GREEN PRACTICES GUIDELINE FOR MANUFACURING SECTOR

KEMENTERIAN SUMBER ASLI, ALAM SEKITAR DAN PERUBAHAN IKLIM

2023

Green Practices Guideline for

MANUFACTURING SECTOR

GREEN PRACTICES GUIDELINE FOR

MANUFACTURING SECTOR

Malaysian Green Technology & Climate Change Corporation

PROJECT TEAM (MGTC)

Ts. Shamsul Bahar Mohd Nor
Kamaradzaman Mohd Bakri
Abd. Malik Atan
Azlina Hashim
Muhammad Faiz Abdul Rahman
Nur Amalina Hasanudin
Khairul Ikhwan Jamaludin

TECHNICAL EXPERT & AUTHORS

Dr Irina Harun
Prof Dr. Faradiella Mohd Kusin
Ts. Raja Shazrin Shah bin Raja Ehsan Shah
Ts. Sr. Dr. Mohammad Ridzuan bin Yahya
Prof Madya Dr. Atikah Kadri
Prof Madya Dr. Norol Hamiza Zamzuri
Prof Madya Dr. Rasidah Hamid
Prof Madya Dr Yusfida Ayu Abdullah
Prof Madya Ir. Dr. Nofri Yenita Dahlan
Dr. Zakiah Ponrahono
Dr. Mohd Yusoff Ishak
Prof. Madya Ir. Dr. Siti Shawalliah Idris
Dr. Marfiah Ab Wahid
Dr. Natrina Mariane P. Toyong
Dr. Siti Ayu Jalil
Dr. Zadariana bt Jamil @ Osman
Noor Azlin Mahat
Zakiyah Hasan

PROJECT SUPPORT & FACILITATION

Afiqah Aiman Abdul Gaffar
Pubeshwaran Yuvarajan
Nur Shazreena Mat Shukri
Siti Afiqah Mohammad Sabri
Syazwani Sahrir
Fatiah Abdul Aziz

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)
Abd Aziz Chik (JAS)
Mohd Nazri Ramli (JAS)
Yusni Md Yusop (MIDA)
Hanis Ilyana Md Isa (MIDA)
Edison Choong Wan Sern (MATRADE)
Mohd Faizal Mohd Alwi (SIRIM Qas International)
Abd Rahim Wasik (SIRIM Qas International)

LIST OF ABBREVIATIONS

3R	Reduce, reuse and recycle
CCS	Carbon Capture and Storage
CH4	Methane
CO2	Carbon Dioxide
COP26	The 2021 United Nations Climate Change Conference
CSR	Corporate Social Responsibility
EEV	Energy Efficient Vehicles
EFB	Empty Fruit Bunches
EMGS	Energy Management Gold Standard
EPF	Employees Provident Fund
EPR	Extended Product Responsibility
EQA1974	Environmental Quality Act 1974
ESG	Environment, Social, and Governance
EToU	Enhanced Time of Use
EU	European Union
EVs	Electric Vehicles
FGV	Felda Global Ventures
GBI	Green Building Index
GDP	Gross Domestic Product
GERO	Gross Domestic Expenditure on Research and Development
GHGs	Greenhouse Gases
GJ	Giga Joule
GLIC	Government-linked Investment Companies
GMP	Good Manufacturing Practice
GTMP	Green Technology Master Plan
HFCs	Hydrofluorocarbons
HHI	Herfindhal-Hirschman Index
HR	Human Resources
ICE	Internal Combustion Engine
IPP	Independent Power Producers
ISO	International Standard Organization
MDGs	Millennium Development Goals
MEPS	Minimum Energy Performance Standard
MITI	Ministry of International Trade and Industry
MSIC	Malaysia Standard Industrial Classification
MT	Metric Tonne
MW	Megawatt
MWh	Megawatt-hour
MyCREST	Malaysian Carbon Reduction & Environmental Sustainability Tools
MyOrganic	Malaysia Organic
MySDG Fund	Malaysia Sustainable Development Goals Trust Fund
N2O	Nitrous Oxide
NEA	National Energy Awards
NEEAP	National Energy Efficiency Action Plan
NF3	Nitrogen Trifluoride
NGV	Natural Gas Vehicles
NGO	Non-Governmental Organizations
NRPAs	National Research and Development Priority Areas
NRW	Non-revenue water
OHSAS	Occupational Health and Safety Assessment Series
PASS	Green Performance Assessment System
PFCs	Perfluorocarbons
POME	Palm Oil Mill Effluent
PRF	Permanent Reserve Forest
PV	Photovoltaics
R&D	Research and Development
RE	Renewable Energy
SDGs	Sustainable Development Goals
SF6	Sulfur Hexafluoride
SME	Small and Medium Enterprises
SO2	Sulfur Dioxide
SOP	Standard Operating Practice
SPAN	Suruhanjaya Perkhidmatan Air Negara
UNIFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
WELPS	Water Efficient Product Labelling Scheme

LIST OF TERMINOLOGIES

CARBON PRICING	The implementation of a tax or fee, or a cap-and-trade system on the carbon content of fossil fuels or on their carbon dioxide emissions. It is a tool mechanism that harnesses market forces to lower their emissions by switching to more efficient processes or cleaner fuels
CARBON TAX	A fee imposed on companies and organizations that emit carbon from the burning of coal, oil or gas. The main goal of carbon tax is to reduce the emission of greenhouse gases to the atmosphere.
CIRCULAR ECONOMY	An economic system that ensures the maximum use is extracted from resources and minimum waste is generated for disposal. It is a model of production and consumption that keeps materials, products and services in circulation for as long as possible by reusing products rather than disposal at end-of-life and then extracting new resources.
CLEANER PRODUCTION	The process of effectively using resources and energies, thus minimizing the waste generated from the process
ECO-DESIGN	A concept that consider and actively minimize the environmental impact of a product across its entire lifecycle, from material extraction and supply to end of life. It may also be known as the ISO/TR 14062 standard for environmental management in product design.
EFFICIENT	Achieving maximum productivity with minimum wasted effort or expense.
WASTE	Waste includes any matter prescribed to be scheduled wastes, or any matter whether in a solid, semi-solid or liquid form, or in the form of gas or vapor which is emitted, discharged or deposited in the environment in such volume, composition or manner as to cause pollution.
GREEN	Any activity or concept that seeks to increase the degree by which the processes of the manufacturing industry meet environmental standards and deepen their integration within a circular economy.
GREEN MANUFACTURING	Reflects a new manufacturing paradigm which implements various green strategies and techniques (technology and innovation) to become more efficient. It includes generating processes with low environmental impacts, and processes that are productive with reduced waste and contamination. It is a multi-measure strategy to reduce an environment-polluting waste created during manufacturing activity.
INDUSTRY	Activities which are described in Section C (Manufacturing) of Malaysia Standard Industrial Classification 2008
MANUFACTURER	Any person or company that assemble or make a product, enclose or pack that product in any container in a form suitable for administration or application, labelling of the container and the carrying out of any process in the course of any of the foregoing activities.
WASTE HIERACHY	A ranking system used for the different waste management options according to which is the best for the environment. The most preferred option is waste prevention, followed by reuse, recycle, recover and the least preferred is disposal.

CONTENT

FOREWORD

The development of green practice guidelines is a continuation of the implementation of the MyHIJAU Program under the Ministry of Environment and Water (KASA) and the Malaysian Green Technology and Climate Change Corporation (MGTC) which is a coordinating agency and secretariat for the program. This program has been approved by the National Council for Green Technology and Climate Change (MTHPI) which was held on 23 October 2012. This is one of the Government's initiatives in the development of Green Technology in Malaysia. It is in line with the implementation of the National Green Technology Policy as well as the direction of Sustainable Consumption & Production (SCP) to encourage local manufacturers, producers and suppliers, especially to companies and Small and Medium Enterprises (SMEs). In addition, it will also focus on the Government's initiatives and direction in the development of the country's SMEs.

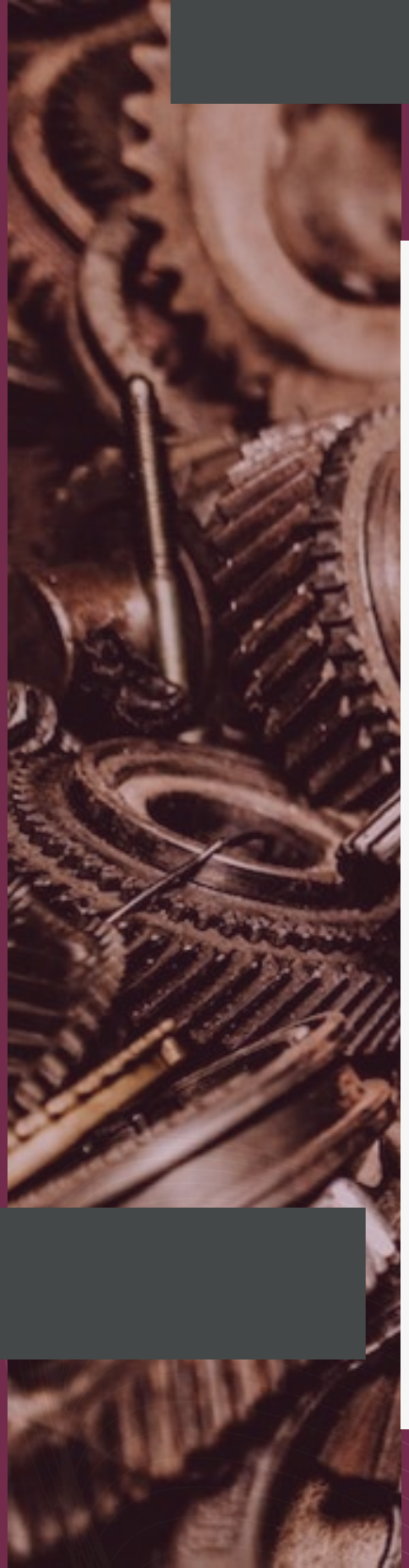
The development of Green Practice Guidelines is to provide guidance to the green industry in implementing green practices at the preliminary stage, during and after construction is implemented. These guidelines also have an implementation direction to ensure that these Guidelines will continue to be referred to and used by all parties, especially industry players to help achieve the government's goal of implementing green development in Malaysia. This green practice can help the industrial sector to have the potential to venture into the field of green technology, especially in the production of green products and services, as well as increase the encouragement of producers, manufacturers and suppliers to apply green technology in the premises, production process and operation. This green practice can help the industrial sector to have the potential to venture into the field of green technology, especially in the production of green products and services, as well as increase the encouragement of producers, manufacturers and suppliers to apply green technology in the premises, production process and operation.

These Guidelines are more towards the requirements that need to be put into practice so that industries, companies and organizations have green practice guidelines that can be referred to as well as help companies achieve the government's goal of using green practices in line with SDG 12.6, which is to encourage the industry to use sustainable practices and integrate information sustainability into the reporting cycle.

