MDTCC

SSM
SURUHANJAYA SYARIKAT MALAYSIA
COMPANIES COMMISSION OF MALAYSIA
(An agency under MDTCC)

ENVIRONMENT REUSE

CONSERVATION ECOLOGY
RENEWABLE ENERGY
REDUCE RECYCLE
SUSTAINABILITY

A TOOLKIT
TO IMPLEMENT
GREEN BUSINESS

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ABOUT THE PROJECT PARTNERS

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About Companies Commission of Malaysia (SSM)
www.ssm.com.my

The Companies Commission of Malaysia (SSM) is a statutory body which regulates companies and businesses in Malaysia. Its other key functions include promoting corporate governance, corporate responsibility and business sustainability, incorporating companies and registering businesses, as well as providing the public with information on both.

About WWF-Malaysia
wwf.org.my

WWF-Malaysia (World Wide Fund for Nature-Malaysia) was established in Malaysia in 1972. It currently runs more than 90 projects covering a diverse range of environmental conservation work, from saving endangered species such as tigers and turtles, to protecting our highland forests, rivers and seas. The national conservation organization also undertakes environmental education and advocacy work to achieve its conservation goals. Its mission is to stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with nature, by conserving the nation's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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WHAT IS IN THIS TOOLKIT?

GREEN OFFICE
This section provides suggestions on '3Rs' for Reduce, Reuse and Recycle for a greener office environment.

The 'low hanging fruits' steps are easy and often free or very low cost to implement with relatively high financial returns.

Practicing green procurement decisions will not only reduce environmental impacts but also enhance environmental reputation by demonstrating commitments to both customers and employees.

GREEN PROCUREMENT
This section lists the green procurement decisions you can make in your supply chain and in selecting transport options.

GREEN OPERATIONS
This section features decisions to reduce waste/pollution and resource through manufacturing, the end of product use and remanufacturing.

Running a green operation will open access to new markets as more and more organizations and individuals are emphasising green products and green supply chain.

ADDRESSING SME
This section offers SMEs simple solutions under green procurement and green operations to adopt sustainable practices.

Although one SME's environmental impact may be insignificant, collectively its impact may exceed that of a large business.

LIST OF ACRONYMS

APEC	Asia-Pacific Economic Cooperation
CFL	Compact Fluorescent Lightbulb
EMS	Environmental Management System
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
GPP	Green Procurement Policy
GTFN	Global Forest and Trade Network
GTFS	Green Technology Financing Scheme
HP	Hewlett-Packard
KWh	Kilowatt-hour
ISO	International Organization for Standardization
LED	Light Emitting Diode (used for lights)
ICT	Information Communication Technology
IT	Information Technology
MTCC	Malaysian Timber Certification Council
NGO	Non-Government Organization
PC	Personal Computer
RSPO	Roundtable on Sustainable Palm Oil
SEDA	Sustainable Energy Development Authority
SER	Social and Environmental Responsibility
SIRIM	Standards and Industrial Research Institute of Malaysia
SSM	Suruhanjaya Syarikat Malaysia (Companies Commission of Malaysia)
TNB	Tenaga Nasional Berhad
US EPA	United States Environmental Protection Agency
WWF	World Wide Fund for Nature

INTRODUCTION

OBJECTIVES

ENVIRONMENTAL SUSTAINABILITY IN MALAYSIA

RECYCLE

CONSERVATION REUSE ECOLOGY

RENEWABLE ENERGY

REDUCE ENVIRONMENT

SUSTAINABILITY

2. INTRODUCTION

2.1 What?

A green business is one that has minimal impact on the local and global environment. It can be characterised by fulfilling these three (3) points:

1. It includes environmental criteria in all business decisions;

2. The products or services supplied have minimal impact on the environment; and

3. The business has made a long-term commitment to applying environmental criteria to daily operations.

Businesses are judged by how green they are through the depth of their environmental commitments. A completely green business would not only include environmental impact from its own operations and products, but also consider the impact made by its employees and suppliers.

2.2 Why?

As well as having minimal impact on the environment, a green business enjoys multiple other benefits including:

- Healthier, more engaged and more productive employees;

- Reduced liability;

- An improved reputation and loyal customers;

- Access to more markets; and

- Financial benefits.

