indicating mutual obligations between the parties. Examples are agreement made by the organization with the intention to manage hazardous waste in a sustainable manner.	
	1	Initiative/ technology available	*Purchasing records and documents:* Documents that serve as evidence of the organization acquiring services or/ and products/ system.	
	0	NO initiative of waste diversion to disposal	*Installation/ maintainance records*: Documents that serve as evidence for installation and maintenance of technologies in the organization. Other initiatives including minimizing the feed to avoid over generation of hazardous waste.	

WATER CONSERVATION INDICATOR

INDICATOR: Water **Sub-Indicator: Water Exploration**				
Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	30% alternative water used	Metered water usage readings (i.e., m^3), utility bills (i.e., m^3) or any other documents recording the water consumption for the organization.	
	3	20% alternative water used	Meter alternative water consumption readings (i.e., m^3), utility bills (i.e., m^3), or any other documents recording the alternative water consumption for the organization. In the event that consumption data for the alternative water is not available, alternative water production readings can be used.	
	2	10% alternative water used		
	1	5% alternative water used		
	0	NO alternative water used		

INDICATOR: Water

Sub-Indicator: Water Efficiency

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	30% water savings	Metered water usage readings (i.e., m^3), utility bills (i.e., m^3) or any other documents recording the water consumption for the organization.	
	3	20% water savings		
	2	10% water savings		
	1	5% water savings		
	0	NO water savings		

ENERGY INDICATOR

INDICATOR: Energy

Sub-Indicator: Emission Reduction

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	45% emission reduction achieved	*GHG Inventory reports prepared in accordance to nationally or internationally recognised standards*	
	3	35% emission reduction achieved		
	2	25% emission reduction achieved		
	1	15% emission reduction achieved		
	0	No emission reduction achieved		

INDICATOR: Energy

Sub-Indicator: Energy Efficiency

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	8% of energy savings	*Energy consumption: Meter energy usage readings (i.e., kWh, kJ, MMBTU), utility bills (i.e. kWh, kJ, MMBTU), or any other documents recording the energy consumption for the organisation.*	
	3	6% of energy savings		
	2	4% of energy savings	*Fuel consumption:* Bills of quantities for fuels (i.e., litres of fuel, kg of fuel, cu.ft of gases), or any other documents recording the fuel consumption for the organisation.	
	1	2% of energy savings	*Certificates of analysis (COA):* COA for fuels shall be referred to determine calorific values of fuels used (if applicable).	
	0	No energy savings		

INDICATOR: Energy

Sub-Indicator: Energy management

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	External certification received for energy management system	*Organisation energy policies:* Organisation policies or guidelines specific to energy or main policy documents which specifically address energy efficiency plan and target.	
	3	Energy saving measure implemented; WITH systematic reporting and monitoring system; WITH energy policies in place	*Organisation mission and vision statements:* Organisation mission and vision statements specific to energy or main policy documents which specifically address energy efficiency.	
	2	Energy saving measure implemented; WITH systematic reporting and monitoring system; WITHOUT energy policies in place	*Energy management activity:* Records and documentation related to energy management activity that include the energy management committee and energy audit.	
	1	Energy saving measure implemented; WITHOUT systematic reporting and monitoring system; WITHOUT energy policies in place	*Data related to energy management activity:* Records and documentation of energy consumption, renewable energy, energy saving and performance within the organisation.	
	0	No energy management system	Reports, reviews by third parties, or certifications received by the organization based on locally or internationally recognised standards.	

INDICATOR: Energy

Sub-Indicator: Renewable energy

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	40% of Renewable Energy used	*Energy consumption:* Meter energy usage readings (i.e., kWh, kJ, MMBTU), utility bills (i.e. kWh, kJ, MMBTU), or any other documents recording the energy consumption for the organisation.	
	3	30% of Renewable Energy used	*Renewable energy consumption:* Meter renewable energy production readings (i.e., kWh, kJ), utility bills (i.e., kWh, kJ, MMBTU), or any other documents recording the renewable energy consumption for the organisation.	
	2	20% of Renewable Energy used	*Fuel consumption:* Bills of quantities for fuels (i.e. litres of fuel, kg of fuel, cu.ft of gases), or any other documents recording the fuel consumption for the organisation.	
	1	10% of Renewable Energy used	*Certificates of analysis (COA):* COA for fuels shall be referred to determine calorific values of fuels used (if applicable).	
	0	No Renewable Energy used	*Energy consumption:* Meter energy usage readings (i.e., kWh, kJ, MMBTU), utility bills (i.e. kWh, kJ, MMBTU), or any other documents recording the energy consumption for the organisation.	

INNOVATION INDICATOR

INDICATOR: INNOVATION **Indicator: Research and Development (R&D)**				
Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Visible Return on Value based on R&D process/ initiative/ output managed by innovation unit/department / personnel, resulting in commercialization/ intellectual property filling/ registration and award	***Proof of in-house R&D Process:***	
	3	Established in house R&D process to Green Practice/ Sustaible Innitiative with proven investment managed by Innovation unit/ department/ personnel	*Organizational Structure:* Refers to systems which outlines how innovation activities are formalized through functions within an R&D unit within the boundaries of the organisations under evaluation, OR	
	2	Established inhouse R&D process to Green Practice/ Sustaible Innitiative managed by Innovation unit/ department / personnel	*Appointment letter or Minute Meeting indicating specific person-in-charge of an R&D project related to Green Practice, OR*	
	1	Established inhouse R&D process relating to Green Practice/ Sustainable Innitiative	*Project Charter:* A document that describes an innovation project in its entirety. (Overview, an outline of scope, an approximate schedule, a budget estimate, anticipated risks, and key stakeholders	
	0	None	***Proof of R&D Investment***	
			Grant Proposal: A document proposing a research project requesting for sponsorship of that research, OR	
			Grant Award Document: A written agreement between the organisation and a grantee as the official notification of grant approval with evidence for contractual grant reporting, OR	
			Investment records: Financial documents/records used as evidence for internal and external investment of technology or system which enables innovation process/ research/ practice/ development in the organisation	

INDICATOR: INNOVATION

Indicator: Research and Development (R&D)

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
			Proof of R&D Outcome	
			Intellectual Property (IP): Provisional IP application document/ E-Filling document/ published detailed of invention on intellectual protection within copyright, trademark, patents, geographical indications, plant varieties, industrial designs and semiconductor integrated circuit layout designs, OR	
			Recognition/ Award/ Certification: Refers to the state or quality innovation product/ process/ service that are recognized or acknowledged by certified bodies, OR	
			Proof of Return on Value *Economic Value:* Project completion report or Financial accounting report outlining investment, revenue and net profit based on commercialization/ marketing attribution success of innovative green products/ services, OR	
			Proof of Return on Value *Social Value*: Project completion report with evidence of applied/ implemented/ reviewed innovation practices which leads to pre-set goals that are measurable improvements on existing practices of identified community.	
			Proof of Return on Value *Project completion report with evidence of improvement on productivity/ practice/ System and resource and material-efficiency leading to improved air and water quality/ fewer waste/ more renewable energy sources and other sustainable conditions*	

INDICATOR: INNOVATION

Indicator: Knowledge Transfer and Collaboration

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Strategic partnership/ Collaborative project with signed MOU+MOA and visible Return on Value		
	3	Strategic partnership/ Collaborative projects with signed MOU+MOA	***Proof of R&D Outcome***	
	2	Strategic partnership/ Collaborative projects with signed MOU	*Intellectual Property (IP):* Documents related to intellectual protection such as copyrights, trademarks, trade secret, industrial design, utility innovation or patent, OR	
	1	Strategic partnership/Collaborative projects with NDA/LOI	*Proof of Return on Value* *Economic Value:* Project completion report or Financial accounting report outlining investment, revenue and net profit based on commercialization/ marketing attribution success of innovative green products/ services, OR	
	0	None	*Proof of Return on Value* *Social Value*: Project completion report with evidence of applied/ implemented/ reviewed innovation practices which leads to pre-set goals that are measurable improvements on existing practices of identified community.	

MANAGEMENT INDICATOR

INDICATOR: MANAGEMENT **Sub-Indicator: Policy and Programme**				
Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	A present of policy related to sustainability, participate in any sustainability program, produce a report related to sustainability program, and receive recognition at national and international level.	*Policy or standards:* Refers to a written policy and/ or international/ national standards used/ implemented within the boundaries of the organization.	
	3	A present of policy related to sustainability, participate in any sustainability program, produce report related to the sustainability program and receive recognition or certification.	*Monitoring record*s: Refers to documents/ records used as evidence and primary data for the purpose of achieving the intended goals.	
	2	A present of policy related to sustainability, participate in any sustainability program, and produce a report related to the sustainability program.	*Contract agreements:* Documents referred to as evidence for indicating mutual obligations between the parties. Examples are agreement made by the organization with the intention to manage hazardous waste in a sustainable manner.	
	1	A present of policy related to sustainability and participate in any sustainability program.		
	0	NONE of the above		

INDICATOR: MANAGEMENT

Sub-indicator: Green Procurement

Score Please tick (/)	Point	Score criteria	Data Sources / Evidence	Attachment Reference
	4	A present of policy and practice of green procurement, record of purchases as evidence including eco-label certified services or/and products/system.	Policy or standards: Refers to a written policy and/or international/national standards used/implemented within the boundaries/organisations.	
	3	A present of policy and practice of green procurement and record of purchases as evidence.	Monitoring records: Refers to documents/records used as evidence and primary data for the purpose to achieve the intended goals.	
	2	A present of policy and practice of green procurement.	Contract agreements: Documents referred to as evidence for indicating mutual obligations between the parties.	
	1	A present of green procurement policy.	Purchasing records and documents: Documents that are serve as evidence of the organization acquiring services or/and products/system.	
	0	None		

INDICATOR: MANAGEMENT

Sub-indicator: Human Capital

Score Please tick (/)	Point	Score criteria	Data Sources / Evidence	Attachment Reference
	4	A present of human capital policy development to establish lifelong learning culture.	Policy or standards: Refers to a written policy and/or international/national standards used/implemented within the boundaries/organisations.	
	3	Key performance indicator documented related to human capital development.	Monitoring records: Refers to documents/records used as evidence and primary data for the purpose to achieve the intended goals.	
	2	Mission and vision of the organization related to human capital development.	Contract agreements: Documents referred to as evidence for indicating mutual obligations between the parties.	
	1	Minutes of meetings related to human capital development.	Purchasing records and documents: Documents that are serve as evidence of the organisation acquiring services or/and products/system.	
	0	None		

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: MATERIAL

SUB-INDICATOR: SUSTAINABLE MATERIALS

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

a) Goal 12.4: Responsible management of chemical and waste
b) Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

1.2. INDICATOR

Material

1.3. SUB-INDICATOR

Sustainable Materials

1.4. LAST UPDATE

3 January 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Services
- Fisheries (Aquaculture)
- Manufacturing
- Livestock
- Mining
- Forest operation
- Construction
- Agriculture & Plantation

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITION

Organisation: The entity undergoing the evaluation.