Referring to the twelfth Malaysia plan under the eighth main focus which is to accelerate green growth, where this green practice development program is able to play a very important role in being a catalyst to ensure that these green practices are more practical and applicable to all parties in the green industry whether directly or indirectly for local companies and businesses to gain exposure to this green industry practice guide.

Therefore, increasing productivity and long-term profits through environmental, social and governance (ESG) elements should be applied in decision-making by ensuring that companies focus on reducing the negative impact on the environment. Although Malaysia only contributes 0.7 percent to greenhouse gas emissions, the Government will continue to fulfil its commitment to reduce GHG emission intensity up to 45 percent to GDP in 2030, based on emission intensity in 2005, in line with the aspiration to become a low carbon country.

It is hoped that this goal can be achieved by focusing on the industry to understand the importance of green practices in business by applying knowledge about the benefits and applications of green technology as well as the implementation strategy of the green practice monitoring mechanism in business management to obtain the recognition of the green industry.



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.

Key Points:

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

INTRODUCTION

1.1 ABOUT THE SECTOR

The manufacturing sector plays a pivotal role in driving economic growth, job creation, and the production of goods on a larger scale, thereby improving livelihoods. In Malaysia, the manufacturing sector has been a key contributor to the nation's Gross Domestic Product (GDP) and employment opportunities. According to data from the Department of Statistics Malaysia, the manufacturing sector accounted for **23.6%** of Malaysia's GDP in 2020 (Department of Statistic Malaysia, 2021). Furthermore, manufacturing sales amounted to **RM124.4 billion**, indicating a 6.5% increase as of June 2021.

GDP

Main contributor at
23.6%
In 2020

With a substantial workforce of **2,215,420 employees** and total salaries and wages of **RM7,360.3 million**, the manufacturing sector is a significant contributor to employment and income generation (Department of Statistic Malaysia, 2021). Recognizing the importance of this sector, the Malaysian government has prioritized it as a key area for investment, both domestically and internationally. In 2020, the manufacturing sector, along with the services and primary sectors, attracted **RM164 billion** worth of approved investments, with 39.1% of these investments coming from foreign sources (Malaysian Investment Development Authority, 2020). These investments are projected to create **114,673 new jobs** across **4,599 projects**, further stimulating economic growth and development.

Contribute to:
- 2,215,420 employment
- RM7,360.3 million in salary & wages

Attracted RM164 billion worth of approved investments

114,673
New jobs

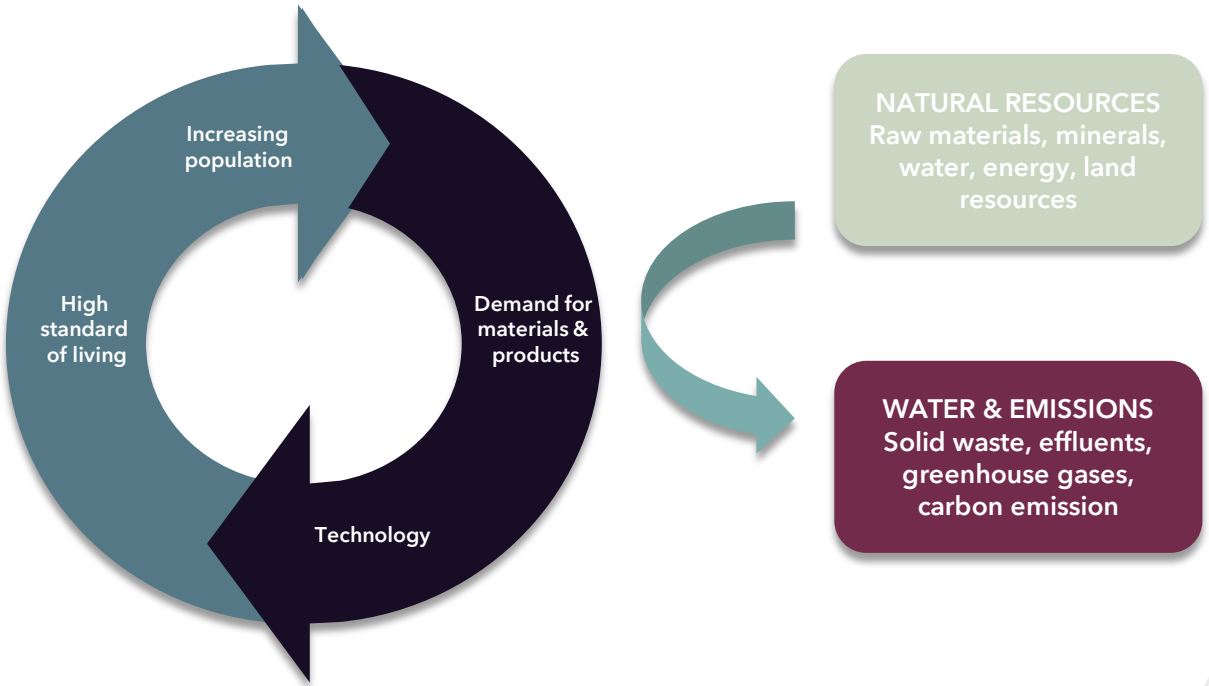
&

4,599
New projects

However, as the manufacturing industry continues to grow and evolve, its **environmental impact becomes a pressing concern**. The industry's traditional processes, aimed at transforming primary inputs into innovative products, have resulted in the utilization of significant amounts of natural resources, including metals, minerals, fossil fuels, and water. The increasing demand for materials and products, driven by higher living standards and population growth, has led to higher energy intensities and the subsequent generation of more waste and emissions. This unsustainable pattern of resource consumption and environmental impact poses challenges to the long-term well-being of both society and the environment.

To address these challenges and promote sustainable practices within the manufacturing sector, the **Green Practices Guideline for the Manufacturing Sector** has been developed. This reference document serves as a comprehensive resource to help industries align with the objectives of the Green Technology Master Plan (GTMP). By adopting the guidelines outlined in this document, manufacturing companies can implement environmentally friendly practices, reduce their ecological footprint, and contribute to the nation's sustainability goals. Through the integration of green technologies, resource efficiency, waste reduction, and emissions management, the manufacturing sector can pave the way for a greener and more sustainable future.

The Green Practices Guideline for the Manufacturing Sector provides contextual examples and practical recommendations that empower industries to improve their environmental performance. By embracing sustainable practices, manufacturers can minimize the environmental impact of their operations, conserve natural resources, enhance their competitiveness, and contribute to the well-being of both present and future generations.



1.2 SCOPE & APPLICATION

The Green Practices Guidelines for the Manufacturing Sector in Malaysia have been developed to provide a comprehensive framework for implementing sustainable practices in the industry. These guidelines align with the objectives of the Green Technology Master Plan (GTMP) and aim to contribute to the nation's sustainability goals. The manufacturing sector, with its significant economic impact and resource consumption, holds immense potential for driving environmental change and promoting sustainable development. Let's explore how the key indicators outlined in these guidelines can be applied in the context of the manufacturing sector:

01 Material

Manufacturers can adopt sustainable material sourcing practices, prioritize the use of recycled and renewable materials, and explore options for reducing waste in production processes. For example, incorporating recycled content into product manufacturing, implementing closed-loop systems to minimize material waste, and optimizing material usage through lean manufacturing principles.

02 Waste

Effective waste management is crucial in the manufacturing sector. Companies can implement strategies to reduce, reuse, and recycle waste generated during production processes. This includes implementing waste segregation systems, exploring partnerships with recycling facilities, and promoting circular economy principles to minimize landfill waste.

03 Water

Manufacturers can implement water conservation measures to minimize water consumption in their operations. This can involve adopting water-efficient technologies, optimizing water usage through process optimization and equipment upgrades, and implementing water recycling and reuse systems where applicable.

By integrating these green practices into the manufacturing sector, Malaysia can pave the way for a more sustainable and resilient industry. Manufacturers can reduce their ecological footprint, conserve resources, minimize waste generation, and contribute to the country's transition to a greener economy. The Green Practices Guidelines for the Manufacturing Sector provide a roadmap for companies to implement sustainable practices, drive innovation, and demonstrate their commitment to environmental stewardship. By embracing these guidelines, manufacturers can not only enhance their competitiveness but also contribute to the overall well-being of society and the environment.

04 Energy

Energy efficiency initiatives are essential for reducing the carbon footprint of the manufacturing sector. Manufacturers can invest in energy-efficient equipment, implement energy management systems, conduct energy audits to identify areas for improvement, and explore opportunities for utilizing renewable energy sources in their operations

05 Innovation

Encouraging innovation and the adoption of green technologies is key to driving sustainability in the manufacturing sector. This can involve implementing advanced manufacturing processes, exploring alternative materials and production methods, and embracing digital technologies to optimize energy and resource usage

06 Management

Effective environmental management practices are crucial for achieving sustainability goals. This includes setting targets for reducing environmental impacts, conducting regular environmental audits, providing training to employees on sustainable practices, and ensuring compliance with relevant environmental regulations and certifications.

1.3 MOTIVATION TO SUSTAINABILITY

Sustainability is of utmost importance in today's global business landscape, including the manufacturing sector. As a significant contributor to economic growth and industrial development, the manufacturing sector in Malaysia recognizes the need to embrace sustainable practices to ensure long-term success, competitiveness, and a positive impact on the environment and society.

ENVIRONMENTAL STEWARDSHIP

Manufacturers have a responsibility to be environmentally responsible. By adopting sustainable practices, they can minimize their ecological footprint, reduce pollution, and conserve natural resources. Demonstrating environmental stewardship showcases a commitment to protecting ecosystems, preserving biodiversity, and addressing climate change.

REGULATORY COMPLIANCE & MARKET ACCESS

Adhering to sustainability practices ensures compliance with environmental regulations and positions manufacturers to exceed industry standards. Proactively meeting regulatory requirements helps businesses avoid fines and legal issues. Additionally, adhering to sustainability standards opens doors to international markets with stringent environmental requirements, expanding market access and export opportunities.

COST SAVINGS & EFFICIENCY

Implementing sustainable practices in the manufacturing sector can lead to significant cost savings and operational efficiency. Energy-efficient technologies, waste reduction strategies, and water conservation measures can lower operational expenses and enhance financial resilience. Embracing sustainable supply chain practices improves resource efficiency, reduces material and transportation costs, and contributes to overall cost savings.

INNOVATION & COMPETITIVENESS

Sustainability drives innovation in the manufacturing sector. Manufacturers investing in green technologies, digital solutions, and sustainable practices gain a competitive edge. Embracing sustainability fosters creativity and problem-solving, allowing businesses to adapt to evolving customer needs and stay ahead in a rapidly changing business landscape.

MARKET DEMAND & REPUTATION

Consumers increasingly prioritize businesses that offer environmentally friendly products. By embracing sustainability, manufacturers can tap into the growing market demand for eco-conscious and socially responsible products. A strong commitment to sustainability enhances reputation, builds trust with customers, and fosters brand loyalty.

EMPLOYEE ENGAGEMENT & PRODUCTIVITY

Commitment to sustainability enhances employee morale, engagement, and productivity. Working for environmentally responsible organizations becomes a source of pride for employees. Manufacturers prioritizing sustainability attract and retain top talent, leading to increased productivity, job satisfaction, and overall organizational success.