In short, a green business will enjoy long term stability and greater ability in facing future business challenges. More details about these benefits can be found as they occur in the relevant sections.

2.3 How?

This Toolkit gives guidelines on how to run a green business by dividing your business activities into three (3) categories:

1. Administration – Maintaining a green office;

2. Managing supply chain – Implementing a green procurement strategy; and

3. Operations – Greening your operations.

In each of these sections, the Toolkit covers:

- The benefits of greening each activity;

- Guidelines on how you can start greening in each activity;

- Incentives that will help inspire your business towards greening or reward your implementation methods; and

- Suggestions on implementation and improvement for each greening activity, through working with employees/colleagues and supplier organizations to meet environmental objectives while focusing on continually improving environmental performance.

3. OBJECTIVES

1. To increase environmental and ethical awareness among the private sector of its business's impact towards the environment in ensuring a more sustainable environment that future generation can inherit.

2. To provide guidance to the private sector in becoming a more resource-efficient economy by using resources in a more sustainable way that will reduce vulnerability to supply shortages and volatile market prices.

3. To promote and educate the private sector in supporting green growth by engaging in a culture of green business through the practices of green office, green procurement and green operations.

4. ENVIRONMENTAL SUSTAINABILITY IN MALAYSIA

4.1 Development of Environmental Policies in Malaysia

In ensuring the sustainability of the environment, Malaysia has established legal and institutional framework for environment protection which can be traced back to the early 1970s when Malaysia participated in the United Nations Conference on the Human Environment in Stockholm in 1972. Malaysia then enacted the Environmental Quality Act in 1974 and established the Department of Environment (DOE) in 1975. Subsequently, Malaysia introduced its first ever environmental policy directives in the Third Malaysia Plan (3MP) from 1976 to 1980. Part Two, The Socio-Economic Framework, Chapter 11 states:

'It is vital that the objectives of development and environmental conservation be kept in balance, so that the benefits of development are not negated by the cost of environmental damage'

There are many dimensions to the environmental problem. Chapter 11 of the 3MP lists the environmental problems as follows:

"… include increases in the amount of pollutants released into the environment; rapid exploitation of land and natural resources without due regard to the ecosystem conservation; and growing congestion in urban areas with the attendant problems of transportation, waste disposal, provision of utilities and noise and visual pollution. Socio-psychological traumas affecting migrants from the rural areas as a result of increasing urbanization also pose specific planning problems in the social and working environment of large urban areas. In addition, environmental problems associated with the squalor of poverty, inadequate housing and utilities, poor health and social services require specific attention".

Along with Malaysia's development policies, the environmental policies are set out in the First Outline Perspective Plan from 1976 to 1990, the Second Outline Perspective Plan from 1991 to 2000, the Third Outline Perspective Plan from 2001 to 2010 and the five-year development plans, in which environmental policies have been consistently addressed up to the present Tenth Malaysia Plan (10MP) from 2011 to 2015.

The Department of Environment, under the purview of the Ministry of Science, Technology and the Environment (MOSTE); reformed in 2004 to Ministry of Science, Technology and Innovation (MOSTI), developed the National Policy on the Environment (NPE) or *Dasar Alam Sekitar Negara.* The Policy was approved by Cabinet Ministers in 2002, under the Eighth Malaysia Plan (8MP) (2001 - 2005), for continuous economic, social and cultural progress and enhancement of the quality of life through environmentally sound and sustainable development.

4.2 The National Environment Policy (NPE)

The NPE provides a framework for a comprehensive approach to natural resource development and provides guidance to Government bodies, private sectors and the public at large on environmental stewardship.

The objectives of the Policy are as follow:

1. A clean, safe, healthy and productive environment for present and future generations;

2. Conservation of the country's unique and diverse cultural and natural heritage with effective participation by all sectors of society; and

3. Sustainable lifestyles and patterns of consumption and production.

There are eight (8) principles listed under NPE to harmonise economic development goals with environmental imperatives:

1. Stewardship of the Environment;

2. Conservation of Nature's Vitality and Diversity;

3. Continuous Improvement in the Quality of the Environment;

4. Sustainable Use of Natural Resources;

5. Integrated Decision-Making;

6. Role of the Private Sector;

7. Commitment and Accountability; and

8. Active Participation in the International Community.

NPE aims to integrate environmental considerations into the Nation's development activities in fostering sustainable economic growth, human development and to protect and enhance the environment for future generations. It is also intended to complement and enhance the environmental dimensions of other national policies and international conventions such as the United Nations Framework Convention on Climate Change (UNFCC)[1], United Nations Convention of Biological Diversity (CBD)[2] and United Nations to Combat Desertification (UNCCD)[3].