Baseline year: A reference point in time against which measure of consumption and/or in the future are measured.

Sustainable material: Sustainable materials are materials that are produced and used in a way that minimises environmental impact and reduces the depletion of natural resources. These materials are often produced using renewable resources, are non-toxic, and are biodegradable or recyclable, for example, clay, rock, sand, bamboo, or materials with eco-label.

Circular economy: A circular economy is an economic system in which resources are used, reused, and recycled in a closed loop, rather than being extracted, used, and then discarded as waste. It is based on the principles of reducing, reusing and recycling, and it is designed to minimize waste and pollution while conserving natural resources.

Life Cycle Assessment: Life Cycle Assessment (LCA) is a methodology used to evaluate the environmental impact of a product or service over its entire life cycle. This includes the extraction of raw materials, production, transportation, use, and disposal or recycling of the product.

ESG: ESG stands for Environmental, Social and Governance. It is a set of criteria used to evaluate the sustainability and societal impact of an investment in an organisation.

Certification: Certification is the provision by an independent body or an authorised agency of written assurance that the product, service, or system in question meets specific requirements.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Company sustainability report: A report published by a company or organization about environmental, social and governance (ESG) impacts.

Organisation sustainability policies: Organisation policies or guidelines specific to sustainability addressed in the company sustainability report.

Sustainability monitoring activity: Self-regulation implementation to show correlation with sustainability goals.

Certification or recognition of sustainable material: Certifications attained by the organisation (including from third parties) related to sustainable material.

3.2. DATA COLLECTION METHOD

Reference and citation to sections, parts, and/or entire documents as evidence. Documents cited shall specifically address the following aspects:

1. Evidence of company sustainability report
2. Evidence of policy for the application of green material.
3. Evidence of self-regulation implementation relating to sustainability goals
4. Evidence of certification or recognition from other parties including third parties

3.3. COMPUTATION

Not applicable.

3.4. ASSUMPTIONS AND UNCERTAINTIES

Not applicable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

1. GRI Standards
2. SASB Standards

4.3. QUALITY MANAGEMENT

ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework

ISO/CD 59004 Circular Economy – Terminology, Principles and Guidance for Implementation

5. REFERENCES

1. National Energy Efficiency Action Plan 2016-2025
2. Malaysia Renewable Energy Roadmap (MyRER)
3. Malaysia National Energy Policy (NEP) 2022-2040
4. The Sustainable Development Goals (SDGs)

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: MATERIAL

SUB-INDICATOR: SUSTAINABLE SERVICES

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

Sustainable Development Goal 12*: Ensure sustainable consumption and production patterns*

a) Goal 12.1: Implement the 10-year sustainable consumption and production framework
b) Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).
c) Goal 12.8: Promote universal understanding of sustainable lifestyles

1.2. INDICATOR

Material

1.3. SUB-INDICATOR

Sustainable Services

1.4. LAST UPDATE

18 January 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Services
- Fisheries (Aquaculture)
- Manufacturing
- Livestock
- Mining
- Forest operation
- Construction
- Agriculture & Plantation

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITION

Organisation: The entity undergoing the evaluation.

Baseline year: A reference point in time against which measure of consumption and/or in the future are measured.

Sustainable services: Sustainable service is a service that fulfils customer needs and can be perpetuated for a long period of time without negatively influencing the natural and social environments. For example, certification or recognition like ISO 14000 or MyHijau, strategy/planning, technical support, testing, and verification.

Sustainable framework: A written document describing a framework for action to enhance international cooperation and accelerate the shift towards sustainable consumption and production (SCP) patterns in both developed and developing countries.

Life cycle thinking: Refers to increasing the sustainable management of resources and achieving resource efficiency along both production and consumption phases of the lifecycle, including resource extraction, the production of intermediate inputs, distribution, marketing, use, waste disposal and re-use of products and services.

Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Company sustainability report: A report published by a company or organization about environmental, social and governance (ESG) impacts.

Organisation sustainability policies: Organisation policies or guidelines specific to sustainability addressed in the company sustainability report.

Sustainability monitoring activity: Self-regulation implementation to show correlation with sustainability goals.

Certification or recognition of sustainable material: Certifications attained by the organisation (including from third parties) related to sustainable services.

3.2. DATA COLLECTION METHOD

Reference and citation to sections, parts, and/or entire documents as evidence. Documents cited shall specifically address the following aspects:

1. Evidence of company sustainability report
2. Evidence of policy for the application of green services.
3. Evidence of self-regulation implementation relating to sustainability goals
4. Evidence of certification or recognition from other parties including third parties

3.3. COMPUTATION

Not applicable.

3.4. ASSUMPTIONS AND UNCERTAINTIES

Not applicable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

1. GRI Standards
2. SASB Standards
3. House Rule

4.3. QUALITY MANAGEMENT

ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework

ISO/CD 59004 Circular Economy – Terminology, Principles and Guidance for Implementation

5. REFERENCES

1. National Energy Efficiency Action Plan 2016-2025
2. Malaysia Renewable Energy Roadmap (MyRER)
3. Malaysia National Energy Policy (NEP) 2022-2040
4. The Sustainable Development Goals (SDGs)

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: WASTE

SUB INDICATOR: NON-HAZARDOUS

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

1. Goal 1: 40% recycling rate of solid waste from total non-hazardous waste generated by 2025.
2. Goal 2: 100% avoidance of waste to landfills by 2025.
3. Goal 3: 180 unit of biogas capture facility by 2030.

These goals are aligned with the world convention COP 26 by the UNFCC emphasising on the solid wastes recycling target, landfill avoidance, and reduction of carbon intensity (against GDP) in 2030 compared to 2005 level. It has been outlined that by 2030, 40% of the solid wastes generated shall be recycled, 100% avoidance of waste to the landfill, and there shall be 180 unit of biogas capture facility. These goals also map to SDG #12 - Sustainable consumption and production, specifically addressing target #12.3 - Substantially reduce waste generation through prevention, reduction, recycling, and reuse by 2030.

1.2. INDICATOR

Waste

1.3. SUB INDICATOR

Non-hazardous waste

1.4. LAST UPDATE

11 April 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Services
- Fisheries (Aquaculture)
- Manufacturing
- Livestock
- Mining
- Forest operation
- Construction
- Agriculture & Plantation

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Biogas Capture Facility: A facility that capture biogas released as a result of waste degradation.

Boundary: A defined border that accounts and limits the key business activities and processes which forms a basis of the study or analysis within the reporting period.

Functional Unit: A specific/selected amount of feed or product or service defined as a basis of calculation, such as mass (weight), volume, and units.

Non-Hazardous Wastes: Any form of materials that are discarded from a process/activity, and in this document, specifically refers to solid form of waste materials.

Non-hazardous waste loss: Any leakage/spills along the waste stream before or after treatment process.

Recycling: Process in converting waste materials into new materials or objects.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

2.2. CONCEPTS

Not applicable.

2.3. UNIT OF MEASURE

1. Percentage (%) of recycling of non-hazardous waste within the organisation.
2. Number of biogas capture facility

3. METHODOLOGY

3.1. DATA SOURCES

Validation/certification/recognition: Refers to documents issued by third party that confirms performance and achievement in meeting certain standard or criteria.

Monitoring records: Refers to documents/records used as evidence and primary data for the purpose of calculating the intended goals and targets. Examples of records that can be referred to are record of wastes generated, recycled, reused, repurposed, disposed. Example of CQI evidence including positive outcome to cost saving; OR profit generation; OR reduce environmental impact.

Relevant contract agreements: Documents referred to as evidence for indicating mutual obligations between the parties. Examples are agreement made by the organisation with the intention to manage hazardous waste in a sustainable manner.

Purchasing records and documents: Documents that serve as evidence of the organisation acquiring services or/and products/system.

Installation/maintenance records: Documents that serve as evidence for installation and maintenance of technologies in the organisation.

3.2. DATA COLLECTION METHOD

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

Evidence:

1. Initiative proposal: Business or project planning with budget allocation.
2. Evidence of initiatives-
   Dedicated space/storage of non-hazardous waste; purchasing record, or installation record; transportation record (e.g., no trips/schedule to transport the waste to dedicated disposal/recycling premise) presence of initiative/unit /facility/equipment/system being validated.
3. Policy in place, documented (e.g., minutes of meeting/policy document/annual budget approval) and disseminated.
4. Monitoring record– look for current record and check for frequency monitoring.
5. Data availability at selected baseline year on the amount of non-hazardous waste recycled, amount of non-hazardous waste disposed, and amount of non-hazardous waste generated. At least any two data listed

must be available to allow calculation on non-hazardous waste recycle.

6. Evidence of recycling by third parties e.g., receipt/invoice/financial report etc.
7. Validation of recycling by third parties e.g., contract/validation report/audit report.
8. Evidence of continuous quality improvement (CQI) exercise such as minute of meeting/CQI report. Example of CQI is performance of the selected contractor.
9. Evidence of recognition by third party such as validation or certification or award.

3.3. COMPUTATION

Selecting a baseline year;

Percentage (%) of recycling non-hazardous waste = [Amount of recycling non-hazardous waste / Total amount of non-hazardous waste generated] × 100;

where:

Amount of recycling non-hazardous waste = Amount of non-hazardous waste generated – Amount of non-hazardous waste disposed.

Total amount of non-hazardous waste generated is the summation of all wastes generated from the process/activity within the boundary.

3.4. ASSUMPTIONS AND UNCERTAINTIES

Non-hazardous waste loss during the activities within the defined boundary is assumed to be negligible.

Secondary data will be used in the event of primary data is unavailable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

Not applicable.

4.3. QUALITY MANAGEMENT

ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework

5. REFERENCES

1. Green Technology Master Plan (GTMP) 2017 – 2030.
2. Sustainable Development Goals (SDG) 2030.

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: WASTE

SUB-INDICATOR: HAZARDOUS WASTE

1. INDICATOR INFORMATION

1.1 GOALS AND TARGETS

1. Goal 1: 50% recycling rate of hazardous waste from the total hazardous waste generated by 2030
2. Goal 2: 40% recycling rate of solid waste from total waste generated by 2025
3. Goal 3: 100% avoidance of waste to landfill/zero waste to landfill by 2025

These goals are aligned with the GTMP 2017-2030 prepared by the Ministry of Energy, Green Technology and Water Malaysia emphasising on the hazardous waste recycling targets. It has been outlined that by 2030, 50% of the hazardous wastes generated from the industrial/sectoral activities shall be recycled. On top of that, the selected goals also addressed the target set by the world convention COP 26 by the UNFCC emphasising on achieving 40% recycling rate and 100% avoidance/zero waste directed to the landfill by 2025. These goals are also mapped to SDG #12 - Sustainable consumption and production, specifically addressing target #12.3 - Substantially reduce waste generation through prevention, reduction, recycling, and reuse by 2030.

1.2. INDICATOR

Waste

1.3. SUB-INDICATOR

Hazardous waste

1.4. LAST UPDATE

8 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Services
- Manufacturing
- Livestock
- Mining
- Forest operation
- Construction
- Agriculture & Plantation

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Boundary: A defined border that accounts and limits the key business activities and processes which forms a basis of the study or analysis within the reporting period.