RESILIENCE TO CLIMATE RISKS

Incorporating sustainability practices in the manufacturing sector builds resilience to climate-related risks. Strategies to mitigate and adapt to climate change impacts, such as extreme weather events or supply chain disruptions, ensure business continuity and protect assets. By preparing for climate risks, manufacturers can navigate uncertainties and maintain operations even in challenging circumstances.

By embracing sustainable practices, the manufacturing sector in Malaysia can contribute to the achievement of the Green Technology Master Plan (GTMP) objectives, foster a sustainable economy, and align with national and global sustainability efforts. The guidelines provide a roadmap for manufacturers to adopt green practices, drive innovation, enhance competitiveness, and make a positive impact on the environment and society.

1.3.1 CLIMATE CHANGE

Climate change presents a significant challenge for the manufacturing sector in the 21st century. It is essential to recognize that economic development should not come at the expense of the environment. Controlling greenhouse gas (GHG) emissions is crucial to mitigate the impacts of climate change for the well-being of present and future generations.

In Malaysia, the manufacturing sector is a significant contributor to global GHG emissions, accounting for a substantial portion of the country's emissions (Malaysia BUR3 UNFCCC Report, 2020). As part of its commitment to climate action and green technology, Malaysia aims to become a low-carbon nation by 2050. This includes a commitment to reduce GHG emissions (against Gross Domestic Product: GDP) by 45% by 2030 compared to the 2005 level, aligning with the targets set in the Paris Agreement and global sustainability goals.

This national aspiration presents opportunities for businesses in the manufacturing sector to lead in sustainable practices, innovation, and energy efficiency. Some examples include:

1. **Energy Efficiency and Renewable Energy**: Manufacturers can invest in energy-efficient technologies and practices to reduce energy consumption and decrease GHG emissions. This can involve implementing energy management systems, adopting clean energy sources such as solar or wind power, and optimizing production processes to minimize energy waste.

2. **Circular Economy and Resource Efficiency:** Adopting circular economy principles can help manufacturers reduce waste generation, promote recycling and reuse, and minimize the consumption of virgin resources. Implementing waste reduction strategies, optimizing material usage, and incorporating remanufacturing or refurbishment practices can contribute to a more sustainable manufacturing approach.

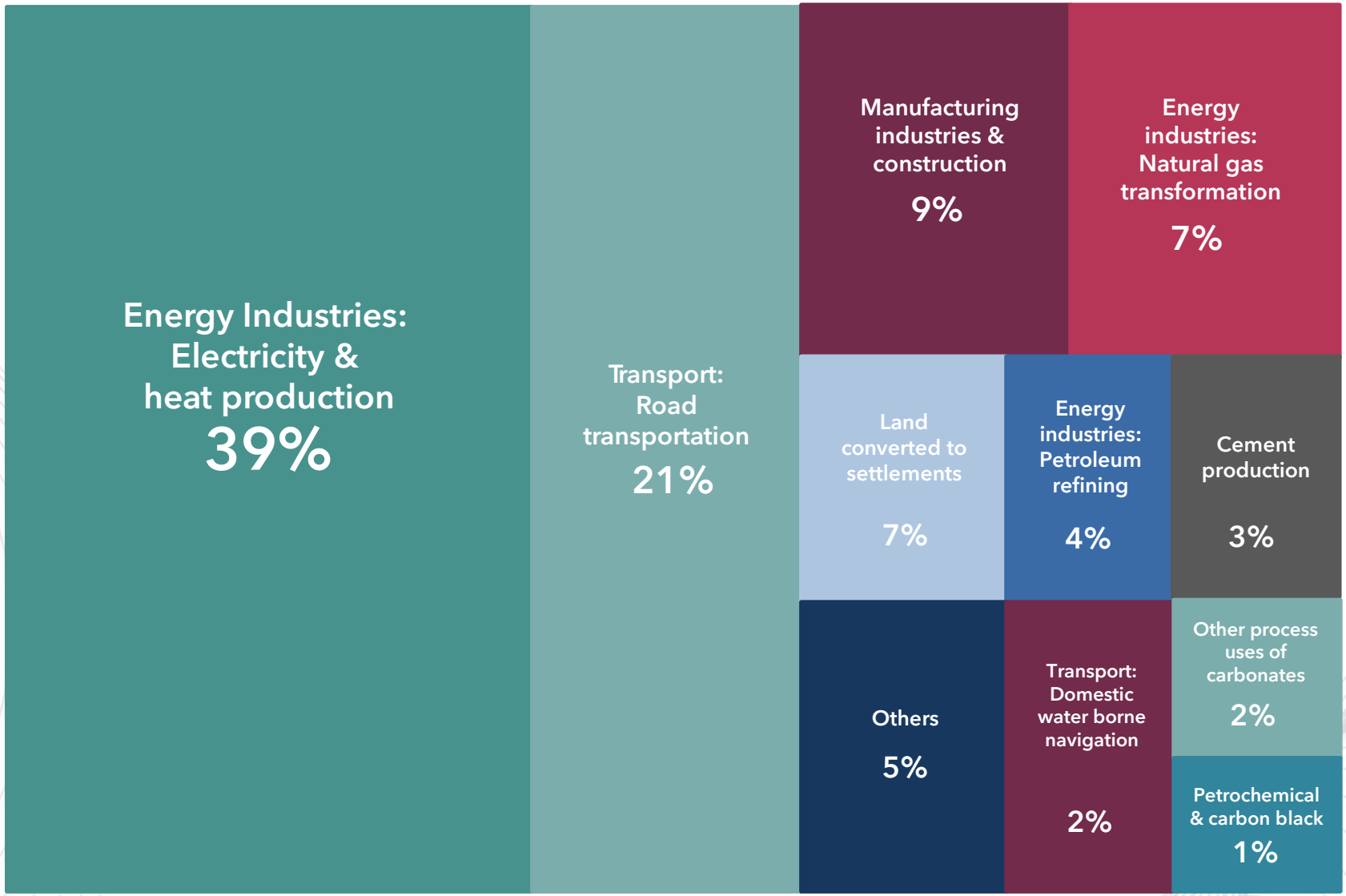
3

Supply Chain Sustainability: Manufacturers can collaborate with suppliers to ensure sustainable sourcing practices, promoting environmentally friendly materials, and minimizing carbon-intensive transportation. This includes assessing the environmental impact of suppliers, implementing supplier codes of conduct, and fostering partnerships that prioritize sustainability.

4

Sustainable Product Design: Manufacturers can integrate sustainability considerations into the design and development of products. This involves using eco-friendly materials, optimizing product life cycles, and ensuring energy efficiency and recyclability. By producing products that are environmentally responsible and meet green standards, manufacturers can appeal to eco-conscious consumers and gain a competitive edge..

By aligning with the Paris Agreement and global sustainability targets, the manufacturing sector in Malaysia can play a vital role in mitigating climate change and promoting a low-carbon future. Embracing sustainable practices not only helps reduce environmental impact but also enhances reputation, attracts socially responsible investors, and strengthens market competitiveness. It is through the collective efforts of manufacturers and the implementation of sustainable measures that Malaysia can build a more resilient and environmentally conscious economy.


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

The manufacturing sector in Malaysia has a significant opportunity to embrace the principles of the circular economy. The circular economy concept focuses on resource reuse, waste prevention, and reducing material loss to promote long-term resilience and sustainable economic growth. Adopting a circular economy approach in the manufacturing sector offers several benefits, including enhanced resource efficiency, cost-effectiveness, waste reduction, and addressing climate change. This can be particularly relevant for industries such as automotive manufacturing, electronics, and consumer goods, which can play a crucial role in advancing the circular economy. Key aspects and initiatives related to the circular economy in Malaysia's manufacturing sector include:

Policy and Regulatory Framework: The Malaysian government has recognized the importance of transitioning to a circular economy and has implemented policies and regulations to support this shift. The Green Technology Master Plan (GTMP) provides guidelines and strategies for adopting sustainable practices in the manufacturing sector, including promoting circular economy principles.

Waste Management and Recycling: Efficient waste management and recycling systems are essential for a circular economy. Malaysia has made progress in waste management through initiatives such as the National Strategic Plan for Solid Waste Management. Manufacturers are encouraged to implement waste reduction measures, promote recycling, and explore innovative solutions for converting waste into valuable resources.

Product Design and Extended Producer Responsibility (EPR): Encouraging sustainable product design and implementing extended producer responsibility schemes are crucial for achieving a circular economy. Manufacturers are encouraged to adopt eco-design principles, prioritize durability and repairability, and take responsibility for the end-of-life management of their products.

Sustainable Supply Chains: Promoting sustainable practices throughout the supply chain is a key focus area for advancing the circular economy in the manufacturing sector. This includes sourcing raw materials from sustainable and ethical suppliers, optimizing transportation and logistics to minimize waste, and collaborating with suppliers to implement circular economy principles.

Innovation and Technology: Innovation and the adoption of advanced technologies play a crucial role in facilitating the transition to a circular economy. Malaysia actively encourages research and development in areas such as resource-efficient manufacturing processes, recycling technologies, and the use of digital platforms for optimizing resource utilization.

Collaboration and Stakeholder Engagement: Collaboration and Stakeholder Engagement: The successful implementation of a circular economy requires collaboration among various stakeholders, including government agencies, manufacturers, academia, and civil society. Malaysia fosters partnerships and engages stakeholders through platforms such as industry associations and research institutes to share knowledge, best practices, and resources to drive the circular economy agenda forward in the manufacturing sector.

By embracing circular economy principles, the manufacturing sector in Malaysia, including industries such as automotive manufacturing, electronics, and consumer goods, can optimize resource use, minimize waste, and promote sustainable practices. This will lead to long-term environmental and economic benefits, contributing to a more resilient and sustainable future for Malaysia's manufacturing industry.

1.3.3 IMPACT OF ESG TOWARDS THE INDUSTRY

ESG, which stands for **Environmental, Social, and Governance** criteria, is a vital consideration for the manufacturing sector in Malaysia. It measures the ethical and sustainability impacts of investments in companies and businesses, and it plays a significant role in ensuring long-term success and sustainability.