Malaysia's Green Strategic areas under the NPE are directed towards the following key areas[4]:

(i)   Education and awareness;
(ii) Effective management of natural resources and the environment;
(iii) Integrated development planning and implementation;
(iv) Prevention and control of pollution and environmental degradation;
(v)   Strengthening administrative and institutional mechanism;
(vi) Proactive approach to regional and global environmental issues; and
(vii) Formulation and implementation of Action Plans.

4.3 The Role of Private Sector in Environmental Sustainability

In the pursuit of becoming a developed Nation by 2020, Malaysia's economic growth, driven by the private sector, cannot continue without attention to the environment. The need to balance between economic growth and environmental sustainability is needed to prevent environmental degradation which can result in lost economic output and endangering of health. The NPE recognises the importance of the private sector role in harmonising economic development goals with environmental imperatives, as stated in the Sixth (6th) Principle.

The private sector is the driver of the Nation's rapid economic growth and contributes to the current state of environment. Thus, the private sector must adapt to environmental challenges, particularly scarcity in natural resources, by mitigating risks into business operations as part as their corporate responsibility initiative towards business sustainability.

4.4 The Role of Public Sector in Environmental Sustainability

Ministry of Natural Resources and Environment (www.nre.gov.my)
In 2004, the Ministry of Natural Resources and Environment (NRE) was established and is responsible in determining the policies and direction to achieve goals of Natural Resources and Environment, in line with Malaysia's commitment towards the United Nations.

NRE had undertaken few departments from the following ministries[5]:

1. Department of Director General of Lands and Mines (JKPTG), Department of Survey & Mapping Malaysia (JUPEM) and National Institute of Land and Survey (INSTUN) from Ministry of Land and Co-operative Development (KTPK);

2. Forestry Department Peninsular Malaysia (JPSM), Forest Research Institute Malaysia (FRIM) and Minerals and Geo Science Department Malaysia (JMG) from Ministry of Primary Industries (KPU);

3. Department of Environment (JAS) and Department of Wildlife & National Parks Peninsular Malaysia (PERHILITAN) from Ministry of Science Technology and Environment (MOSTI); and

4. Department of Irrigation and Drainage (JPS) and National Hydraulic Research Institute of Malaysia (NAHRIM) from Ministry of Agriculture (MOA).

Department of Environment (www.doe.gov.my)
Under the purview of NRE, the Department of Environment (DOE) is to prevent, eliminate and control pollution while improving the environment, consistent with the purposes of the Environment Quality Act 1974 and the regulations under DOE[6]. It is also responsible for the implementation of the resolutions decided by the international conventions.

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[1] Malaysia signed UNFCCC on 9 June 1993 and subsequently became a party of the Convention by ratification on 13 July 1994. The country further signed and ratified the Kyoto Protocol to UNFCCC on 12 March 1999 and 4 September 2002 respectively

[2] Malaysia signed the CBD on 12 June 1992 and ratified it on 24 June 1994 and continues to strengthen its effort to manage its biological diversity on a sustainable basis to address conservation of natural resources.

[3] Malaysia signed the CCD in 1995 and ratified it in 1997 (in line with Agenda 21)

[4] NPE, pg. 7

[5] NRE Corporate Information (www.nre.gov.my)

[6] DOE Core Services (www.doe.gov.my)

Ministry of Energy, Green Technology and Water Malaysia (MEGTW)

This Ministry was established on 9 April 2009. The objectives of the Ministry are:

- To ensure the effective implementation of policies in the energy, water and green technology sectors;

- To ensure the provision of comprehensive and integrated infrastructure that meets the standards and quality requirement;

- To provide a conducive environment for industrial and technology development;

- To provide continued research and development (R & D) to increase the use of technology;

- To ensure an efficient, effective and affordable service delivery system;

- To ensure that the regulatory mechanisms are implemented in accordance with the provisions of existing legislation; and

- To continuously improve the ability of the organization to achieve the industry's and green technology's goal.