Functional Unit: A specific/selected amount of feed or product or service defined as a basis of calculation, such as mass (weight), volume, and units.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

Recycling: Process in converting waste materials into new materials or objects.

Scheduled Waste: Scheduled waste is any waste that has hazardous characteristics that have the potential to negatively impact the public and the environment. A total of 77 types of scheduled waste are listed under the First Schedule, Environmental Quality (Scheduled Waste) Regulations 2005, and the management of such waste shall be in accordance with the provisions under the above Regulations.[1]

Waste loss: Any leakage/spills along the waste stream before or after treatment process.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Percentage (%) of recycling of hazardous waste within the organisation.

3. METHODOLOGY

3.1. DATA SOURCES

Validation/certification/recognition: Refers to documents issued by third party that confirms performance and achievement in meeting certain standard or criteria.

Monitoring records: Refers to documents/records used as evidence and primary data for the purpose of calculating the intended goals and targets. Examples of records that can be referred to are record of wastes generated, recycled, reused, repurposed, disposed. Example of continuous quality improvement (CQI) evidence including positive outcome to cost saving; OR profit generation; OR reduce environmental impact.

Relevant contract agreements: Documents referred to as evidence for indicating mutual obligations between the parties. Examples are agreement made by the organisation with the intention to manage hazardous waste in a sustainable manner.

Purchasing records and documents: Documents that serve as evidence of the organisation acquiring services or/and products/system.

Installation/maintenance records: Documents that serve as evidence for installation and maintenance of technologies in the organisation. Other initiatives including minimising the feed to avoid over generation of hazardous waste.

3.2. DATA COLLECTION METHOD

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

Evidence:

1. Initiative proposal: Business or project planning with budget allocation.

[1] Source: Department of Environment

2. Evidence of initiatives-
    - Dedicated space/storage of schedule waste; valid licence from regulatory body (special management) permit; purchasing record, or installation record; maintenance record; transportation record (e.g., no trips/schedule to transport the waste to dedicated disposal/recycling premise) presence of initiative/unit /facility/equipment/system being validated.
    - Policy in place, documented (e.g., minutes of meeting/policy document/annual budget approval) and disseminated.
    - Monitoring record– look for current record and check for frequency of monitoring.
    - Data availability at selected baseline year on the amount of schedule waste recycle, amount of schedule waste disposed, and amount of schedule waste generated. At least any two data listed must be available to allow calculation on schedule waste recycle.
3. Evidence of recycling by third parties e.g., receipt/invoice/financial report etc.
4. Validation of recycling by third parties e.g., contract/validation report/audit report.
5. Evidence of continuous quality improvement (CQI) exercise such as minute of meeting/CQI report. Example of CQI is performance of the selected contractor.
6. Evidence of recognition by third party such as validation or certification or award.

3.3. COMPUTATION

$$\text{Percentage (\%) of hazardous waste recycled} = \frac{\text{Amount of hazardous waste recycled}}{\text{Amount of hazardous waste generated}} \text{ x } 100$$

where;

Amount of hazardous waste recycled = Amount of hazardous waste generated – Amount of hazardous waste disposed.

Total amount of hazardous waste generated is the summation of all hazardous waste generated from the process/activity within the boundary.

3.4. ASSUMPTIONS AND UNCERTAINTIES

- Instrument applicability is limited to the activities within the defined boundary.
- Secondary data will be used in the event of primary data is unavailable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

Not applicable.

4.3. QUALITY MANAGEMENT

ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework

ISO/CD 59004 Circular Economy – Terminology, Principles and Guidance for Implementation

5. REFERENCES

1. Green Technology Master Plan (GTMP) 2017 – 2030.
2. Sustainable Development Goals (SDG) 2030.
3. "Malaysia - High-Level Segment Statement COP 26." *Unfccc.int*, 11 Nov. 2021, https://unfccc.int/documents/31082

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: WATER

SUB-INDICATOR: WATER EXPLORATION

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: To reduce dependency on potable water by exploring the consumption of other water resources such as rainwater and recycled water.

The goal of this instrument is mapped to the following global goals and National targets:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns.

Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

1.2. INDICATOR

Water

1.3. SUB-INDICATOR

Water Exploration

1.4. LAST UPDATE

16 March 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture
- Aquaculture
- Construction
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Organisation: The entity undergoing the evaluation.

Water: Refers to water that meets quality standards for various processes and applications within the industry.

Potable water: Refers to clean and safe drinking water that meets quality standards for various processes and applications within the industry – for the purpose of this Guideline, this also refers to water supplied as city water.

Water conservation: Refers to the practice of reducing water usage, improving efficiency, and implementing sustainable strategies to minimize the overall water footprint within processes.

Water efficiency: Refers to the optimization and reduction of water usage throughout industrial processes to minimize waste and improve resource conservation.

Water saving: A water consumption reduction measured against a baseline year.

Water consumption: An energy usage by the organisation and its sub-entities for its operations and activities.

Alternative water: Refers to water from alternative sources such as rainwater or reclamation processes.

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Percentage (%) of alternative water used with reference to the total water used within the organisation.

3. METHODOLOGY

3.1. DATA SOURCE

Water consumption: Metered water usage readings (i.e., m^3), utility bills (i.e., m^3), or any other documents recording the water consumption for the organisation.

Alternative water consumption: Meter alternative water consumption readings (i.e., m^3), utility bills (i.e., m^3), or any other documents recording the alternative water consumption for the organisation. In the event that consumption data for alternative water is not available, alternative water production readings can be used.

3.2. DATA COLLECTION METHOD

Water consumption:

- Meter usage reading showing a consumption of water over a period of time. Typically, meter reading is provided with a monthly time span. The total water consumed shall be computed by taking the total meter readings for individual months over the period of the reporting year. In the event that more than one water source is available, the sum of the meter readings shall be considered.
- Bills of quantities of water purchased shall be used to represent consumption of water over a period of time. The total water consumed shall be computed by taking the total quantities for the period of the reporting year. In the event that more than one water source is consumed, the sum of the quantities of water consumed shall be considered.
- Other forms of evidence acceptable include, purchase invoices, bill of lading, and other similar documents.
- Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for water purchased with the assumption that the water purchased is consumed within the reporting period.

Alternative water consumption:

- Meter usage reading showing a consumption of alternative water over a period of time. Typically, meter reading is provided with a monthly time span. The total alternative water consumed shall be computed by taking the total meter readings for individual months over the period of the reporting year. In the event that more than one alternative water source is available, the sum of the meter readings shall be considered.
- Bills of quantities of alternative water purchased shall be used to represent consumption of

alternative water over a period of time. The total alternative water consumed shall be computed by taking the total quantities for the period of the reporting year. In the event that more than one alternative water source is consumed, the sum of the quantities of alternative water consumed shall be considered.

- Other forms of evidence acceptable include, purchase invoices, bill of lading, and other similar documents.
- Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for alternative water purchased with the assumption that the water purchased is consumed within the reporting period.

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

3.3. COMPUTATION

The renewable energy percentage and renewable fuel percentage for the reporting period can be calculated using the following equations:

$$\text{Percentage (\%) of alternative consumption} = \frac{[\text{Alternative water consumption (i.e., } m^3)]}{[\text{Total water consumption (i.e., } m^3)]} \times 100\%$$

3.4. ASSUMPTIONS AND UNCERTAINTIES

Any and all averaging approach to consumption data shall be noted and wherever practicably possible the uncertainties shall be quantified.

Total water consumed for the reporting period shall be calculated based on the actual consumption of water for each month within the reporting period. In the event of data unavailability, average consumptions can be provided. Averaging approaches and assumptions made should be described in sufficient detail.

Total water consumed for the year of reporting shall be calculated based on the actual consumption of fuel for each month within the reporting period. Each source of water should be calculated separately.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

Not applicable.

4.2. VALIDATION

Measurement and Verification (M&V) report to verify savings endorsed by certified M & V professional.

4.3. QUALITY MANAGEMENT

Not applicable.

5. REFERENCES

1. ISO 46001:2019 Water efficiency management systems.
2. Green Technology Master Plan Malaysia 2017–2030.
3. The Sustainable Development Goals (SDGs).

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: WATER

SUB-INDICATOR: WATER EFFICIENCY

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: To increase water efficiency and improve water saving in operations.

The goal of this instrument is mapped to the following global goals and National targets:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

1.2. INDICATOR

Water

1.3. SUB-INDICATOR

Water Efficiency

1.4. LAST UPDATE

16 March 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture
- Aquaculture
- Construction
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Organisation: The entity undergoing the evaluation.

Water: Refers to water that meets quality standards for various processes and applications within the industry.

Water conservation: Refers to the practice of reducing water usage, improving efficiency, and implementing sustainable strategies to minimize the overall water footprint within processes.

Water efficiency: Refers to the optimization and reduction of water usage throughout industrial processes to minimize waste and improve resource conservation.

Water saving: A water consumption reduction measured against a baseline year.

Water consumption: An energy usage by the organisation and its sub-entities for its operations and activities.

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Percentage (%) of water consumption reduction measured against the baseline year.

3. METHODOLOGY

3.1. DATA SOURCE

Water consumption: Metered water usage readings (i.e., m^3), utility bills (i.e., m^3), or any other documents recording the water consumption for the organisation.

3.2. DATA COLLECTION METHOD

Water consumption:

- Meter usage reading showing a consumption of water over a period of time. Typically, meter reading is provided with a monthly time span. The total water consumed shall be computed by taking the total meter readings for individual months over the period of the reporting year. In the event that more than one water source is available, the sum of the meter readings shall be considered.
- Bills of quantities of water purchased shall be used to represent consumption of water over a period of time. The total water consumed shall be computed by taking the total quantities for the period of the reporting year. In the event that more than one water source is consumed, the sum of the quantities of water consumed shall be considered.
- Other forms of evidence acceptable include, purchase invoices, bill of lading, and other similar documents.
- Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for water purchased with the assumption that the water purchased is consumed within the reporting period.

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

3.3. COMPUTATION

The water saving for the reporting period can be calculated using the following equations:

$$\text{Percentage (\%) of energy saving} = \frac{\text{Total water consumed for the year of reporting } (m^3) - \text{Total water consumed for the baseline year } (m^3)}{\text{Total water consumed for the baseline year } (m^3)} \quad (1)$$

Remark: Negative (%) indicates there is savings, positive (%) indicates there is no savings

3.4. ASSUMPTIONS AND UNCERTAINTIES

Any and all averaging approach to consumption data shall be noted and wherever practicably possible the uncertainties shall be quantified.

Total water consumed for the reporting period shall be calculated based on the actual consumption of water for each month within the reporting period. In the event of data unavailability, average consumptions can be provided. Averaging approaches and assumptions made should be described in sufficient detail.

Total water consumed for the year of reporting shall be calculated based on the actual consumption of fuel for each month within the reporting period. Each source of water should be calculated separately.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

Not applicable.