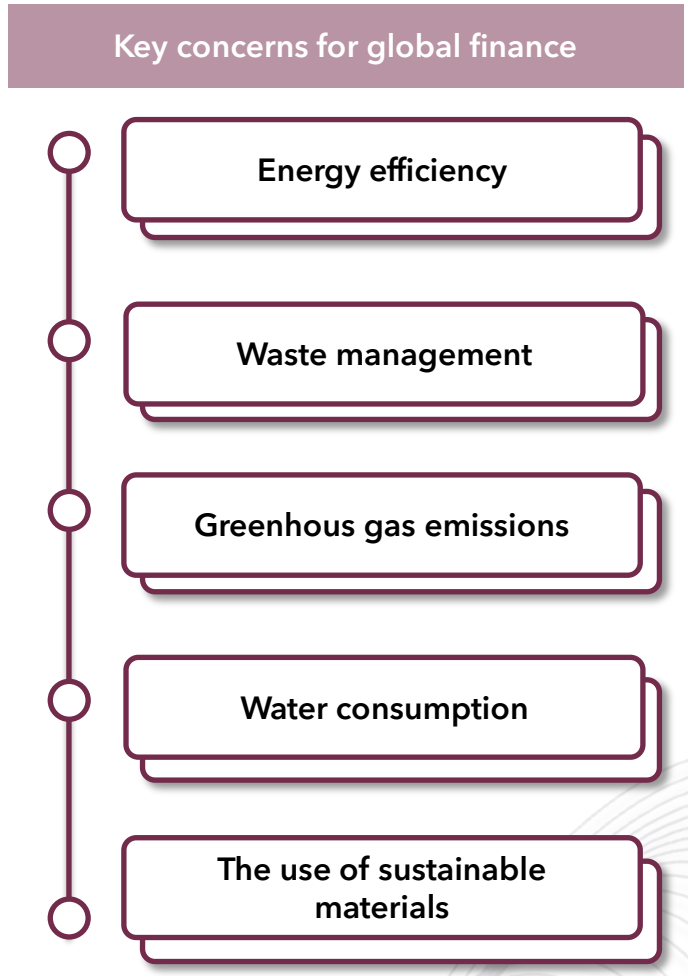
The Ministry of International Trade and Industry, in collaboration with various government agencies and industry stakeholders, has outlined strategies to empower and enable manufacturing enterprises, including Small and Medium Enterprises (SMEs), **to adopt ESG practices.** This includes providing guidance on sustainable manufacturing practices, promoting good governance and transparency, and encouraging the integration of environmental and social considerations into business operations.

The manufacturing sector, encompassing industries such as automotive, electronics, and consumer goods, faces various challenges related to environmental impacts, resource efficiency, and greenhouse gas emissions. Compliance with ESG principles has become increasingly important for the long-term survival and success of businesses in these industries. It aligns with the expectations of consumers, investors, and regulatory bodies.

At **COP26**, developed countries pledged USD 100 billion annually to support climate efforts in developing countries, in line with the goals of the **Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC)** until 2025. This climate finance includes local, national, and transnational funding for mitigation and adaptation actions, providing manufacturing businesses with opportunities to align with existing ESG frameworks and receive financial support for their sustainable initiatives.

Globally, a growing number of investors prioritize ESG frameworks when making investment decisions. **Energy efficiency, waste management, greenhouse gas emissions, water consumption, and the use of sustainable materials are key concerns for global finance**. These aspects fall within the three focal factors of ESG, which evaluate the sustainability and ethical impact of investments.

Manufacturing businesses that neglect to address ESG components may face risks in their operations, including reputational damage, regulatory non-compliance, increased financing costs, and fluctuating share price performance. To address environmental protection, climate change, and sustainable development, companies in the manufacturing sector should consider **adopting green technologies, implementing sustainable manufacturing processes, and integrating social responsibility into their supply chains.**



By embracing ESG principles, the manufacturing sector in Malaysia can enhance its environmental performance, social responsibility, and governance practices. This ensures long-term viability and competitiveness in an increasingly sustainable-focused global landscape. Additionally, it opens doors to new market opportunities, attracts responsible investors, and strengthens stakeholder relationships based on trust and shared sustainability goals.

1.3.4 SUSTAINABLE DEVELOPMENT GOALS

The manufacturing sector in Malaysia has a significant role to play in contributing to the achievement of the **United Nations Sustainable Development Goals (SDGs).** Adopted in 2015, the SDGs provide a universal framework for ending poverty, protecting the planet, and ensuring peace and prosperity by 2030. The SDGs encompass social, economic, and environmental aspects of sustainability, offering a comprehensive approach to addressing global challenges and promoting sustainable development. Each goal is accompanied by specific targets and indicators to measure progress.

In the manufacturing sector, businesses can actively support the SDGs by embracing sustainable practices and integrating sustainability into their operations and reporting. By doing so, they can contribute to various SDGs, such as:

Affordable and Clean Energy - Businesses can promote the generation and use of clean and renewable energy sources, reducing reliance on fossil fuels and transitioning to more sustainable energy alternatives.

Industry, Innovation, and Infrastructure - Embracing innovation and sustainable practices can help businesses contribute to responsible resource extraction, enhance resource efficiency, and support the development of sustainable infrastructure that promotes economic growth while minimizing environmental impact.

Climate Action - By implementing strategies to reduce greenhouse gas emissions, improving energy efficiency, and adopting sustainable manufacturing processes, businesses can contribute to climate mitigation efforts and help address the challenges of climate change.

Life on Land - Emphasizing responsible practices in land use, forest management, and biodiversity conservation can help protect ecosystems, promote land restoration, and support sustainable land management practices.

Partnerships for the Goals - Collaboration between businesses, government bodies, and civil society can foster partnerships and initiatives that drive sustainable development efforts, promote knowledge sharing, and leverage resources to achieve the SDGs.

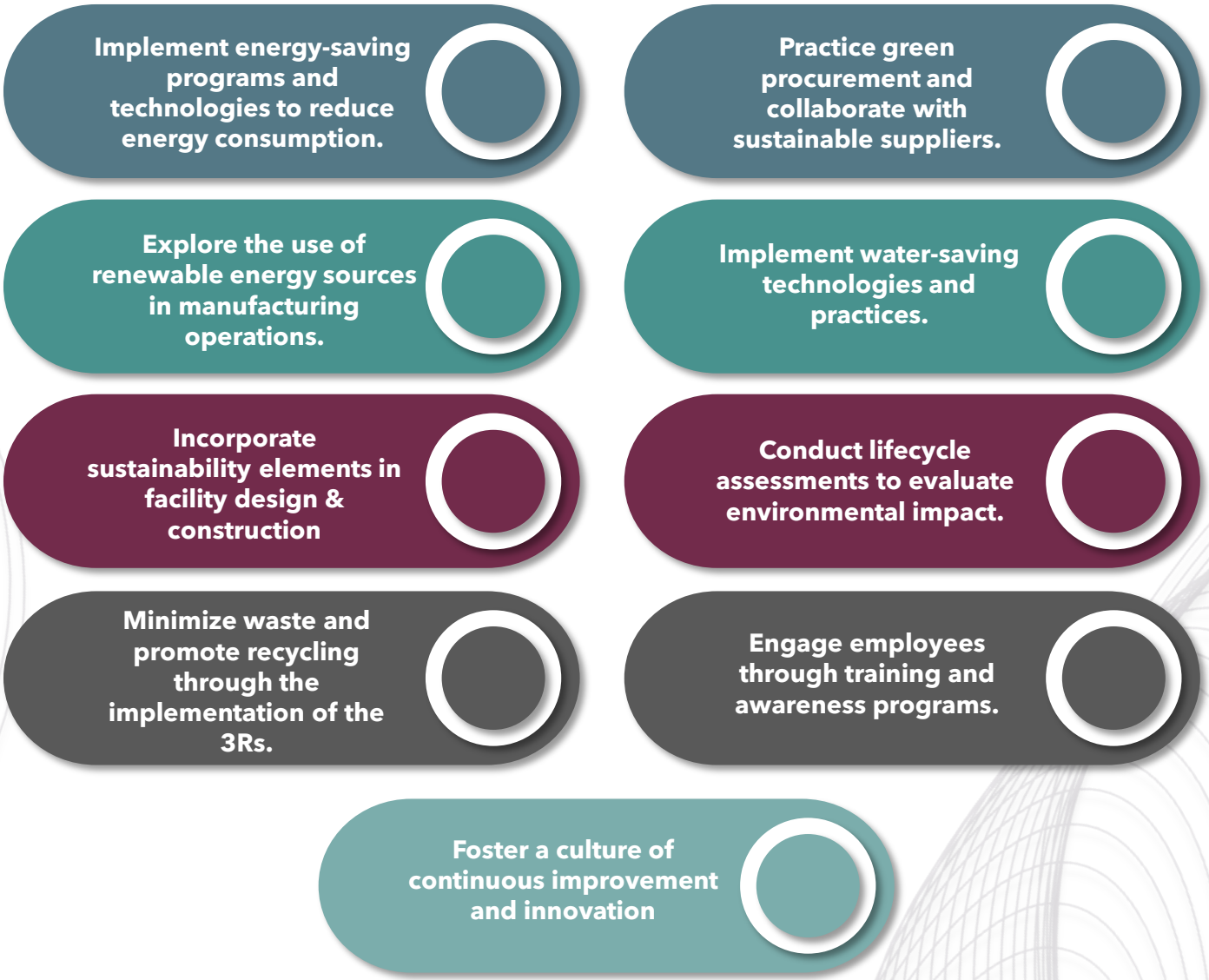
By aligning their operations with the SDGs, businesses in the manufacturing sector can contribute to Malaysia's progress in achieving sustainable development, addressing social and environmental challenges, and ensuring a prosperous future for all. Embracing sustainable practices, adopting green technologies, and promoting responsible resource management will not only benefit the environment but also enhance competitiveness, attract responsible investors, and contribute to the overall well-being of society.

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 manufacturing sector are:



1.4.2 GP IN THE MANUFACTURING SECTOR

The manufacturing sector in Malaysia plays a crucial role in the country's economy, contributing significantly to the Gross Domestic Product (GDP). As the sector continues to grow, it becomes increasingly important to incorporate green practices to align with sustainability goals and address environmental challenges.

Within the manufacturing sector, various industries such as automotive, electronics, textiles, food processing, and chemical production have the opportunity to adopt green practices. These practices aim to minimize environmental impact, promote resource efficiency, and support sustainable development. Examples of green practices in the manufacturing sector include:

Resource Conservation: Implementing measures to conserve resources such as raw materials, water, and energy. This can involve optimizing production processes, implementing recycling and reuse programs, and adopting energy-efficient technologies and equipment.

Pollution Prevention: Reducing the use of toxic and hazardous materials in operations to minimize emissions and waste. This can be achieved through the implementation of cleaner production techniques, the use of eco-friendly materials, and the proper management of waste streams.

Energy Efficiency: Implementing energy-saving measures and utilizing renewable energy sources to reduce greenhouse gas emissions. This can involve upgrading machinery and equipment to more energy-efficient models, optimizing energy consumption through process improvements, and investing in renewable energy technologies.

Supply Chain Sustainability: Collaborating with suppliers to ensure responsible sourcing practices, promote sustainable materials, and reduce environmental impacts throughout the supply chain. This can include engaging suppliers in sustainability initiatives, promoting transparency in the supply chain, and incentivizing sustainable practices.

Product Life Cycle Assessment: Conducting life cycle assessments to identify environmental impacts throughout the entire life cycle of products. This can help manufacturers make informed decisions about product design, material selection, and end-of-life management to minimize environmental footprints.

Environmental Management Systems: Implementing environmental management systems, such as ISO 14001, to establish structured approaches to environmental performance monitoring, compliance, and continuous improvement. This can involve setting environmental objectives, conducting regular audits, and engaging employees in environmental stewardship.