Below is a list of Malaysian Government Ministries and Agencies related to environment:

Department of Irrigation & Drainage	www.water.gov.my
Department of Land and Mineral	www.kptg.gov.my
Marine Parks Malaysia	www.dmpm.nre.gov.my
Department of Wildlife and National Parks Peninsular Malaysia	www.wildlife.gov.my
Minerals and Geo-Science Department	www.jmg.gov.my
Forest Research Institute of Malaysia	www.frim.gov.my
Institute of Hydraulic Research (Institut Penyelidikan Hidraulik Malaysia)	www.nahrim.gov.my

WIND ENERGY

SOLAR ENERGY

RECHARGEABLE

REUSE

ENERGY SAVING BULB

RECYCLE

GREEN
OFFICE

RECYCLE
CONSERVATION REUSE ECOLOGY
RENEWABLE ENERGY
REDUCE ENVIRONMENT
SUSTAINABILITY

5. GREEN OFFICE

5.1 Introduction

Depending on your nature of business, your office may or may not play a significant part in your business's environmental impact. In either case reducing your office environmental impacts can be rewarding. By starting with just cheap and easy steps, you can return financial and intangible benefits within a few months as you reduce electrical and water usage and waste output, streamline office equipment and engage employees.

Benefits

High financial returns

When energy and water are metered, monitoring energy and water usage understandably also reduces energy and water bills. Often, the initial steps of energy and water conservation are **'low hanging fruits'** – easy and often free or very low cost to implement (e.g. changing to energy efficient lightbulbs, switching off equipment, lights and air-conditioning after office hours) with relatively high financial returns. These easy and cheap actions have been highlighted in the next sections for your reference. The steps which are not highlighted as 'low hanging fruits' may be more expensive and difficult in the short term as they may require investing in new equipment or encouraging employees to significantly change their behaviour. However, more expensive equipment purchased for energy or water savings will often pay its extra cost back within months, and engaging employees in environmentally friendly behaviour can result in extra benefits for your business and employees, plus extend the practice of environmentally friendly behaviour beyond the workplace.

High employee engagement

Research has shown that when employees feel their companies demonstrate operations based on their professed values, engagement levels are significantly influenced. High employee engagement is correlated with low company turnover and high employee productivity, which in turn influences organizational and financial performance[7].

New skills for employee

Employees also benefit by learning how to behave in an environmentally conscious manner. Research has also shown that when employees learn new skills (such as environmental conscious behaviour) and transfer these from work to home, they benefit from higher mental health and greater work satisfaction[8].

[7] Gomez, 2009

[8] Hanson et al., 2006

> ' The Ecological Footprint (EF) represents how much natural resources we use compared to the Earth's capacity to renew these resources. The Global EF is 1.5 - meaning that we are currently using more than half as much natural resources than the Earth's capacity to renew naturally. Malaysia's EF is even greater, at 1.7. This means that if everyone in the world has the EF that an average Malaysian does, we would need the resources produced by 1.7 planets (WWF, 2014). '

Overview

In addition to the introduction, this section is split into 9 other subsections. Sections 5.2 to 5.6 give suggestions on following the "3 Rs": Reduce, Reuse and Recycle, with sections 5.2 to 5.4 looking at reducing energy, water and materials separately and Sections 5.5 and 5.6 addressing reusing and recycling. Even after reducing, reusing and recycling, you might still have waste, and some waste might need special consideration for disposal. Section 5.7 helps you to identify these and how you can dispose them.

Section 5.8 explores green office purchases and suggests further ways to reduce your office impact on the environment by committing to changing your purchasing decisions.

Section 5.9 explores what national and regional incentives exist for reducing your office impacts and Section 5.10 gives suggestions on how you can mainstream your vision for a greener office.

5.2 Reduce: Energy

There are many opportunities for reducing energy usage in the workplace, some of which you might already be following. The suggestions in this section are divided into 3 parts, for reducing energy consumption from air conditioning, lighting and equipment. Every office is different, so you should consider these suggestions in the context of your workplace as some may be more relevant than others.