4.2. VALIDATION

Measurement and Verification (M&V) report to verify savings endorsed by certified M & V professional.

4.3. QUALITY MANAGEMENT

Not applicable.

5. REFERENCES

1. ISO 46001:2019 Water efficiency management systems
2. Green Technology Master Plan Malaysia 2017–2030.
3. The Sustainable Development Goals (SDGs).

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: ENERGY

SUB-INDICATOR: EMISSION REDUCTION

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Nationally Determined Contribution (NDC) of 45% carbon intensity reduction in 2030 compared to 2005 level.

The goal of this instrument is mapped to the following global goals and National targets:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

National Commitment at COP – Nationally Determined

Contribution (NDC) of 45% carbon intensity reduction in 2030 compared to 2005 level.

1.2. INDICATOR

Energy

1.3. SUB-INDICATOR

Emission Reduction

1.4. LAST UPDATE

3 January 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Organisation: The entity undergoing the evaluation.

Energy: Energy resources, which refer to substances like fuels, petroleum products, heating and cooling, and electricity in general, because a significant portion of the energy contained in these resources can easily be extracted to serve a useful purpose.

Energy consumption: Energy usage by the organisation and its sub-entities for its operations and activities.

Energy savings: Energy consumption reduction measured against a baseline year.

Emission: Emission herein refers to greenhouse gas (GHG). GHG is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect.

The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. GHG emissions herein refers to all the GHGs and are collectively reported in carbon dioxide equivalent (CO_2e).

Baseline year: A reference point in time against which measure of consumption and/or in the future are measured.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

GHG inventory: A list of emission sources and the associated emissions quantified using standardized methods.

*Scope 1: D*irect greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organisation (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles).

Scope 2: Indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling.

Scope 3: Indirect GHG emissions associated with activities from assets not owned or controlled by the reporting organisation.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Percentage (%) reduction in emissions by an organisation within its operations in percentage with reference to a selected baseline year.

3. METHODOLOGY

3.1. DATA SOURCES

GHG Inventory reports prepared in accordance to nationally or internationally recognised standards.

3.2. DATA COLLECTION METHOD

GHG Inventory:

1. The emissions for the reporting period shall be the total GHG emissions generated by the organisation for the reporting period in CO_2e.
2. The total GHG emissions generated shall consider the total of Scope 1 and Scope 2 emissions generated by the organisation for the reporting period.
3. If present, the Scope 3 emission shall be considered for computing the total emissions.
4. Reports generated by the "Sistem Pengurusan dan Pemantauan Industri Hijau" provided by Department of Environment Malaysia can serve as evidence to represent the total GHG emissions for the organisation for the reporting period.
5. Reports and certification by national or international standards such as the ISO 14064 can serve as evidence to represent the total GHG emissions for the organisation for the reporting period.

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

3.3. COMPUTATION

The emission reduction can be calculated using the following equation:

$$\text{Emission reduction} = \frac{[\text{Total emissions for the reporting period}(\text{kg } CO_2e) - \text{Total emissions for the baseline year}(\text{kg } CO_2e)]}{\text{Total emissions for the baseline year (kg } CO_2e)} \times 100\%$$

3.4. ASSUMPTIONS AND UNCERTAINTIES

The uncertainties reported within the organisation's GHG inventory shall be noted.

Any and all averaging approach to GHG data shall be noted and wherever practicably possible the uncertainties shall be quantified.

GHG emissions shall account for Scope 1 and Scope 2 emissions for the organisation.

Scope 3 emissions may be included in the calculation. If Scope 3 emissions are included, values of Scope 3 emissions shall be considered throughout all the expressions.

Any omissions shall be clearly noted with justifications.

Calculation methods to comply with GHG Protocol Standards or IPCC standards or ISO 14064 standards or any other internationally recognise standards.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

The review or validation of information and GHG inventory by the organisation shall be noted.

4.3. QUALITY MANAGEMENT

Any certification obtained with regard to the organisation's carbon emissions and management shall be noted.

5. REFERENCES

1. National Energy Efficiency Action Plan 2016–2025.
2. Malaysia Renewable Energy Roadmap (MyRER).
3. Dasar Tenaga Negara (DTN) 2022–2040.
4. The Sustainable Development Goals (SDGs).

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: ENERGY

SUB-INDICATOR: ENERGY EFFICIENCY

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Energy saving meeting the National energy savings target of 8% by 2025.

The goal of this instrument is mapped to the following global goals and National targets:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

National Energy Efficiency Action Plan 2016–2025:

1. 52,233 GWh of energy savings (8.0%)
2. 37,702 kt CO_2 equivalent reduction

1.2. INDICATOR

Energy

1.3. SUB-INDICATOR

Energy Efficiency

1.4. LAST UPDATE

3 January 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Fisheries (Aquaculture)
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Organisation: The entity undergoing the evaluation.

Energy: Energy resources, which refer to substances like fuels, petroleum products, heating and cooling, and electricity in general, because a significant portion of the energy contained in these resources can easily be extracted to serve a useful purpose.

Energy Consumption: An energy usage by the organisation and its sub-entities for its operations and activities.

Energy Saving: An energy consumption reduction measured against a baseline year.

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

Certified M & V Professional: A certified professional that qualifies to conduct measurement and verification activities according to guidelines or standards for reporting energy savings.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Percentage (%) of electricity and fuel consumption reduction measured against the baseline year.

3. METHODOLOGY

3.1. DATA SOURCES

Energy consumption: Meter energy usage readings (i.e., kWh, kJ, MMBTU), utility bills (i.e., kWh, kJ, MMBTU), or any other documents recording the energy consumption for the organisation.

Fuel consumption: Bills of quantities for fuels (i.e., litres of fuel, kg of fuel, cu. ft of gases), or any other documents recording the fuel consumption for the organisation.

Certificates of analysis (COA): COA for fuels shall be referred to determine calorific values of fuels used (if applicable).

3.2. DATA COLLECTION METHOD

Energy consumption:

1. Meter usage reading showing a consumption of energy over a period of time. Typically, meter reading is provided with a monthly time span. The total energy consumed shall be computed by taking the total meter readings for individual months over the period of the reporting year. In the event that more than one energy source is available, the sum of the meter readings shall be considered.
2. If there are more than one type of energy being consumed, a common energy unit shall be utilised. (e.g., MWh, MJ)
3. Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for energy purchased with the assumption that the energy purchased is consumed within the reporting period.

Fuel consumption:

1. Bills of quantities of fuel for fuels purchased shall be used to represent consumption of fuel over a period of time. The total fuel consumed shall be computed by taking the total quantities for the period of the reporting year. In the event that more than one fuel source is consumed, the sum of the quantities of fuel consumed shall be considered.
2. Other forms of evidence acceptable include, purchase invoices, bill of lading, and other similar documents.
3. If there are more than one type of fuel being consumed, a common energy unit shall be utilised. (e.g., MWh, MJ)
4. The energy unit of fuels shall be computed by multiplying the calorific value (e.g., J/kg, kJ/l) of the fuel with the quantity (e.g., kg, l). Refer to the Appendix for the list of common calorific value that can be used as reference. In the event of fuels not listed in the Appendix, the assessor shall request from the organisation for such information accompanied by respective reference document (e.g., certificates of analysis for fuel calorific value, literature reference).
5. Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for fuel purchased with the assumption that the energy purchased is consumed within the reporting period.

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

3.3. COMPUTATION

The energy and fuel saving for the reporting period can be calculated using the following equations:

$$\text{Percentage (\%) of energy saving} = \frac{\text{Total energy consumed for the year of reporting (units for energy)} - \text{Total energy consumed for the baseline year (unit for energy)}}{\text{Total energy consumed for the baseline year (unit for energy)}} \times 100\% \quad (1)$$

$$\text{Percentage (\%) of fuel saving} = \frac{\text{Total fuel consumed for the year of reporting (unit for fuel)} - \text{Total fuel consumed for the baseline year (unit for fuel)}}{\text{Total fuel consumed for the baseline year (unit for fuel)}} \times 100\% \quad (2)$$

NB: Negative (%) indicates there is savings, positive (%) indicates there is no savings

3.4. ASSUMPTIONS AND UNCERTAINTIES

Wherever fuel characteristic information is used for calculations, it shall be noted that the averaging of such characteristics (i.e., calorific value) contributes to uncertainties.

Any and all averaging approach to consumption data shall be noted and wherever practicably possible the uncertainties shall be quantified.

Total energy consumed for the reporting period shall be calculated based on the actual consumption of energy for each month within the reporting period. In the event of data unavailability, average consumptions can be provided. Averaging approaches and assumptions made should be described in sufficient detail.

Total fuel consumed for the year of reporting shall be calculated based on the actual consumption of fuel for each month within the reporting period. Each type of fuel should be calculated separately.

Suggested unit for fuel as follows:

- Liquid fuel (i.e., petrol, diesel, oil, etc.): litres of fuel
- Solid fuel (i.e., coal, woodchip, etc): kg of fuel
- Gaseous fuel (i.e., natural gas, LPG, etc.): MMBTU or cu. ft. of gases

If the organisation is reporting both energy and fuels, the energy units should be standardised in MWh or MJ and reported in combination.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

Measurement and Verification (M&V) report to verify savings endorsed by certified M & V professional.

4.3. QUALITY MANAGEMENT

Not applicable.

5. REFERENCES AND DOCUMENTATION

1. National Energy Policy (2022–2040).
2. National Energy Efficiency Action Plan 2016–2025.
3. The Sustainable Development Goals (SDGs

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: ENERGY

SUB INDICATOR: ENERGY MANAGEMENT SYSTEM

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Energy saving meeting the National energy savings target of 8% by 2025.

The goal of the Energy: Energy Efficiency instrument is mapped to the following global goals and National targets:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

National Energy Efficiency Action Plan 2016-2025

1. Target of 52,233 GWh of energy savings (8.0%)
2. Target of 37,702 kt CO_2 equivalent reduction

Malaysia Renewable Energy Roadmap (MyRER)

National aspiration of 31% renewable energy (RE) capacity by 2025 and 40% by 2035

Dasar Tenaga Negara (DTN) 2022-2040

National target set for RE at 18,431MW in 2040.

1.2. INDICATOR

Energy

1.3. SUB-INDICATOR

Energy Management Systems.

1.4. LAST UPDATE

3 January 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITION

Organisation: The entity undergoing the evaluation.

Energy: Energy resources, which refer to substances like fuels, petroleum products, heating and cooling, and electricity in general, because a significant portion of the

energy contained in these resources can easily be extracted to serve a useful purpose.

Renewable energy: Energy resources that is collected from renewable resources that are naturally replenished on a human timescale. It includes sources such as sunlight, wind, the movement of water, and geothermal heat.

Energy consumption: An energy usage by the organisation all it any sub-entities for its operations and activities.

Energy Management System: A set of policies and procedures integrated and put into practice to track, analyse, and plan for energy usage in an organisation.

Energy savings: An energy consumption reduction measured against a baseline year.