By integrating these green practices, the manufacturing sector in Malaysia can achieve multiple objectives. It can reduce its environmental footprint, conserve resources, enhance operational efficiency, and contribute to the national Green Technology Master Plan (GTMP) objectives. Additionally, adopting green practices can enhance the sector's reputation, attract environmentally conscious customers, and create a competitive advantage in the market.

The incorporation of green practices in the manufacturing sector demonstrates a commitment to environmental stewardship, sustainable development, and the well-being of society. By embracing these practices, Malaysia's manufacturing sector can contribute to broader national and global efforts towards sustainability, while ensuring its own long-term growth and success.

1.4.3 EXISTING NATIONAL POLICIES & GUIDELINES

The manufacturing sector in Malaysia operates within a regulatory framework that promotes sustainable development and environmental protection. These policies and guidelines provide the foundation for responsible practices. Here are some key policies and guidelines relevant to the manufacturing sector:

National Policy on the Environment (Dasar Alam Sekitar Negara): This policy sets the direction for environmentally sound and sustainable development. It aims to achieve economic progress while enhancing the quality of life for Malaysians. The policy provides the framework for environmental management in the manufacturing sector.

Environmental Quality Act 1974: This act focuses on pollution prevention, abatement, and control, as well as the enhancement of environmental quality. It establishes regulations and standards for managing environmental impacts in various sectors, including manufacturing. Compliance with environmental requirements is essential for manufacturing businesses.

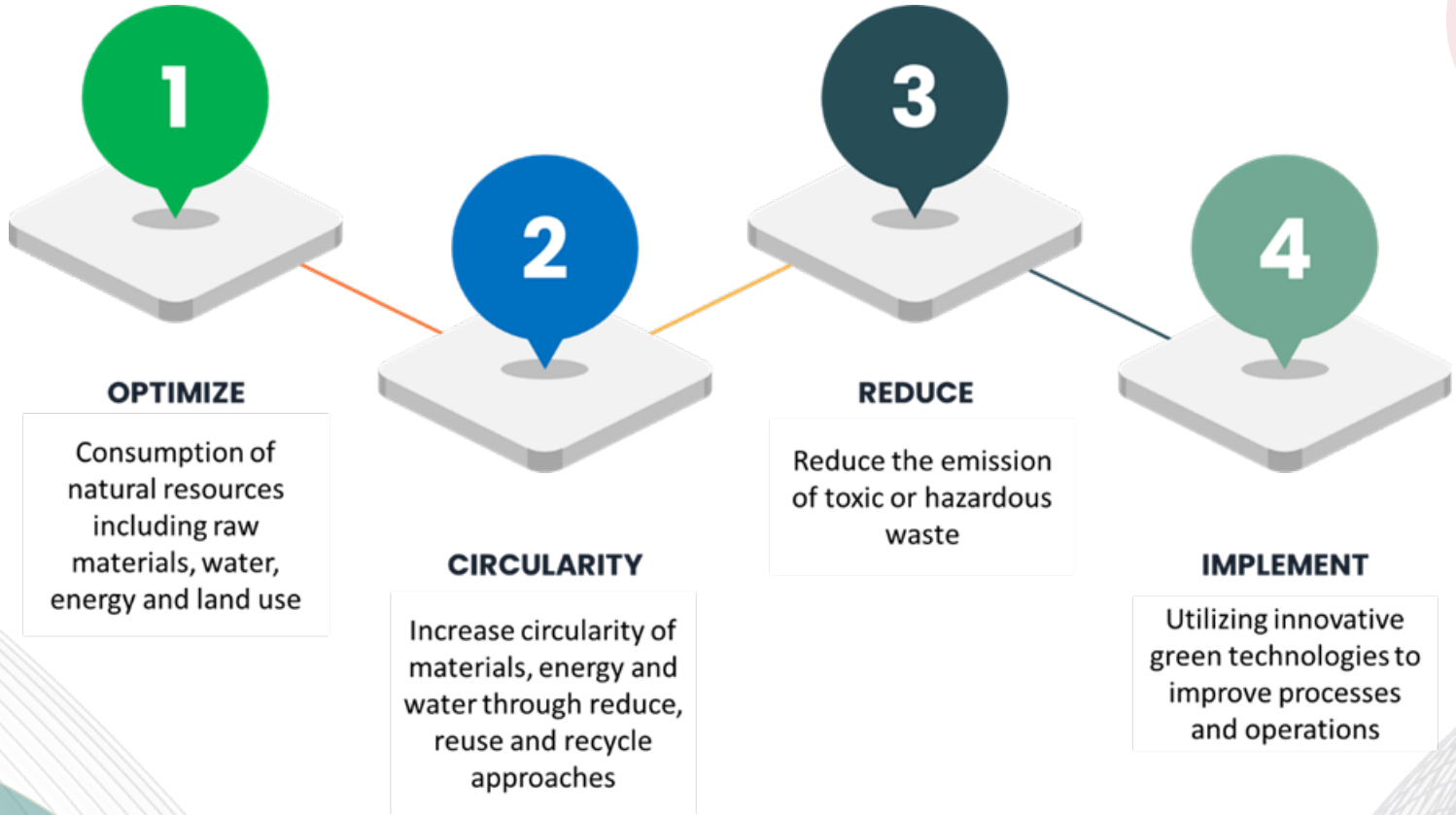
Water Services Industry Act 2006 (Act 655): This act regulates the water supply and sewerage services sector. It establishes a licensing and regulatory framework to ensure efficient and sustainable water use. Compliance with the act's objectives is crucial for manufacturing businesses that rely on water supply or manage sewerage services.

Good Manufacturing Practice (GMP): GMP is a prerequisite for manufacturing licenses and product registrations in industries such as pharmaceuticals, cosmetics, food, and veterinary products. Compliance with GMP ensures the production of safe, quality products. Adherence to environmental and safety standards is an integral part of GMP for manufacturing businesses.

International Standard Organization (ISO) Standards: ISO develops international standards applicable across industries. Several ISO standards are relevant to the manufacturing sector, including ISO 14001 for Environmental Management System, ISO 45001 for Occupational Health and Safety, and ISO 50001 for Energy Management System. These standards provide guidelines for environmental stewardship, occupational health and safety, and efficient energy management..

Malaysian Standard: MS1525:2019: This standard focuses on energy efficiency and the use of renewable energy in non-residential buildings. It provides guidance for reducing energy consumption and promoting the use of renewable energy sources. Manufacturers can adopt the practices outlined in this standard to create a sustainable and energy-efficient manufacturing environment..

Compliance with these national policies, acts, standards, and guidelines is crucial for the manufacturing sector in Malaysia. They ensure responsible and sustainable practices, protect the environment, and promote the well-being of workers and communities. By adhering to these policies and guidelines, manufacturing businesses can contribute to the long-term viability of the industry and align with global sustainability goals.



1.4.4 BENEFITS OF GREEN PRACTICES

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

Increased Efficiency and Resource Conservation:
Green practices result in improved efficiency, reducing the consumption of materials, energy, and water. Through optimized processes and technologies, manufacturers can minimize waste generation, improve production efficiency, and achieve a lower intensity of resource usage. Examples include implementing energy-efficient equipment, adopting sustainable procurement practices, and optimizing water usage, leading to cost savings and reduced environmental impact.

Support for Green Innovations:
Embracing green practices fosters an environment conducive to innovation in technology and processes. The manufacturing sector can drive the development and adoption of sustainable technologies, such as eco-friendly manufacturing processes, renewable energy integration, and waste reduction strategies. These innovations not only contribute to sustainability goals but also position businesses at the forefront of technological advancements.

Enhanced Human Resource Utilization:
Green practices promote better utilization of human resources. By investing in employee training and education on sustainable practices, manufacturers can develop a skilled workforce capable of driving efficiency, implementing environmental safeguards, and adapting to evolving sustainability requirements. This improves productivity, job satisfaction, and retention rates.

Increased Productivity and Revenue:
Adopting green practices often leads to increased productivity and revenue. Streamlining processes, reducing waste, and optimizing resource utilization can improve overall operational efficiency. Moreover, incorporating sustainable practices enhances the company's reputation, attracting environmentally conscious customers and investors, and potentially expanding market opportunities.

Support for ESG Aspirations and Sustainability Reporting:
Green practices align with Environmental, Social, and Governance (ESG) aspirations and sustainability reporting. By integrating the specific indicators outlined in green practice guidelines, manufacturers can review, manage, and plan for more sustainable business decisions. This ensures alignment with ESG goals, enhances transparency, and promotes responsible corporate citizenship.

Adaptation to Global Initiatives:
The global trend of sustainable manufacturing and increasing focus on environmental responsibility require closer scrutiny of greener and sustainable practices in the manufacturing sector. Initiatives related to carbon emissions reduction, circular economy principles, and environmental impact mitigation are gaining traction worldwide. By proactively adopting green practices, manufacturers can position themselves for compliance with evolving regulations and tap into emerging opportunities related to sustainability-focused markets and carbon-neutral supply chains.

Implementing green practices in existing operations and processes brings direct and indirect benefits to the manufacturing sector. Beyond environmental protection, it increases long-term productivity, profitability, and resilience. By achieving ESG objectives, businesses can ensure their long-term survival and reputation while contributing to a sustainable future for the industry and the nation as a whole.

	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

Green practices in the manufacturing sector in Malaysia aim to foster innovation, minimize resource usage, eliminate or minimize toxic substances, reduce waste generation, and achieve net-zero greenhouse gas emissions throughout the entire product life cycle. Recognizing the importance of sustainability, businesses in the manufacturing sector are committed to adopting green practices to ensure long-term viability and environmental stewardship.

This guideline has been specifically developed considering the unique capacities, operations, and environmental impacts of diverse sectors within the manufacturing industry. It provides a framework for implementing green practices that are applicable and beneficial across various manufacturing operations in Malaysia.

The goals of green practices in the manufacturing sector include:

Resource Conservation: Manufacturers aim to conserve valuable resources such as energy, water, and materials. By optimizing resource usage, adopting efficient technologies and processes, and promoting responsible consumption, companies in the manufacturing sector can minimize their ecological footprint and reduce resource depletion.

Reduction of Toxic and Hazardous Materials: Green practices focus on minimizing the use of toxic and hazardous materials in manufacturing operations. Businesses can adopt alternative materials, promote safer practices, and implement sustainable procurement policies to minimize emissions and waste generated during their production processes.

Greenhouse Gas Emission Reduction: The manufacturing sector aims to reduce greenhouse gas emissions. By implementing cleaner and more energy-efficient technologies, optimizing energy consumption, and exploring renewable energy options, businesses can contribute to mitigating climate change impacts.

The guideline provides general recommendations that can be applied across different sectors within the manufacturing industry. It emphasizes the importance of businesses adopting and implementing green practices in Malaysia. These recommendations enable companies to develop action plans and implementation strategies tailored to their specific capabilities, operations, and long-term sustainability goals.

By following the outlined steps, businesses in the manufacturing sector can develop comprehensive action plans for integrating green practices into their existing and future operations. The approach takes into account the sector's current capabilities and strategies, ensuring a practical and achievable transition towards sustainability and responsible resource management.