Air conditioning

In Malaysia, air conditioning accounts for a large proportion of energy usage (up to 65%) in commercial buildings. It is a common misconception that reducing energy usage from air conditioning will reduce comfort. However, this is generally not the case. The following steps can be taken to reduce your air conditioning energy usage while maintaining comfort levels:

- **Where available, adjust temperature to 24°**
  The Government has ruled that Government offices, apart from critical areas like server rooms and operating theaters set their air conditioners at a minimum temperature of 24°. In Malaysia's climate, this is a comfortable temperature for most people.

- **Choose energy-efficient air conditioners**
  Inverter type air-conditioners are more efficient than non-inverter types. If you are using more than one unit, consider a multi-split system, which involves just one outdoor vent unit for multiple air conditioning units. Look out for units with energy labels such as the Energy Commission label with a rating of 4 stars or above, a European Union energy label rated B or above, an Energy Star label or a Singapore Energy Label with at least 3 ticks. You can also calculate the efficiency yourself: The Coefficient of Performance (COP) = Capacity (kW)/Power Consumption (kW). This information should be available on the product sticker or on the manufacturer's website. You should aim for a COP of 3 or above.

- **Make use of fans to support air conditioning units**
  A fan can be used to help circulate cold air from an air conditioner, reducing the need for extra air conditioners or lower temperature settings. It is a common myth that using fans and air conditioners together will lead to breaking your air conditioner or fan. However, there is no evidence for this.

- **Ensure good insulation**
  The cold air from the air conditioning unit can sometimes escape through open doors and windows, and heat from outside can come in through poorly insulated roofs and windows. If your company is in charge of the office building, consider insulating roofs and/or painting them with white or reflective paint, and installing double glazed windows. Double glazed windows are not commonly used in Malaysia currently, but have been used in green energy buildings such as the Energy Commission Diamond building and are worth considering. Consider tinting windows and using blinds to help block out the heat on hot days.

- **Turn air conditioning off during non-office hours**
  If the office is warm and stuffy in the morning, experiment with setting a timer to turn on the air conditioning 10 to 30 minutes before the start of office hours.

- **Maintain your air conditioning units**
  Regular maintenance and annual service of air conditioning units can ensure continual energy efficiency and performance.

- **Plant vegetation around the exterior of your office**
  If you have control over the landscaping around your office premises, consider planting trees which will help shade office buildings. The planting of other vegetation such as shrubs or flowers will also help reduce the urban heat island effect, lowering temperatures around your office and reducing your air conditioning energy usage.

Lighting

- **Use low energy light bulbs**
  Where possible, replace incandescent bulbs with compact fluorescent light bulbs (CFLs), LED bulbs or strip lights. CFLs are available in the same range of colour temperature and brightness as incandescent bulbs, so you do not need to sacrifice ambience. Choosing low energy light bulbs can save up to 75% of running costs while maintaining the same light levels. Low energy light bulbs also produce less heat than incandescent bulbs, which can lead to further savings in air conditioning use.

- **Match light fixtures and brightness to purpose**
  Light fixtures affect the performance of a bulb by shading and directing light. By matching the appropriate light fixtures for the purpose of the light you may be able to use dimmer bulbs. For example to light up work spaces you may consider light fixtures that direct light towards the work space rather than opt for brighter ambient lighting.

- **Use natural lighting**
  Where possible, allow natural light into the office. Consider installing lighting shelves[9] by windows which reflect sunlight towards the ceiling, lighting up the whole room and avoid glare to workers directly below windows.

- **Switch off lights when not in use**
  Switch off office lights at the end of the day and in areas such as store rooms or photocopy rooms when they are not in use for more than 10 minutes. This can be facilitated with the use of motion sensors in areas which are not used often.

- **Use light intensity sensors**
  Consider installing a light intensity sensor which will adjust the office light intensity in response to changes in natural light intensity.

- **Label light switches clearly**
  Clearly labelling light switches by the areas they service and their specific purpose helps your employees avoid misuse of lights.

- **Clean dirty light fittings and lamps regularly**
  Clean bulbs and light fittings cast more light than dirty ones, allowing you to get the same amount of light from fewer bulbs.

- **Replace any existing 50W halogen down lights with 20W**
  20W down lights give a similar effect to 50W down lights and only use 40% of the energy.

- **Use light coloured office fittings**
  Light coloured office fittings can brighten up the office and reduce the need for additional lighting.