Baseline year: A reference point in time against which measure of consumption and/or in the future are measured.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Organisation energy policies: Organisation policies or guidelines specific to energy or main policy documents which specifically address energy efficiency plan and target.

Organisation mission and vision statements: Organisation mission and vision statements specific to energy or main policy documents which specifically address energy efficiency.

Energy management activity: Records and documentation related to energy management activity that include the energy management committee and energy audit.

Data related to energy management activity: Records and documentation of energy consumption, renewable energy, energy saving and performance.

Reports, reviews by third parties, or certifications received by the organisation based on locally or internationally recognised standards.

Company policies, mission, and vision statements for continuous improvement.

3.2. DATA COLLECTION METHOD

Organisation energy policies:

1. Policies or guidelines specific to energy or main policy documents which specifically address energy efficiency plan and target.
2. Statements within the policy describing energy management systems. Statements describing targets for energy reduction, energy efficiency efforts, and any statements describing efforts or targets in achieving energy efficiency, increasing renewable energy mix, increasing renewable fuel mix shall also be considered.

Organisation mission and vision statements:

1. Organisation mission or vision statements specific to energy or organisation aspiration documents which specifically address energy efficiency plan and target.
2. Statements within the mission or vision statements describing energy management systems can be used as evidence. Statements within mission or vision statements describing targets for energy reduction, energy efficiency efforts, and any statements describing

efforts or targets in achieving energy efficiency, increasing renewable energy mix, increasing renewable fuel mix shall also be considered.
3. Organisation mission and vision statements specific to energy or main policy documents which specifically address energy efficiency.

Energy management activity:

1. Documents, records, logbooks, minutes of meetings, and any written documentation related to energy management activity. May include documents describing activities by the energy management committee and energy audit.
2. Any form of documentation, including media such as videos and pictures related to energy management activity may also be considered as evidence.

Data related to energy management activity:

1. Records and documentation of energy consumption, renewable energy, energy saving and performance within the organisation.
2. Documents, records, logbooks, minutes of meetings, and any written documentation of data related to energy management activity. May include documents recording data activities by the energy management committee and energy audit.

Organisation mission and vision statements: Organisation mission and vision statements specific to energy or main policy documents which specifically address energy efficiency.

Energy management activity: Records and documentation related to energy management activity that include the energy management committee and energy audit.

Data related to energy management activity: Records and documentation of energy consumption, renewable energy, energy saving and performance within the organisation.

Reports, reviews by third parties, or certifications received by the organisation based on recognised standards.

Company policies, mission, and vision statements for continuous improvement.

Reference and citation to sections, parts, and/or entire documents as evidence. Documents cited shall specifically address the following aspects:

1. Evidence of a policy for more efficient use of energy.
2. Evidence of fixed targets and objectives to meet the policy.
3. Evidence of the usage data to better understand and make decisions about energy use.
4. Evidence of the performance of the policy.
5. Evidence of a continuous improvement in energy management.

3.3. COMPUTATION

Not applicable.

3.4. ASSUMPTIONS AND UNCERTAINTIES

Not applicable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

1. ISO 50001:2018 Energy Management System.
2. AEMAS Energy Management Gold Standard.

4.3. QUALITY MANAGEMENT

Not applicable.

5. REFERENCES

1. National Energy Efficiency Action Plan 2016–2025
2. Malaysia Renewable Energy Roadmap (MyRER).
3. Dasar Tenaga Negara (DTN) 2022–2040.
4. The Sustainable Development Goals (SDGs)

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: ENERGY

SUB INDICATOR: RENEWABLE ENERGY

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: National target of 31% RE (renewable energy) capacity mix in 2025, and 40% by 2035.

The goal of this instrument is mapped to the following global goals and National targets:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns.

Goal 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (target at Sustainable reporting in companies).

National Energy Efficiency Action Plan 2016 – 2025:

1. 52,233 GWh of energy savings (8.0%)
2. 37,702 ktCO_2 equivalent reduction

Malaysia Renewable Energy Roadmap (MyRER)

National aspiration of 31% renewable energy (RE) capacity by 2025 and 40% by 2035.

Dasar Tenaga Negara (DTN) 2022 – 2040

National target set for RE at 18,431MW in 2040.

1.2. INDICATOR

Energy

1.3. SUB-INDICATOR

Renewable Energy

1.4. LAST UPDATE

13 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Organisation: The entity undergoing the evaluation.

Energy: Energy resources, which refer to substances like fuels, petroleum products, heating and cooling, and electricity in general, because a significant portion of the energy contained in these resources can easily be extracted to serve a useful purpose.

Renewable energy: Energy resources that is collected from renewable resources that are naturally replenished on a human timescale. It includes sources such as sunlight, wind, the movement of water, and geothermal heat.

Renewable fuel: Fuel resources that is produced from renewable resources. Examples include biofuels and Hydrogen fuel. This is in contrast to non-renewable fuels such as natural gas, LPG, petroleum, coal, and other fossil fuels and nuclear energy.

Energy consumption: An energy usage by the organisation and all its sub-entities for its operations and activities.

Energy savings: An energy consumption reduction measured against a baseline year.

Reporting period: The time span for which the instrument assesses the organisation. Unless required otherwise time span should be one year.

2.2. COMPUTATION

Not applicable.

2.3. UNIT OF MEASURE

Percentage (%) of renewable energy used with reference to the total energy used within the organisation.

Percentage (%) of renewable fuel used with reference to the total fuel used within the organisation.

3. METHODOLOGY

3.1. DATA SOURCES

Energy consumption: Meter energy usage readings (i.e., kWh, kJ, MMBTU), electricity bills (i.e., kWh, kJ, MMBTU), or any other documents recording the energy consumption for the organisation.

Renewable energy consumption: Meter renewable energy production readings (i.e., kWh, kJ), utility bills (i.e., kWh, kJ, MMBTU), or any other documents recording the renewable energy consumption for the organisation.

Fuel consumption: Bills of quantities for fuels (i.e., litres of fuel, kg of fuel, cu.ft of gases), or any other documents recording the fuel consumption for the organisation.

Certificates of analysis (COA): COA for fuels shall be referred to determine calorific values of fuels used (if applicable).

3.2. DATA COLLECTION METHOD

Energy consumption:

1. Meter usage reading showing a consumption of energy over a period of time. Typically, meter reading is provided with a monthly time span. The total energy consumed shall be computed by taking the total meter readings for individual months over the period of the reporting year. In the event that more than one energy source is available, the sum of the meter readings shall be considered.
2. If there are more than one type of energy being consumed, a common energy unit shall be utilised. (e.g., MWh, MJ)
3. Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for energy purchased with the assumption that the energy purchased is consumed within the reporting period.

Renewable Energy consumption:

1. Meter usage reading showing a generation of renewable energy over a period of time. Typically, meter reading is provided with a monthly time span. The total renewable energy generated shall be computed by taking the total meter readings for individual months over the period of the reporting year. In the event that more than one energy source is available, the sum of the meter readings shall be considered.
2. If there are more than one type of renewable energy being generated, a common energy unit shall be utilised. (e.g., MWh, MJ)

3. Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for energy purchased with the assumption that the energy purchased is consumed within the reporting period.

Fuel consumption:

1. Bills of quantities of fuel for fuels purchased shall be used to represent consumption of fuel over a period of time. The total fuel consumed shall be computed by taking the total quantities for the period of the reporting year. In the event that more than one fuel source is consumed, the sum of the quantities of fuel consumed shall be considered.
2. Other forms of evidence acceptable include, purchase invoices, bill of lading, and other similar documents.
3. If there are more than one type of fuel being consumed, a common energy unit shall be utilised. (e.g., MWh, MJ)
4. The energy unit of fuels shall be computed by multiplying the calorific value (e.g., J/kg, kJ/l) of the fuel with the quantity (e.g., kg, l). Refer to the Appendix for the list of common calorific value that can be used as reference. In the event of fuels not listed in the Appendix, the assessor shall request from the organisation for such information accompanied by respective reference document (e.g., certificates of analysis for fuel calorific value, literature reference).
5. Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for fuel purchased with the assumption that the energy purchased is consumed within the reporting period.

Fuel consumption coming from renewable sources:

1. Bills of quantities of fuel for fuels coming from renewable purchased shall be used to represent consumption of renewable fuel over a period of time. The total renewable fuel consumed shall be computed by taking the total quantities for the period of the reporting year. In the event that more than one renewable fuel source is consumed, the sum of the quantities of fuel consumed shall be considered.
2. Other forms of evidence acceptable include, purchase invoices, bill of lading, and other similar documents. Documents and records of renewable fuels consumed (e.g., biomass, biogas) can also serve as evidence.
3. If there are more than one type of renewable fuel being consumed, a common energy unit shall be utilised. (e.g., MWh, MJ)
4. The energy unit of renewable fuels shall be computed by multiplying the calorific value (e.g., J/kg, kJ/l) of the fuel with the quantity (e.g., kg, l). Refer to the Appendix for the list of common calorific value that be used as reference. In the event of fuels not listed in the Appendix, the assessor shall request from the organisation for such information accompanied by respective reference document (e.g., certificates of analysis for fuel calorific value, literature reference).
5. Other documents that can be used as evidence are purchase invoices received by utility providers or suppliers for fuel purchased with the assumption that the energy purchased is consumed within the reporting period.

Observations: Observations are made during the site visit to understand the actual case scenario of the green initiative implementation within the boundaries of the organisation.

Interviews: Interviews with respondent carried out to acquire insight of the processes/activities involved within the boundaries of the organisation.

Questionnaires/surveys: A set of questions designed for respondent to acquire insight of the processes/activities involved within the boundaries of the organisation.

Documents reviews: Documents reviewed during the site visit to support the observation.

3.3. COMPUTATION

The renewable energy percentage and renewable fuel percentage for the reporting period can be calculated using the following equations:

Percentage (%) of renewable energy consumption =

$$\frac{[\text{Energy consumption coming from RE sources (i.e., kWh, kJ, MMBTU)}]}{[\text{Total energy consumption (i.e., kWh, kJ, MMBTU)}]} \times 100\%$$

Percentage (%) of renewable fuel consumption =

$$\frac{[\text{Fuel consumption coming from renewable sources (unit for fuel)}]}{[\text{Total fuel consumption (unit for fuel)}]} \times 100\%$$

3.4. ASSUMPTIONS AND UNCERTAINTIES

Wherever fuel characteristic information is used for calculations, it shall be noted that the averaging of such characteristics (i.e., calorific value) contributes to uncertainties.

Any and all averaging approach to consumption data shall be noted and wherever practicably possible the uncertainties shall be quantified.

Total energy consumed for the reporting period shall be calculated based on the actual consumption of energy for each month within the reporting period. In the event of data unavailability, average consumptions can be provided. Averaging approaches and assumptions made should be described in sufficient detail.

Total fuel consumed for the year of reporting shall be calculated based on the actual consumption of fuel for each month within the reporting period. Each type of fuel should be calculated separately.