Overall, embracing green practices in the manufacturing sector in Malaysia is crucial for conserving resources, minimizing environmental impacts, reducing greenhouse gas emissions, and promoting the sector's long-term viability in alignment with global sustainability goals.

2.2 GUIDELINE IMPLEMENTATION

Green practices in the manufacturing sector in Malaysia aim to foster innovation, minimize resource usage, eliminate or minimize To successfully integrate green practices into existing operations and processes, manufacturers in the manufacturing sector are recommended to follow the following three steps:

STAGE 1: ASSESSMENT

1. 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. Understand the goals, targets, terminologies, data sources, and collection methods by referring to the Indicator Instrument Factsheet (Appendix 3) for detailed information on each indicator.

2. Gather the necessary documents and records as evidence of green practices implementation, such as utility bills, purchasing records, contract documents, and other relevant information specified in the Indicator Instrument Factsheet and Green Practices Data Collection Form.

3. Evaluate green practices according to the criteria established for each sub-indicator during the assessment process. Present the relevant documents as proof of implementation. 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 indicator's applicability and importance to the manufacturing sector. Translate the total score into a Star Rating system described in Section 1.5.

STAGE 2: SET TARGETS FOR IMPROVEMENT

1. Establish clear objectives based on the assessment conducted in Stage 1. Define the desired outcomes of implementing green practices in the manufacturing sector, such as reducing carbon emissions and promoting sustainable procurement. Identify areas for improvement based on the assessment results

2. 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. Assign deadlines or timelines to each target to ensure effective measurement of progress.

STAGE 3: IMPLEMENT GREEN PRACTICES

1. Develop a detailed action plan outlining the necessary steps and timelines for implementing green practices in the manufacturing sector. Refer to the examples provided in Section 2.3 for guidance. Break down 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 implementation efforts.

2. Foster employee engagement at all levels to drive successful implementation. Raise awareness about the importance of sustainability and provide training and education on green practices. Encourage employees to contribute ideas and suggestions for improving sustainability efforts. Recognize and reward environmentally conscious behaviors and achievements to cultivate a culture of sustainability within the manufacturing sector

3. Engage with suppliers and partners to promote sustainable practices throughout the supply chain in the manufacturing sector. Encourage them to adopt environmentally friendly practices and prioritize suppliers with strong sustainability credentials. Collaborate on initiatives such as joint recycling programs or sharing best practices to collectively reduce the environmental footprint of the manufacturing sector

4. Establish a system for measuring and evaluating the effectiveness of green practices in the manufacturing sector. Monitor key performance indicators (KPIs) to track progress towards sustainability goals. Regularly review and analyze data to identify areas for improvement. Use this information to refine strategies and adjust implementation plans as needed, ensuring continuous improvement in the sector's green practices

By following these stages, businesses in the manufacturing sector can effectively integrate green practices into their operations, promoting sustainability, minimizing environmental impact, and contributing to the long-term viability of the manufacturing industry in Malaysia.

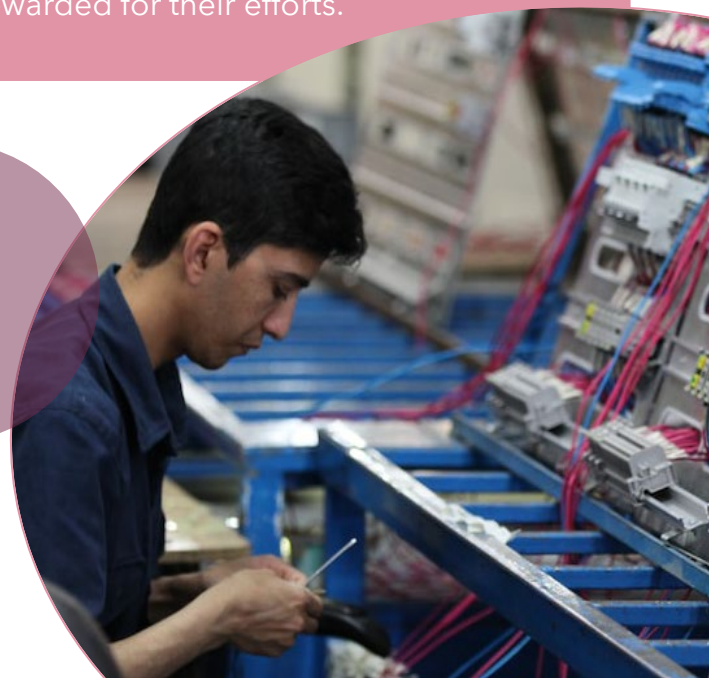
2.3 INDICATORS

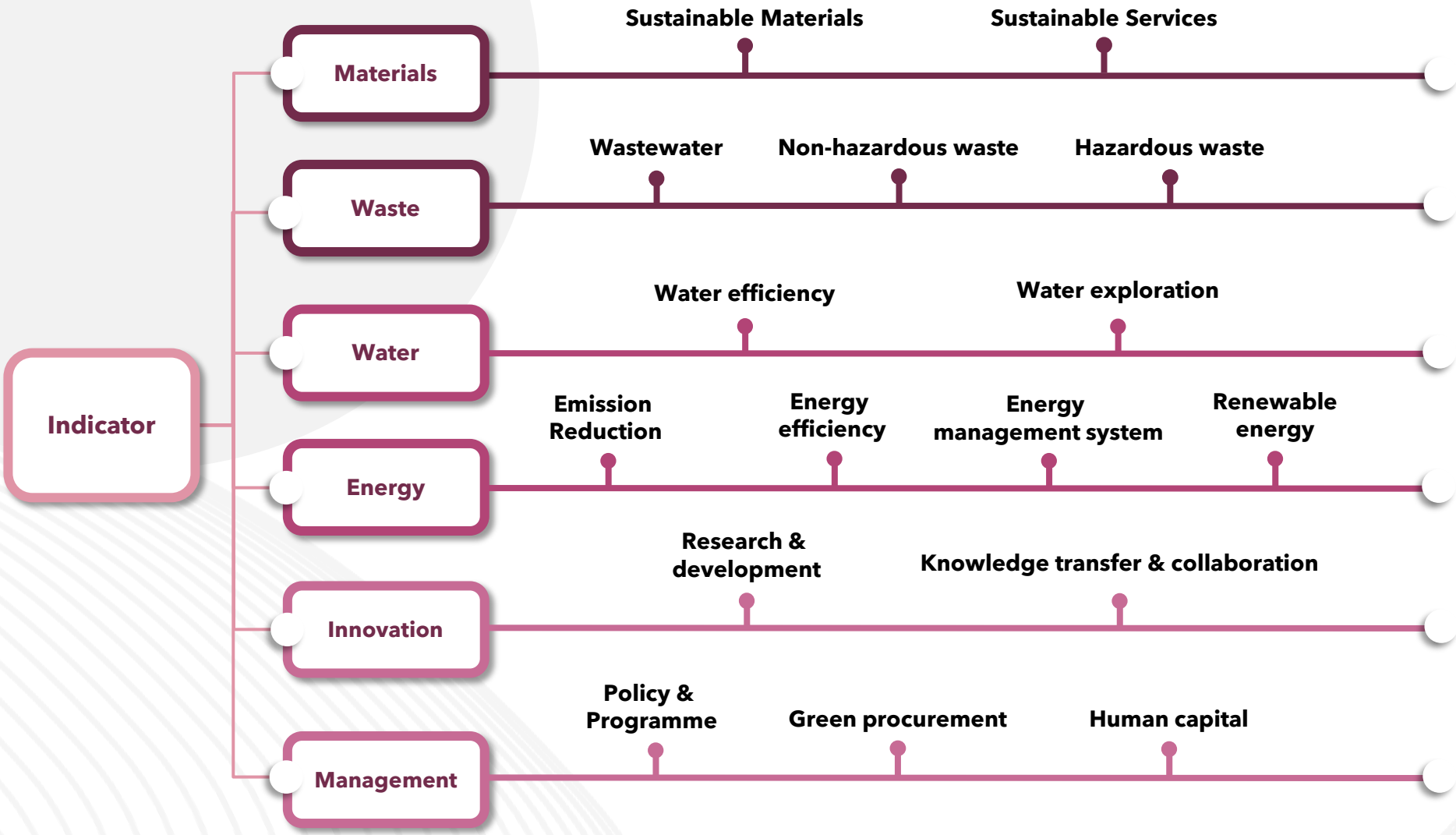
Indicators are crucial for evaluating and comparing the performance of industries in adopting green practices. These indicators provide a standardized framework for assessing the environmental sustainability efforts across various sectors. In order to ensure a comprehensive and meaningful evaluation, 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.




Indicator
Materials
Sustainable Materials
Sustainable Services
Waste
Wastewater
Non-hazardous waste
Hazardous waste
Water
Water efficiency
Water exploration
Energy
Emission Reduction
Energy efficiency
Energy management system
Renewable energy
Innovation
Research & development
Knowledge transfer & collaboration
Management
Policy & Programme
Green procurement
Human capital

MATERIAL

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.

MATERIAL			
Sub-indicator	Requirement	Objective Evidence for Assessment	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	• Choose renewable and sustainable materials for products, packaging, and office supplies. • Incorporate recycled materials into products and packaging
Sustainable services	Demonstration on purchase or use of sustainable services	• Company sustainability report • Organisation sustainability policies • Sustainability monitoring activity • Certification or recognition of sustainable material	• Adopt circular economy principles to design products, processes, and systems that minimize waste and promote resource efficiency, reuse, and recycling • Implement sustainable supply chain practices

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 Manufacturing sector includes three (3) sub-indicators;

Wastewater | **Non-hazardous Solid Waste** | **Hazardous Waste**

WASTE			
Sub-indicator	**Requirement**	**Objective Evidence for Assessment**	**Green Practices**
Wastewater	• Targeted percentage of water recycling achieved by the organisation • Targeted percentage of wastewater sludge recovery achieved by the organisation	• Records on monitoring effluent discharge flow, recycling flow, and sludge recovered	• Monitor and report wastewater discharge to meet regulatory standards and protect the environment. • Develop a wastewater management plan covering treatment, discharge, and monitoring. • Invest in innovative wastewater treatment technologies for reduced environmental impact. • Improve the quality of treated wastewater through advanced treatment methods.
Non-hazardous waste	• Targeted percentage of non-hazardous waste recycled achieved by the organisation • Number of biogas capture facility within the organisation	• Records on monitoring non-hazardous waste generated and recycled in the organisation • Number of biogas facility	• Implement waste minimization program. • Segregate waste by type for proper disposal. • Compost organic waste. • Use refillable and reusable containers. • Donate or sell usable items. • Utilize composting for organic waste management. • Opt for refillable containers for products.
Hazardous waste	• Targeted percentage of hazardous waste recycled achieved by the organisation	• Records on monitoring hazardous waste generated and recycled in the organisation	• Establish waste minimization program. • Segregate waste by type in designated containers for proper disposal.

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.