Information Technology

- **Switch all equipment off when not in use**
  Ensure all equipment is switched off at the end of office hours and for program equipment to hibernate when not in use during office hours. Switching off equipment at the wall or unplugging may save even more energy, depending on your equipment as most office equipment continue to draw energy while turned off.

  o Note that turning computers off does not harm them.

  o Encourage employees to switch off their monitors when they go to lunch.

  o Switch fax machines off during non-office hours or, if you are worried about missing faxes and your office has more than one fax machine, divert faxes to one or two machines during non-office hours and turn off other fax machines.

  o Purchase a timer switch for office equipment.

These switches plug into power points and can be programmed to turn power on and off during certain times of the day. Timer switches can be used with, for example, vending machines, boiling water units, photocopiers and printers to turn them off during non-office hours. Provide signs to clearly indicate to employees how to switch these back on should they be needed during non-office hours.

- **Turn on energy-saving settings**
  Activate energy saving settings on computers and other electrical appliances if available. If done manually, suggested settings are as follows for periods of non-activity:

  o Monitor Hibernation mode – Deactivate your screensaver, which keeps your monitor on, and set your monitor to hibernate after 15 minutes of non-activity.

  o System standby (hard drive switches off) – 30 minutes of non-activity.

  o System hibernation (system switches off) – 2 hours of non-activity.

- **Minimise number of photocopiers and printers**
  When idling, small machines use about 100 – 120 W/h, while large machines use even more. Photocopiers and printers are left to idle 95% of the time. If this is the case in your office, reduce the number of photocopiers and printers to increase their productive time, or identify main machines and keep spares switched off until they are needed.

- **Batch your photocopies**
  The majority of electricity used by photocopiers is in the initial 'warm up' phase as it is getting ready to photocopy. Save energy by saving up your photocopy tasks and doing them in one batch.

Further energy savings can be made with the purchase of energy efficient equipment when old equipment ages to the end of service life. Often, the amount of money saved from reduced energy usage will be greater than the extra cost of purchasing energy efficient equipment within just a few months. Please see Section 5.8, "Commitment to Green Office Purchases" for more information.

Transport

Emissions from everyday transport to and from the office and meetings outside of the office can be reduced by:

- Providing a shuttle bus to/from a nearby transport hub for morning and evening rush hours;

- Allowing employees to work at home; and

- Purchasing low-emission company vehicles.

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[9] Lighting/light shelves are horizontal light-reflecting overhangs (shelves) that are placed above eye-level near windows to reflect light deeper into a building at the same time as reducing light in the area around the window.

These options can reduce the number of vehicles on the road, save your employees money and reduce employees stress from driving in rush hour.

5.3 Reduce: Water

Despite our tropical rainfall, Malaysia has experienced several episodes of fresh water shortages in the last few decades. This can be expected to worsen with the growing needs for water in the near future.

Practicing water conservation is a feasible solution that can help avert this. In addition, it can also reduce chemical use and energy consumption for water treatment in Malaysia. Furthermore, you will be ready if water tariffs rise in response to the water shortage.

Suggestions for conserving water are as below:

- **Fix dripping faucets, pipes and toilets**
  Ensure all taps can be turned off with ease. Encourage staff to report dripping taps, pipes and toilets to maintenance crew or an appointed member of staff who will be able to get them fixed.

- **Install low-flow faucets/aerators**
  Low-flow faucets reduce water usage by reducing the amount of water used but adding pressure to water flow, so that there is no noticeable difference to people using the faucets. Aerators can be installed on existing faucets.

- **Replace single flush toilets with dual flush toilets**
  This can save 8 litres/flush on average.

- **Fully load dishwashers before turning on**
  Set dishwashers to economy setting and scrape food off rather than rinsing before putting dishes into the dishwasher.

- **Enlist the help of your cleaning staff**
  Inform cleaning staff of your commitment to reducing water usage and discuss with them opportunities to reduce water usage in their cleaning procedures.

5.4 Reduce: Materials

Paper

- **Use computers for data management**
  Implement a paper-free electronic database for information storage and communication within the office.

- **Keep a printed reference section**
  If hard copies of reference documents are needed, keep these in a central reference section for everybody to use, so that staff do not have to print their own copies. (This is not applicable for confidential documents).

- **Think twice about printing**
  Ask employees to think twice about whether they need to take printouts. Suggest reading from screen or using electronic means of communication.