Suggested unit for fuel as follows:

Liquid fuel (i.e., petrol, diesel, oil, etc.) - litres of fuel

Solid fuel (i.e., coal, woodchip, etc) - kg of fuel

Gaseous fuel (i.e., natural gas, LPG, etc.) – MMBTU or cu.ft of gases

If the organisation is reporting both renewable electricity and renewable fuels, the energy units should be standardised in MWh or MJ and reported in combination.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

There are no limitations to this indicator.

4.2. VALIDATION

Renewable Energy Certificate (REC) issued by Tenaga Nasional Berhad (TNB) or GSPARX Sdn. Bhd. to validate total amount of renewable energy subscribed.

4.3. QUALITY MANAGEMENT

Not applicable.

5. REFERENCES

1. National Energy Efficiency Action Plan 2016 – 2025
2. Malaysia Renewable Energy Roadmap (MyRER)
3. Dasar Tenaga Negara (DTN) 2022 – 2040
4. The Sustainable Development Goals (SDGs)

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: INNOVATION

SUB-INDICATOR: KNOWLEDGE TRANSFER AND COLLABORATION

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Establishment of strategic partnership/ collaboration/ JV/ knowledge transfer program for innovation in green practices and commercialisation initiatives.

Sustainable Development Goal 8: Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

Sustainable Development Goal 9: Build resilient infrastructure, promote sustainable industrialization, and foster innovation

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Green Technology Master Plan (GTMP) 2017 – 2030
Strategic Thrust

ST2: Market Enablers

8.3.6 Introducing Roll-Out Plans Comprising Human Capital Development and Public - Private Collaboration to Green the Cities

8.3.7 International Collaborations

ST3: Human Capital Development

8.4.2 Greater Collaboration with Tertiary Institutions for Upskilling of Graduates

Dasar Sains, Teknologi, Inovasi Negara (DSTIN) 2021 – 2030

ST1: Advancing Scientific and Social Research Development and Commercialisation

1. Increase Gross Expenditure on R&D (GERD) to at least 2.0% of GDP by 2020
2. Enhance the performance of public and private Research, Development & Commercialization funding

1.2. INDICATOR

Innovation

1.3. SUB-INDICATOR

Knowledge transfer and collaboration

1.4. LAST UPDATE

13 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Knowledge transfer: Method of sharing information, abilities, ideas, discoveries, and skills across different areas/ community that encourages innovation and boost efficiency in the organization system. The activity involves research, academic engagement for technology transfer or commercialization through the relationship between collaborative partners, with outcomes of successful knowledge or technology transfer and commercialization.

Strategic collaboration: Strategic actions or programs in innovation practice to achieve specific goals and objectives of mutual benefit to the parties involved, creating values for intended audience/clients/consumers/stakeholders.

2.2. COMPUTATION

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Contract agreements: Documents indicating mutual obligations between two or more parties such as Letter of Intent (*LOI)/ Non-Disclosure Agreement (NDA)/ Memorandum of Understanding (MOU)/ Memorandum of Agreement (MOA).*

Intellectual Property (IP): Documents related to intellectual protection such as copyrights, trademarks, trade secret, industrial design, utility innovation or patent.

Proof of Return on Value:

Economic Value: Financial accounting report indicating outlining investment, revenue and net profit based on commercialization/ marketing attribution success of innovative green products/ services.

Social Value: Project completion report with evidence of applied/ implemented/ reviewed innovation practices which leads to pre-set goals that are measurable improvements on existing practices of identified community.

Other related Value: Project report or document information improvement on productivity/ practice/ System and resource and material-efficiency leading to improved air and water quality/ fewer waste/ more renewable energy sources and other sustainable conditions.

3.2. DATA COLLECTION METHOD

Contract agreements

Evidence indicating a formal contract or agreement within collaborative parties:

1. Letter of Intent (*LOI)/ Non-Disclosure Agreement (NDA)/ Memorandum of Understanding (MOU)/ Memorandum of Agreement (MOA).*

Intellectual Property (IP)

1. Provisional IP application document or;
2. E-Filling document or;
3. Published detailed of invention or;
4. IP Award certificate/ letter or;
5. IP filing number

Organisation may present proof of Economic ROI and/or Social Value ROI

Proof of Return on Investment (ROI) or Return on Value (ROV):

Proof of Economic ROI

1. Financial accounting report of commercialized product/service solution resulting from innovation project. (e.g., commercial activities, transactions, order, invoice)

2. Proof of positive return on investment (ROI) is not necessary. However, organization will only need to proof that commercialized product/ service is going to or actively being promoted to market.

Proof of Social Value ROI

1. Project completion report (clearly shows measurable pre-set goals to improve existing practices related to community engagement outlining innovation product/ service/ process applied/ implemented/ system/ management/ productivity reviewed on identified community).
2. In the event of an ongoing project, proof of actual goals is not yet necessary. However, proof plan or ongoing engagement with community must be present through official project documents.

Proof of Other ROV

1. Project completion report with evidence of improvement on productivity/ practice/ System and resource and material-efficiency leading to improved air and water quality/ fewer waste/ more renewable energy sources and other sustainable conditions.

3.3. COMPUTATION

Not applicable

3.4. ASSUMPTIONS AND UNCERTAINTIES

Not applicable

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

Not applicable

4.2. VALIDATION

Not applicable

4.3. QUALITY MANAGEMENT

1. Malaysian Standards (MS) - Standards Malaysia
2. Local or International Product Certification – SIRIM
3. Good Design Mark – Malaysia Design Council
4. MyHIJAU Mark - MGTC

5. REFERENCES

1. Green Practice Guideline for Services Sector (Final Report Draft 2022)
2. Green Technology Master Plan Malaysia /GTMP (2017 – 2030)
3. Dasar Sains, Teknologi dan Inovasi Negara/ DSTIN (2021 – 2030)
4. Dasar Keusahawanan Negara /DKN (2030)
5. Sustainable Development Goals (SDG) 2030
6. Dasar Perubahan Iklim Negara

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: INNOVATION

SUB-INDICATOR: RESEARCH AND DEVELOPMENT (R&D)

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal 1: Establishment of Research & Development (R&D) process, output, and policy for organisation.

Goal 2: To increase investment or incentive received to support innovation in green practice to promote commercialization, Intellectual Property and award/recognition within the organisation.

Sustainable Development Goal 8: Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

Sustainable Development Goal 9: Build resilient infrastructure, promote sustainable industrialization, and foster innovation

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Green Technology Master Plan (GTMP) 2017 – 2030

Strategic Thrust

ST4: Research & Development & Commercialization (R&D&C)

8.5.1 A key steppingstone towards an innovative Green Technology (GT) hub

8.5.1.1 R&D&C Projects

8.5.2 Encouraging more localised and demand driven R&D&C

ST2: Market Enablers

8.3.2 Funding GT project development

8.3.3 Exploring Alternative GT Financing Ecosystem

8.3.4 GT Incentives

Dasar Sains, Teknologi, Inovasi Negara (DSTIN) 2021 – 2030

ST1: Advancing Scientific and Social Research Development and Commercialisation

1. Enhance commercialisation and increase uptake of home-grown R&D innovative products through clear guidelines and standards compliance
2. Increase Gross Expenditure on R&D (GERD) to at least 2.0% of GDP by 2020

1.2. INDICATOR

Innovation

1.3. SUB-INDICATOR

Research and Development (R&D)

1.4. LAST UPDATE

13 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Research & Development (R&D): Activities that organisation undertakes to innovate and introduce new improvised products and services.

Commercialisation: The process of bringing new products and services to market.

Innovation: Innovation refers to activity that contribute to the creation of key products, services, or processes to reduce the harm, impact, and deterioration of the environment while optimising the use of natural resources.

Products: Product innovation involves creating new products or improved versions of existing products that increase their uses or impact in green solution/environment. It applies the concept of green to the entire process of product innovation by increasing resource utilization, efficiently promoting green production design, and positively promoting corporate financial performance.

Services: Green service innovation includes elements such as green invention, environmental service portfolio, environmental service delivery, and environmental service design. Distinct from other service innovations, green service innovation focuses on environmental social responsibility and customer experience.

Intellectual Property: Form of property that includes any tangible/intangible creations of human intellect, green practices, or green innovation initiatives. Namely patents, copyrights, industrial design, utility innovation, trademarks, and trade secrets.

Social innovations: New solutions (products/ services/ models/ markets/ processes) that simultaneously meet a social need and lead to new or improved capabilities and relationships and better use of assets and resources.

2.2. CONCEPT

Not applicable

2.3. UNIT OF MEASURE

Not applicable

3. METHODOLOGY

3.1 DATA SOURCES

Innovation Management Procedure: Sets of policies, processes and procedures used by organisations to ensure fulfilment of tasks required to achieve operational objective for innovation (including financial success, safe operation, product quality, client relationships, legislative and regulatory conformance, and worker management).

Organizational Structure: Refers to systems which outlines how innovation activities are formalized through functions within an R&D unit and within the boundaries of the organisations under evaluation.

Product/ Design/ System/ Solution Blueprint/ Refers to related standard documents/record/proof of concept and pertaining innovation outcome.

Project Charter: A document that describes an innovation project in its entirety. (Overview, an outline of scope, an approximate schedule, a budget estimate, anticipated risks, and key stakeholders.

Grant Proposal: A document proposing a research project requesting for sponsorship of that research.

Grant Award Document: A written agreement between the organisation and a grantee as the official notification of grant approval with evidence for contractual grant reporting.

Investment Records: Financial documents/records used as evidence for internal and external investment of technology or system which enables innovation process/ research/ practice/ development in the organisation.

Intellectual Property (IP): Provisional IP application document/ E-Filling document/ published detailed of invention on intellectual protection within copyright, trademark, patents, geographical indications, plant varieties, industrial designs and semiconductor integrated circuit layout designs.

Recognition/ Award/ Certification: Refers to the state or quality innovation product/ process/ service that are recognized or acknowledged by certified bodies.

Proof of Return on Value:

Economic Value: Financial accounting report indicating outlining investment, revenue and net profit based on commercialization/ marketing attribution success of innovative green products/ services.

Social Value: Project completion report with evidence of applied/ implemented/ reviewed innovation practices which leads to pre-set goals that are measurable improvements on existing practices of identified community.

Other related Value: Improvement on productivity/ practice/ System and resource and material-efficiency leading to improved air and water quality/ fewer waste/ more renewable energy sources and other sustainable conditions.

3.2. DATA COLLECTION METHOD

The data to be collected should prove the existence of a Research and Development (R&D) unit/ dept/ personnel with proof of project document and R&D result that includes any one of the suggested types of evidence.

Proof of in-House R&D Process (any of the following):

Existence of R&D unit/dept/ personnel/ appointment

1. A unit or section or department that has a role on promoting innovation
   (e.g: R&D department, testing department, incubation unit) or;
2. Appointment letter or minute meeting indicating specific Person in Charge for a R&D project related to green practices.
3. Position or job title in charge in R&D, testing or innovation (e.g: Project manager, Research Supervisor,) or;
4. A project or an activity promoting innovation in management procedure within the reporting period. (e.g: new product development, Innovation Competition, Design improvement, product or service refinement) or;
5. In the event of unit or section specifically promoting innovation is not present, a specific team that work on innovation project can be considered as evidence of innovation management system in place.