WATER			
Sub-indicator	**Requirement**	**Objective Evidence for Assessment**	**Green Practices**
Water Exploration	Targeted percentage of alternative water used by the organisation	Records on monitoring city water and alternative water use	• Explore alternative water sources for supplementation or replacement. • Assess water quality of alternative sources for different uses.
Water Efficiency	Targeted percentage of water consumption reduction achieved by the organisation	Records on monitoring city water use	• Conduct water audit for identifying high water usage areas and conservation opportunities. • Install water-efficient equipment and processes to reduce water consumption. • Utilize recycled water for non-potable applications to reduce freshwater demand.

ENERGY

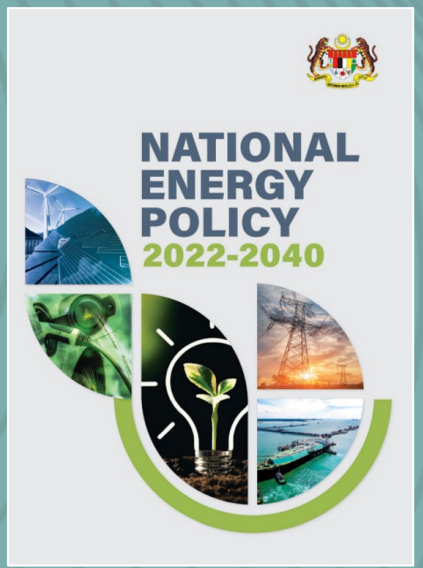
2.3.4 ENERGY

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.

Prioritize energy-saving measures & the adoption energy-efficient technologies

- **Optimizing manufacturing processes**
- **Implementing smart energy management systems**
- **Investing in energy-efficient equipment**

ENERGY			
Sub-indicator	Requirement	Objective Evidence for Assessment	Green Practices
Energy Efficiency	Targeted percentage of electricity and fuel consumption reduction achieved by the organisation	• Meter energy usage readings • Bills of quantities for fuels • COA for fuels	• Minimize energy consumption through component selection, power-saving mode, and insulation. • Optimize energy flow in production processes through heat optimization. • Reduce energy consumption and emissions in transportation.
Renewable Energy	Targeted percentage of renewable energy used by the organisation	• Meter energy usage readings • Bills of quantities for fuels • COA for fuels	• Utilization of renewable energy from process residues (waste materials, waste heat or solid waste), or from auxiliary facilities (solar, wind or equivalent). • Application of waste-to-energy technologies. • Installation of solar panel for energy supply to reduce electricity consumption.
Energy Management System	Demonstration of an Energy Management System setup within the organisation	Records supporting the setup, operation, and performance achieved by the Energy Management System	• Include green practices in the organization's mission and vision statement. • Document energy-saving activities systematically. • Periodically report energy usage for monitoring purposes.
Emission Reduction	Targeted percentage of emissions reduction achieved by the organisation	GHG Inventory reports	• Switch to renewable energy sources for operations and reduce reliance on fossil fuels. • Replace internal combustion forklifts with battery-powered alternatives. • Install inverters for energy efficiency. • Implement green transportation practices.

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.

Sub-indicator	Requirement	Objective Evidence for Assessment	Green Practices
Knowledge Transfer and Collaboration	Demonstration of knowledge transfer and strategic collaboration occurring in the organisation	Records and documentations such as MOUs, MOAs, IPs, etc.	• Strategic partnership or collaborative project to commercialize green product for commercialization, to create social value in targeted community and to improve current green practice • Develop strategic of partnership/collaborated project MoU/MoA and proved of ROI in building operations and activities to optimize lifetime of building services system within building compound area.
Research and Development (R&D)	Demonstration of R&D activities occurring in the organisation	Records and documentations such as organisation chart, procedures, blueprints, proposals, etc.	• Develop and implement policies related to allocation of resources towards R&D within the organization. • Making strategic investment in R&D and innovations that enable green technologies to be embedded into existing infrastructure, systems, and processes.

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.

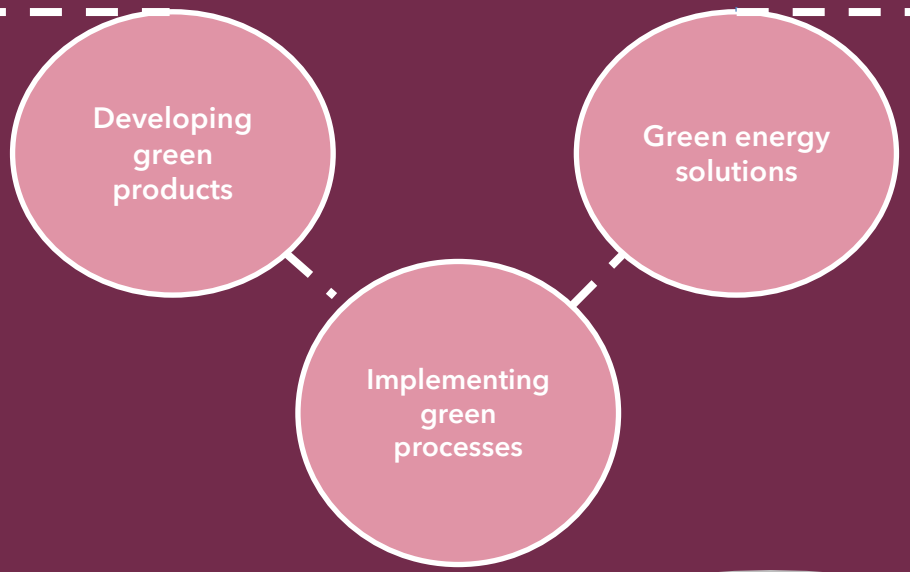
Going beyond compliance with legal requirements, being environmentally responsible means investing in human capital and adopting management practices that actively contribute to the industry's green initiatives. This involves fostering a culture of sustainability within the organization, where all stakeholders, 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.

Sub-indicator	Requirement	Objective Evidence for Assessment	Green Practices
Green Procurement	Demonstration of green procurement practices occurring in the organisation	Records and documentations such as policies and standards, agreements, purchase records, etc.	• Include environmental requirements in specifications with contractors, suppliers, and service providers. • Establish a mechanism to determine level of greenhouse gas emissions generated by suppliers.
Policy and Programme	Demonstration of policies and programs practices occurring in the organisation that support Green Practices	Records and documentations such as MOUs, MOAs, IPs, etc.	• Promotion of recycling and reuse practices to raise awareness of responsible and sustainable consumption. • Develop green policies or operating standards to integrate sustainability in business operations across several departments, foster innovation, and boosts engagement.
Human Capital	Demonstration of a human capital development program in the organisation that support Green Practices	Records and documentations such as policies and standards, records of training, etc.	• Open opportunities to the current workforce to become competent person for environmental management and green practices. • Development of career paths for competent person related to environment protection and climate action such as environmental auditor and that of similar roles.

CHAPTER 3
IMPLEMENTATION

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, manufacturers can refer to the specific guidelines and best practices that support the application of green practices in the industry. Manufacturers 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 manufacturing industry to implement green practices in their operations.

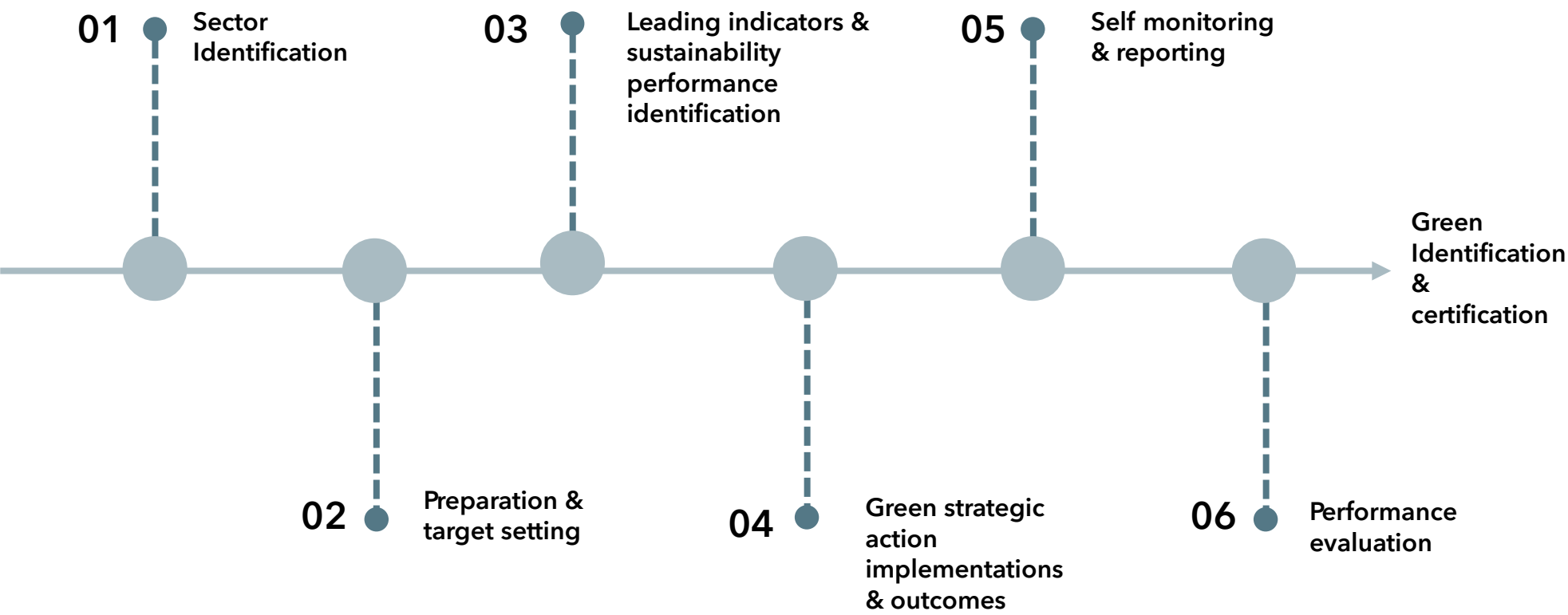
To support the industry in implementing green practices, a comprehensive Green Certificate Roadmap has been developed. The roadmap serves as a strategic guide, assisting industry players in adopting and implementing sustainable practices within their manufacturing processes.

The long-term goal is to enable industry players to apply for the Green Certificate as a formal recognition of their commitment to sustainability and environmental stewardship.

Industry players meeting the eligibility criteria may also benefit from proposed financing incentives and support.

Establishing the Green Certificate encourages the industry to prioritize and embrace sustainable practices, fostering knowledge sharing and collaboration across the sector.

The Green Certificate aims to drive widespread adoption of sustainable practices, promote environmental protection, and contribute to the overall sustainability goals of the manufacturing sector in Malaysia.


01
Sector Identification
02
Preparation & target setting
03
Leading indicators & sustainability performance identification
04
Green strategic action implementations & outcomes
05
Self monitoring & reporting
06
Performance evaluation
Green Identification & certification

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.

REFERENCE

Altenburg, T. and Assmann, C. (2017) Green Industrial Policy: Concept, Policies, Country Experiences, German Development Institute. Geneva. Retrieved from: https://wedocs.unep.org/bitstream/handle/20.500.11822/22277/Green_industrial_policy.pdf.