Product/ Design/ System/ Solution Blueprint

1. Evidence illustrates the outcome from R&D, Commercialization, or Innovation (eg: Technical Drawing, System Drawing or chart, Layout, Product blueprint, Prototype, Model Making, Mock-ups, Proof of Concept Development).
2. A proof of service system (eg: System Flowchart, Apps, Software Development).

Project Charter: Project Plan and Proposal or Project Roadmap outlining the overview of project, scope, schedule, estimated budget.

Proof of Research & Development Investment (any of the following):

Grant Proposal:

1. Proof of submitted grant proposal outlining context, objectives, and methods leading to research and development project for innovation activities/ product/ services/ process. or;
2. Grant proposal draft that will be submitted within the year of reporting period. (With proof of call for submission poster/ email/ letter)

Grant Award Document:

1. Grant agreement for research and development project – active grant. (eg: Grant letter, Contract agreement, grant certificate, Proof of grant/ financial) or;
2. Grant payment (eg: Proof of grant/ financial record or transaction) or;
3. Grant Monitoring records (eg: Project progress report, financial statements)

Investment Records:

1. Financial documents/records used as evidence for internal and external investment of technology or system which enables innovation process/ research/ practice/ development in the organisation.
2. A written agreement between the organisations as the official notification of grant/ fund/ sum value invested with evidence for contractual investment reporting.

Internal/external investment of innovation-enabling technology or system:

1. Agreement, subscription, assignment, or other document evidencing in physical form an investment appointing the organization as custodian.
2. Purchase or installation record of system or technology.

Proof of Research & Development Outcome/ Project Report (any of the following):

Proof of Return on Investment (ROI) or Return on Value (ROV):

Proof of Economic ROI

1. Financial accounting report of commercialized product/service solution as a result of innovation project. (e.g commercial activities, transactions, order, invoice)
2. Proof of positive return on investment (ROI) is not necessary, organization will only need to proof that commercialized product/ service is going to or actively being promoted to market.

Proof of Social Value ROI

1. Project completion report (clearly shows measurable pre-set goals to improve existing practices related to community engagement outlining innovation product/ service/ process applied/ implemented/ system/ management/ productivity reviewed on identified community).
2. In the event of an ongoing project, proof of actual goals is not yet necessary. However, proof plan or ongoing engagement with community must be present through official project documents.

Proof of Other ROV: Project completion report with evidence of improvement on productivity/ practice/ System and resource and material-efficiency leading to improved air and water quality/ fewer waste/ more renewable energy sources and other sustainable conditions.

Intellectual Property (IP):

1. Provisional IP application document/ E-Filling document/ published detailed of invention on intellectual protection within copyright, trademark,

patents, geographical indications, plant varieties, industrial designs and semiconductor integrated circuit layout designs.
2. E-Filling document or;
3. Published detailed of invention or;
4. IP Award certificate/ letter or;
5. IP filling number.

Recognition/ Award/ Certification:

1. Recognition of achievement, label, standards or special acknowledgment on Innovative solution, product or services. (eg: MyHIJAU mark, Eco-label mark, MS mark, or significant recognition promoting innovation).
2. Certificate for Research & Development outcome from local or international agencies, association, government bodies and authorities (eg: Product Certification from SIRIM, Standards Malaysia, MGTC, MRM or MyIPO).
3. Proof of award received from R&D&C&I initiative, projects, programs, or venture. (eg: Local or International recognized award/ organizer/ provider).

3.3. COMPUTATION

Not applicable

3.4. ASSUMPTIONS AND UNCERTAINTIES

Not applicable

4 OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

Not applicable

4.2. VALIDATION

Not applicable

4.3. QUALITY MANAGEMENT

- Malaysian Standards (MS) – Standards Malaysia
- Local or International Product Certification – SIRIM
- Good Design Mark – Malaysia Design Council
- MyHIJAU Mark – MGTC

5. REFERENCES

1. Green Practice Guideline for Services Sector (Final Report Draft 2022)
2. Green Technology Master Plan Malaysia /GTMP (2017 – 2030)
3. Dasar Sains, Teknologi dan Inovasi Negara/ DSTIN (2021 – 2030)
4. Sustainable Development Goals (SDG) 2030
5. Dasar Keusahawanan Negara /DKN (2030)

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: MANAGEMENT

SUB-INDICATOR: GREEN PROCUREMENT

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal: Encourage companies to adopt sustainable practices and integrate sustainability information into their reporting cycle.

This goal is mapped to SDG #12 - Sustainable consumption and production, specifically addressing target #12.6 - Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (Sustainable target reporting in companies).

1.2. INDICATOR

Management

1.3. SUB-INDICATOR

Green Procurement

1.4. LAST UPDATE

13 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Boundary: A defined border that accounts for and limits the key business activities and processes which form the basis of the study or analysis.

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Reporting period: The period for which the instrument assesses the organization. Unless required, otherwise period should be one year.

Management: Management from an organizational perspective refers to planning, organizing, and administering its resources and activities effectively to achieve specific objectives efficiently.

Green Procurement: The acquisition of environmentally friendly products and services, including setting environmental requirements in selecting suppliers, contractors, and contract agreements.

2.2. CONCEPTS

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Policy or standards: Refers to a written policy and/or international/national standards used/implemented within the organization's boundaries.

Monitoring records: Refers to documents/records used as evidence and primary data to achieve the intended goals.

Contract agreements: Documents are evidence for indicating mutual obligations between the parties.

Purchasing records and documents: Documents indicate the organization acquiring services or/and products/systems.

3.2. DATA COLLECTION METHOD

Policy or standards:

1. A green procurement written document that states services or/and products/systems.
2. A description of company guidelines related to services or/and products/systems.
3. Strategic action plan document of a company on green procurement commitments.
4. Green procurement policy document related to the organization's services or/and products/systems.

Monitoring Records:

1. A statement of green practices activities related to green procurement that are shared in minutes of meetings, mission & vision, website, social media, and others.
2. Recognition of certificate and award on green procurement activities in national and international organizations.

Contract agreements: A documented agreement on green procurement related to services or/and products/systems (LoI/MoU/MoA).

3.3. COMPUTATION

Not applicable.

3.4. ASSUMPTION AND UNCERTAINTIES

Not applicable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

Not applicable.

4.2. VALIDATION

Any nationally and internationally recognized eco-label certification.

4.3. QUALITY MANAGEMENT

ISO 20400:2017 (Green Procurement)

5. REFERENCES AND DOCUMENTATION

1. Sustainable Development Goals (SDG) 2030.
2. ISO 20400:2017 Guideline

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: MANAGEMENT

SUB-INDICATOR: POLICY AND PROGRAMME

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal: Encourage small, medium, and large companies to adopt sustainable practices and reporting.

This goal is aligned with the Sustainable Development Goals (SDGs) created by the United Nations in its 2030 Agenda. Sustainable Development #12.6 focuses on small, medium, and large companies adopting sustainable practices by integrating sustainable information into their reporting cycle. This goal is crucial to ensure that the pattern of Consumption and Production should be sustainable as the key to sustaining the livelihoods of current and future generations.

1.2. INDICATOR

Management

1.3. SUB-INDICATOR

Policy and Programme

1.4. LAST UPDATE

13 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITIONS

Boundary: A defined border that accounts for and limits the key business activities and processes which form the basis of the study or analysis.

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Reporting period: The period for which the instrument assesses the organization. Unless required, otherwise time span should be one year.

Management: Management from an organizational perspective refers to planning, organizing, and administering resources and activities effectively to achieve specific objectives efficiently.

Policy: Documented statement to achieve specific goals by the organizations.

Program: An activity that supports the achievement of the stated goal. The results of the project activities must have a direct, real, and measurable impact on achieving the intended purpose.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Policy or standards: Refers to a written policy and/or international/national standards used/implemented within the organization's boundaries.

Monitoring records: Refers to documents/records used as evidence and primary data to achieve the intended goals.

Contract agreements: Documents are evidence for indicating mutual obligations between the parties.

3.2. DATA COLLECTION METHOD

Policy or standards:

1. Policy or standards comply with local, national, and international legislation and regulations (e.g., Environmental Quality Act 1974).
2. Policy or standards of green practice by the organization (e.g., ISO standards).
3. Developed guidelines or standard operating procedures of any green practice by the organization (e.g., MyHIJAU Guidelines).
4. A planned roadmap and implemented strategy of new green practices (e.g., National Green Growth Roadmap).

Monitoring Records:

1. Reports of participation in any sustainability programs on the website, social media, posters, and minutes of meetings.
2. Recognition of certificate and award received on sustainability programs at national and international levels.

Contract agreements:

1. A written agreement of green practices commitment among employees and top management (e.g., Vision and missions of organization).
2. A written agreement of green practices commitment with industries (e.g., MOU/MOA/LOI/LOA/NDA).
3. A written agreement of green practices commitment for corporate social responsibility (CSR) (e.g., Community).

3.3. COMPUTATION

Not applicable.

3.4. ASSUMPTION AND UNCERTAINTIES

Not applicable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION

Not applicable.

4.2. VALIDATION

Not applicable.

4.3. QUALITY MANAGEMENT

ISO 9001:2015 (Quality Management Systems)
ISO 14001:2015 (Environmental Management System)
ISO 45001:2018 (OSHA)

5. REFERENCES

1. Sustainable Development Goals (SDG) 2030.
2. ISO 9001:2015 Guideline
3. ISO 14001:2015 Guideline
4. ISO 45001:2018 Guideline

INDICATOR INSTRUMENT FACTSHEET

INDICATOR: MANAGEMENT

SUB-INDICATOR: HUMAN CAPITAL

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

Goal: Encourage companies to adopt sustainable practices and integrate sustainability information into their reporting cycle.

This goal is mapped to SDG #12 - Sustainable consumption and production, specifically addressing target #12.6 - Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle (Sustainable target reporting in companies).

1.2. INDICATOR

Management

1.3. SUB-INDICATOR

Human Capital

1.4. LAST UPDATE

13 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Agriculture & Plantation
- Aquaculture
- Construction
- Forest operation
- Livestock
- Manufacturing
- Mining
- Services

2. DEFINITION AND CONCEPT

2.1. DEFINITIONS

Boundary: A defined border that accounts for and limits the key business activities and processes which form the basis of the study or analysis.

Baseline year: A reference point in time against which a measure of consumption and/or production in the present and/or future are measured.

Reporting period: The period for which the instrument assesses the organization. Unless required, otherwise period should be one year.

Human Capital: A productive wealth embodied in labour, skills, and knowledge that can be developed, recruited, trained, and managed to achieve organizational goals.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

Not applicable.

3. METHODOLOGY

3.1. DATA SOURCES

Policy or standards: Refers to a written policy and/or international/national standards used/implemented within the boundaries/organizations.

Monitoring records: Refers to documents/records used as evidence and primary data to achieve the intended goals.

Contract agreements: Documents are evidence for indicating mutual obligations between the parties.

Purchasing records and documents: Documents indicate the organization acquiring services or/or products/systems.

3.2. DATA COLLECTION METHOD

Policy or standard:

1. Human capital development document that stated key performance indicators related to green practices.
2. A strategic action plan on human capital development that the organization undertakes to meet its green practices.
3. Policy on human capital development related to green practices applied in the organization.

Monitoring Records:

1. Minutes of meetings related to human capital development.
2. A statement of documented human capital development that the organization shares on its website, social media, and other media of communications.
3. Recognition of organizational human capital development activities (e.g., certificate, award at national and international levels).
4. *Contract agreements: A d*ocumented agreement indicating mutual obligations between the parties that is related to human capital development.

3.3. COMPUTATION

Not applicable.

3.4. ASSUMPTIONS AND UNCERTAINTIES

Not applicable.

4. OTHER METHODOLOGICAL CONSIDERATIONS

4.1. COMMENT AND LIMITATION.

Not applicable.

4.2. VALIDATION

Not applicable.

4.3. QUALITY MANAGEMENT

ISO 30414:2018 (Human Resource Management)

5. REFERENCES AND DOCUMENTATION

1. Sustainable Development Goals (SDG) 2030.
2. ISO 30414:2018 Guide

QUESTIONNAIRE

1. Cost-benefit analysis: This involves comparing the costs of implementing the evaluation method with the potential benefits that it is expected to produce.
    (a) On a scale of 1-5, how expensive is it to implement this evaluation method? (1 = very inexpensive, 5 = very expensive)
    (b) On a scale of 1-5, how much of a benefit is this evaluation method expected to produce? (1 = no benefit, 5 = significant benefit)
    (c) On a scale of 1-5, how likely is it that the benefits of this evaluation method will outweigh the costs? (1 = not likely at all, 5 = extremely likely)
    (d) On a scale of 1-5, how confident are you that the costs of this evaluation method can be financed? (1 = not confident at all, 5 = extremely confident)
    (e) On a scale of 1-5, how well does this evaluation method compare to other evaluation methods in terms of cost-benefit ratio? (1 = much worse, 5 = much better)
    (f) On a scale of 1-5, how much of an impact does this evaluation method have in terms of unintended consequences? (1 = no impact, 5 = significant impact)
    (g) On a scale of 1-5, how much of an impact does this evaluation method have in terms of long-term costs or benefits? (1 = no impact, 5 = significant impact)
    (h) On a scale of 1-5, how much of an impact does this evaluation method have in terms of regulatory or legal considerations? (1 = no impact, 5 = significant impact)

2. Feasibility study: This is a comprehensive analysis of the potential risks, challenges and opportunities of the evaluation method, including the resources required and the potential impact on the stakeholders.
    (a) On a scale of 1-5, how easy is it to implement this evaluation method? (1 = very difficult, 5 = very easy)
    (b) On a scale of 1-5, how well does this evaluation method fit within the available resources and constraints? (1 = not well at all, 5 = extremely well)
    (c) On a scale of 1-5, how likely is it that this evaluation method will be successful given the available resources and constraints? (1 = not likely at all, 5 = extremely likely)
    (d) On a scale of 1-5, how much time is required to implement this evaluation method? (1 = very little time, 5 = a significant amount of time)
    (e) On a scale of 1-5, how well does this evaluation method perform during the pilot testing? (1 = not well at all, 5 = extremely well)
    (f) On a scale of 1-5, how well does this evaluation method perform in terms of logistics? (1 = not well at all, 5 = extremely well)
    (g) On a scale of 1-5, how well does this evaluation method perform in terms of data accessibility? (1 = not well at all, 5 = extremely well)
    (h) On a scale of 1-5, how well does this evaluation method perform in terms of expert review? (1 = not well at all, 5 = extremely well)

3. Time analysis: This involves analysing the amount of time required to implement the evaluation method, including the time required for data collection, analysis, and reporting.
    (a) On a scale of 1-5, how much time is required to set up this evaluation method? (1 = very little time, 5 = a significant amount of time)
    (b) On a scale of 1-5, how much time is required for data collection with this evaluation method? (1 = very little time, 5 = a significant amount of time)
    (c) On a scale of 1-5, how much time is required for data analysis with this evaluation method? (1 = very little time, 5 = a significant amount of time)
    (d) On a scale of 1-5, how much time is required for reporting with this evaluation method? (1 = very little time, 5 = a significant amount of time)
    (e) On a scale of 1-5, how often does the data need to be updated with this evaluation method? (1 = rarely, 5 = frequently)
    (f) On a scale of 1-5, how much of an impact does this evaluation method have on staff time? (1 = no impact, 5 = significant impact)
    (g) On a scale of 1-5, how much of an impact does this evaluation method have on the project timeline? (1 = no impact, 5 = significant impact)
    (h) 8. On a scale of 1-5, how well does this evaluation method fit within the overall project schedule? (1 = not well at all, 5 = extremely well)
    (i) On a scale of 1-5, how much flexibility is there to adjust the timing of data collection and analysis with this evaluation method? (1 = very little flexibility, 5 = a lot of flexibility)
    (j) On a scale of 1-5, how much time is required for training personnel to use this evaluation method? (1 = very little time, 5 = a significant amount of time)

4. Pilot testing: This involves testing a small-scale version of the evaluation method to identify any potential issues or challenges that need to be addressed before full implementation.
    (a) On a scale of 1-5, how well did this evaluation method perform during the pilot test? (1 = not well at all, 5 = extremely well)
    (b) On a scale of 1-5, how well did the evaluation method meet the needs of the test participants? (1 = not well at all, 5 = extremely well)
    (c) On a scale of 1-5, how well did the evaluation method achieve the desired outcomes? (1 = not well at all, 5 = extremely well)
    (d) On a scale of 1-5, how much feedback did test participants provide about the evaluation method? (1 = very little feedback, 5 = a lot of feedback)
    (e) On a scale of 1-5, how well did the evaluation method perform compared to other similar methods tested? (1 = not well at all, 5 = extremely well)
    (f) On a scale of 1-5, how feasible is it to implement this evaluation method on a larger scale? (1 = not feasible at all, 5 = extremely feasible)
    (g) On a scale of 1-5, how much of an impact did the evaluation method have on the pilot test participants? (1 = no impact, 5 = significant impact)
    (h) On a scale of 1-5, how well did the evaluation method perform in terms of data accuracy? (1 = not well at all, 5 = extremely well)
    (i) On a scale of 1-5, how well did the evaluation method perform in terms of data reliability? (1 = not well at all, 5 = extremely well)

(j) On a scale of 1-5, how well did the evaluation method perform in terms of data validity? (1 = not well at all, 5 = extremely well)

5. Expert review: This involves consulting with experts in the field to gain their perspective on the feasibility of the evaluation method, including any potential challenges and opportunities.
   (a) On a scale of 1-5, how well does this evaluation method align with current industry standards and best practices? (1 = not well at all, 5 = extremely well)
   (b) On a scale of 1-5, how well does this evaluation method address the research question or problem it is intended to solve? (1 = not well at all, 5 = extremely well)
   (c) On a scale of 1-5, how well does this evaluation method utilize appropriate methods and techniques? (1 = not well at all, 5 = extremely well)
   (d) On a scale of 1-5, how well does this evaluation method account for potential sources of bias? (1 = not well at all, 5 = extremely well)
   (e) On a scale of 1-5, how well does this evaluation method account for potential confounding variables? (1 = not well at all, 5 = extremely well)
   (f) On a scale of 1-5, how well does this evaluation method account for potential ethical concerns? (1 = not well at all, 5 = extremely well)
   (g) On a scale of 1-5, how well does this evaluation method account for potential limitations? (1 = not well at all, 5 = extremely well)
   (h) On a scale of 1-5, how well does this evaluation method account for potential uncertainties? (1 = not well at all, 5 = extremely well)
   (i) On a scale of 1-5, how well does this evaluation method account for potential generalizability? (1 , not well at all, 5 = extremely well)
   (j) On a scale of 1-5, how well does this evaluation method perform in terms of data quality? (1 = not well at all, 5 = extremely well)

6. Stakeholder analysis: This involves identifying and assessing the perspectives and needs of the stakeholders affected by the evaluation method, to understand the feasibility of the method in relation to their needs and concerns.
   (a) On a scale of 1-5, how important are the stakeholders in the success of this evaluation method? (1 = not important at all, 5 = extremely important)
   (b) On a scale of 1-5, how satisfied are stakeholders with this evaluation method? (1 = not satisfied at all, 5 = extremely satisfied)
   (c) On a scale of 1-5, how well does this evaluation method meet the needs of the stakeholders? (1 = not well at all, 5 = extremely well)
   (d) On a scale of 1-5, how much input did stakeholders have in the development of this evaluation method? (1 = no input, 5 = significant input)
   (e) On a scale of 1-5, how well does this evaluation method align with the goals and objectives of the stakeholders? (1 = not well at all, 5 = extremely well)
   (f) On a scale of 1-5, how well does this evaluation method account for potential stakeholder conflicts? (1 = not well at all, 5 = extremely well)
   (g) On a scale of 1-5, how well does this evaluation method account for potential stakeholder resistance? (1 = not well at all, 5 = extremely well)

(h) On a scale of 1-5, how well does this evaluation method account for potential stakeholder power imbalances? (1 = not well at all, 5 = extremely well)
(i) On a scale of 1-5, how well does this evaluation method consider the perspectives of diverse stakeholders? (1 = not well at all, 5 = extremely well)
(j) On a scale of 1-5, how well does this evaluation method involve stakeholders in the implementation and monitoring process? (1 = not well at all, 5 = extremely well)

7. Logistics: This involves assessing the logistical aspects of the evaluation method, including the availability of necessary equipment, personnel, and facilities required to implement the evaluation method.
   (a) On a scale of 1-5, how well does this evaluation method fit within the existing infrastructure and resources? (1 = not well at all, 5 = extremely well)
   (b) On a scale of 1-5, how much additional infrastructure and resources are required for this evaluation method? (1 = no additional resources, 5 = significant additional resources)
   (c) On a scale of 1-5, how well does this evaluation method account for potential logistical challenges? (1 = not well at all, 5 = extremely well)
   (d) On a scale of 1-5, how well does this evaluation method account for potential geographical challenges? (1 = not well at all, 5 = extremely well)
   (e) On a scale of 1-5, how well does this evaluation method account for potential seasonal challenges? (1 = not well at all, 5 = extremely well)
   (f) On a scale of 1-5, how well does this evaluation method account for potential security challenges? (1 = not well at all, 5 = extremely well)
   (g) On a scale of 1-5, how well does this evaluation method account for potential scalability? (1 = not well at all, 5 = extremely well)
   (h) On a scale of 1-5, how well does this evaluation method account for potential sustainability? (1 = not well at all, 5 = extremely well)
   (i) On a scale of 1-5, how well does this evaluation method account for potential adaptability? (1 = not well at all, 5 = extremely well)
   (j) On a scale of 1-5, how well does this evaluation method account for potential data privacy? (1 = not well at all, 5 = extremely well)

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