Department of Statistics Malaysia. (2021). Index of Industrial Production. Retrieved from: https://www.dosm.gov.my.

Economic Planning Unit. (2021). Twelfth Malaysia Plan 2021-2025. Retrieved from: https://rmke12.epu.gov.my/en.

Kerajaan Negeri Sembilan. (2011). Garis Panduan Pelaksanaan Dasar Teknologi Hijau Negeri Sembilan (2011-2020). Retrieved from: http://www.ns.gov.my/component/phocadownload/category/107-tahun-2011#.

Global Green Growth Institute. (2016). Green Growth Planning Guidelines. Retrieved from: https://www.greengrowthknowledge.org/guidance/green-growth-planning-guidelines.

Iskandar Regional Development Authority. (2014). Green Economy Guideline Manual. Retrieved from: https://iskandarmalaysia.com.my/green/resources.html.

Jabatan Alam Sekitar Malaysia. (2014). Guidelines for Green Industry Auditor. Retrieved from: https://enviro2.doe.gov.my/ekmc/digital-content/87723/.

Kementerian Tenaga, Teknologi Hijau dan Air (KeTTHA). (2008). National Renewable Energy Policy & Action Plan. Retrieved from: https://www.seda.gov.my/policies/national-renewable-energy-policy-and-action-plan-2009/.

Kementerian Tenaga, Teknologi Hijau dan Air (KeTTHA). (2017). Green Technology Master Plan Malaysia 2017-2030. ISBN 978-967-5893-09-4. Retrieved from: https://www.pmo.gov.my/wp-content/uploads/2019/07/Green-Technology-Master-Plan-Malaysia-2017-2030.pdf.

Kementerian Tenaga, Teknologi Hijau dan Air (KeTTHA). (2018). Garis Panduan Perolehan Hijau Kerajaan 3.0. Retrieved from: https://www.myhijau.my/green-procurement/.

Malaysian Investment Development Authority (MIDA). (2020). Malaysia Investment Performance Report. Retrieved from: https://www.mida.gov.my/report/.

Kementerian Alam Sekitar dan Air (KASA). (2002). Dasar Alam Sekitar Negara. Retrieved from: https://www.doe.gov.my/dasar-alam-sekitar-negara/.

Partnership for Action on Green Economy. (2017). Green Industrial Policy and Trade: A Tool-Box. Retrieved from: https://www.un-page.org/resources/green-industrial-policy-green-trade/green-industrial-policy-and-trade-tool-box.

Qureshi, M. I. et al. (2020) 'Classifications of sustainable manufacturing practices in ASEAN region: A systematic review and bibliometric analysis of the past decade of research', Sustainability (Switzerland), 12(21), pp. 1–19. doi: 10.3390/su12218950.

Raja Ghazilla, R. A. et al. (2015) 'Drivers and Barriers Analysis for Green Manufacturing Practices in Malaysian SMEs: A Preliminary Findings', Procedia CIRP. Elsevier, 26, pp. 658–663. doi: 10.1016/J.PROCIR.2015.02.085.

Sachidananda, M., Webb, D. P. and Rahimifard, S. (2016) 'A Concept of Water Usage Efficiency to Support Water Reduction in Manufacturing Industry', Sustainability 2016, Vol. 8, Page 1222. Multidisciplinary Digital Publishing Institute, 8(12), p. 1222. doi: 10.3390/SU8121222.

WWF. (2018). Cleaner Production Guide for the Textile Sector. Retrieved from: https://www.wwf.se/dokument/wwf-and-hm-cleaner-production-guide-for-the-textile-sector/.

CASE STUDIES

EXAMPLE SUCCESS STORY:
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:
HOW INDUSTRY MAY BENEFIT FROM IMPLEMENTING GREEN PRACTICES

Direct benefits to manufacturers include cost saving that comes from reduced overall utilities consumption including electricity and water. These are some of the general examples:

Electricity saving through optimization of consumption

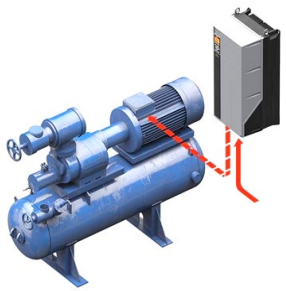
Electric motors are widely used in the industry. Using variable frequency drive (VFD) or variable speed drive (VSD), the current flow can be controlled which optimizes energy consumption. Theoretically, up to 10-15% electricity can be saved from the use of the VFD or VSD.

Estimate:

Cost of operating a non-VSD motor = RM7,200/month

Price of new machine = RM30,000

With an average of 12.5% electricity saving.



Water saving through recycle, reuse and reduce strategies

Assuming one of the largest commercial premise consumption of water is around 500,000 m3/month, with just 15% reduction through strategies such as reduce, reuse and recycling of used water.

Estimate:

Average water bill = RM958,716/month

With an average of 15% reduction

Electricity saving by utilizing daylight

Assuming the electricity consumption of Company A is 138,244 kWh/month, corresponding to electricity bill of RM80,604.20/month.

Estimate:

Setting up of transparent roof panels to utilize natural light in building, around 30% electricity saving is targeted which amounts to.

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
GHG	Green House 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
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	Wastewater	40	**20**
	Non-Hazardous	40	
	Hazardous waste	20	
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	Wastewater	40	x / 4 * 40	x	20	
	Non-Hazardous	40	x / 4 * 40	x		
	Hazardous waste	20	x / 4 * 20	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: Wastewater				
A. Treated Effluent				
Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Wastewater recovery initiative/technology available (e.g., IETS, biogas capture facility and etc.); implemented; WITH monitoring in place; ≥ 33% treated effluent recycle; WITH continuous quality improvement (CQI); 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	Wastewater recovery initiative/ technology available (e.g., IETS, biogas capture facility and etc.); implemented WITH monitoring in place; WITH achievement of Treated Effluent Recycle ≥ 33%	*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	Wastewater recovery initiative/ technology available (e.g., IETS, biogas capture facility and etc.); 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	Wastewater recovery initiative/ technology available (e.g., IETS, 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 wastewater recovery	*Installation records*: Documents that serve as evidence for installation of technologies in the organization.	

B. Sludge Recovery

Score Please tick (/)	Point	Score Criteria	Data Sources / Evidence	Attachment Reference
	4	Sludge recovery initiative/ technology available; implemented; WITH monitoring in place; WITH continuous quality improvement (CQI); WITH achievement of 100% sludge recovery; 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	Sludge recovery initiative/ technology available; implemented; WITH monitoring in place; WITHOUT continuous quality improvement (CQI); WITH achievement of 100% sludge recovery	*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	Sludge recovery 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	Sludge recovery initiative/ technology available, but NOT implemented	*Purchasing records and documents:* Documents that serve as evidence of the organization acquiring services or/ and products/ system.	
	0	NO initiative of sludge recovery	*Installation/ maintainence records*: Documents that serve as evidence for installation of technologies in the organization.	

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.	

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 records*: 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. 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. 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: WASTEWATER

1. INDICATOR INFORMATION

1.1. GOALS AND TARGETS

1. Goal 1: 100% sludge to be recycled by 2030.
2. Goal 2: 33% of treated effluent to be recycled by 2030.

These goals are aligned with the GTMP 2017-2030 emphasising on the wastewater treatment recycling targets. It has been outlined that by 2030, 100% of sludge shall be recycled and 33% of treated effluent shall be recycled. 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

Wastewater

1.4. LAST UPDATE

9 May 2023

1.5. RELATED SECTORS

This indicator instrument applies to the following sectors:

- Fisheries (Aquaculture)
- Manufacturing
- Livestock
- Mining

2. DEFINITIONS AND CONCEPTS

2.1. DEFINITION

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.

Wastewater: Effluent generated after the use of any water related resources in a variety of applications or processes.

Sludge recovery: It is the process of extracting useful components from sludge. Dewatering, thickening, and digesting are just a few of the processes that can be used to recover the sludge and make them ready for repurposed process.

2.2. CONCEPT

Not applicable.

2.3. UNIT OF MEASURE

1. Percentage (%) of recycling of water from the wastewater processing unit within the organisation.
2. Percentage (%) of sludge recovery from the wastewater processing unit within the organisation.

3. METHODOLOGY

3.1. DATA SOURCES

Validation/certification/recognition: Refers to documents issued by third parties that confirms performance and achievement in meeting certain standards 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.

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 records: Documents that serve as evidence for installation of technologies in the organisation.

Maintenance records: Documents that serve as evidence of maintenance activity of the wastewater processing unit.

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-
   Purchasing record, or installation record; presence of initiative/unit /facility/equipment/system being validated.
3. Monitoring record – look for current record and check for frequency monitoring.
4. Data availability at selected baseline year:
   a. Data on:
      i. Amount of discharge from the stream leaving the treatment unit to water bodies;
      ii. Amount of discharge from the stream leaving the treatment facility that is utilized elsewhere in the organization;
      iii. Amount of wastewater generated from the process unit.

   At least any two data listed above must be available to allow calculation on treated recycled effluent.

   b. Data on amount of sludge leaving the treatment unit and amount of sludge sent for disposal.
5. Evidence of recycling by third parties e.g., receipt/invoice/financial report etc.
6. Validation of recycling by third parties e.g., contract/validation report/audit report.

7. Evidence of continuous quality improvement (CQI) exercise such as minute of meeting/CQI report. Example of CQI is performance of the selected contractor.
8. Evidence of recognition by third party such as validation or certification or award.

3.3. COMPUTATION

Percentage (%) of recycled water=

[(Amount of recycled water) / (Total amount of wastewater generated)] ×100

Where:

Amount of recycle of water = Amount of discharge from the stream leaving the treatment facility that is utilized elsewhere in the organization within the baseline year.

Total amount of wastewater generated = Amount of wastewater discharge from the stream leaving the process unit within the baseline year.

Note: In the case of stream meter is not available the secondary data in the form of size (volume) of the following storage may be used: pond, tank, dam etc.

Percentage (%) of sludge recovery=[((A-B))/((A))]×100

Where:

A = Amount of sludge produced from the wastewater treatment facility and leaving the wastewater treatment unit.

B = Amount of sludge produced from the wastewater treatment facility and sent for disposal.

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

Not applicable.

4.2. VALIDATION

Not applicable.

4.3. QUALITY MANAGEMENT

National Water Quality Standard.

5. REFERENCES

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

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: 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. UNIT OF MEASUREMENT

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. UNIT OF MEASUREMENT

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 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

3.3. 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. 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. 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. 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 UNIT OF MEASURE

Not applicable

3. DATA SOURCE AND DATA COLLECTION METHOD

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. 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. 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, CONCEPT, AND CLASSIFICATIONS

2.1. DEFINITIONS AND CONCEPTS

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. 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 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)

Link to Google form: https://docs.google.com/forms/d/e/1FAIpQLSenOOok7nloLCSrkRLYF5CW0yX3_u5k_Jup7UM-1Vec9w5Zrw/viewform?usp=sf_link