- **Print double-sided**
  Set computer print settings to print on both sides of paper by default. When printing large documents for reading, consider printing 2 pages per page (2-up) as well as double-sided.

- **Ask for double-sided documents**
  Encourage suppliers to provide you with double-sided documents to reduce suppliers' use of paper.

- **Reuse single-sided paper**
  Keep a box for unwanted single-sided paper next to printers and encourage employees to use these to print drafts or for notepaper.

- **Reuse stationery**
  Re-use folders, covers and file-clips. Use labels to re-name folders and covers. Re-use envelopes, especially when sending information internally.

- **Use IT for marking edits in documents**
  Most word processors such as Microsoft Office and Open Office have the ability to track changes to or add notes to a document. Office users can use this facility instead of printing out drafts and marking out by hand.

- **Refuse unwanted mail**
  When receiving unwanted junk mail through the post or fax, inform the sender that you would like your office removed from the sending list.

- **Check that you are not sending unwanted mail**
  Use e-mail or send a returnable postcard first to check that potential recipients are interested in receiving your mail. Also, consider sending electronic versions of your mail-outs by e-mail instead.

- **Use computer-linked faxes**
  Computer-linked faxes can send faxes directly via computer rather than having to print out a page and fax it through.

- **Educate staff on properly using office equipment**
  Educating staff on how to properly use office equipment such as printers and fax machines will avoid printing and copying mistakes, and also facilitate the use of paper-saving features such as double-sided printing/copying.

Equipment

- **Repair equipment**
  Attempt to get equipment repaired before discarding and purchasing new equipment.

- **Replace parts**
  If equipment needs replacing, think about whether you need to replace the whole equipment, or just parts. For example in terms of IT equipment, IT staff or contractors can advise you on replacing or purchasing new parts for staff computers rather than replacing them whole. This is easy for PC, harder for laptops and generally not possible for phones.

- **Pass equipment on to other users**
  When equipment is no longer suitable for use within the office, check to see whether the equipment can be used by others, maybe by other offices or by staff in home environments. Similarly, equipment that may no longer be suitable in one part of the office may still be suitable for use in other parts of the office.

- **Buy less**
  Think twice before buying new equipment – will your office really use it? If equipment will not be used often, think about leasing equipment or sharing with neighbouring offices.

- **Use rechargeable batteries** 💡
  Use rechargeable batteries where batteries are needed, such as for remote controls or clocks.

Other

- **Avoid packaging** 💡
  Inspect potential purchases for excess packaging. Buy everyday supplies such as stationery or pantry supplies in bulk to reduce packaging. Avoid individual sachets of sugar/salt/coffee/creamer when purchasing for the office pantry.

- **Use cloth towels** 💡
  Instead of or as well as paper towels, keep cloth towels in the pantry. You might think of labelling towels for purposes, e.g. drying or cleaning.

- **Refurbish office furniture**
  Check if your office furniture can be refurbished rather than purchasing new furniture. If you are getting rid of old furniture, check if you can donate or sell your old furniture to staff, charity or second hand buyers.

5.5 Reuse: Food/Drink Receptacles

- **Re-use cups, crockery and cutlery** 💡
  Provide cupboards for cups, crockery and cutlery for office use. Encourage staff to bring in their own reusable cups, crockery and cutlery or provide them for the office. Discourage the use of disposable cups, plates and cutlery.

5.6 Recycle

Reducing and reusing can only do so much; you will still have waste (hopefully a lot less after you have reduced and reused). Recycling is important as it reduces the amount of waste, including toxic and hazardous waste going into landfills, reduces original material/mineral extraction and reduces energy and water used in extracting these materials. In Malaysia, common recyclables are paper/cardboard, plastic (generally plastic bottles), aluminium/tin and glass.

- **Engage a licensed recyclable waste collector or send to a recycling centre**
  Contact your Local Government (PBT) for more information on recycling centres within your area.

- **Educate staff on recycling**
  Your recyclable waste collector or recycling centre will be able to tell you what materials you can recycle, and how they should be sorted. In general certain types of paper, plastic, glass and tin can be recycled. Plastic and tin products may also need to be cleaned before recycling if they have come into contact with food, and you may want to do this anyway if you are storing your recycling for periods of time between collections or trips to the recycling centre.

- **Provide recycling stations**
  Construct a primary recycling station within a central area of the office for staff to bring all of their recycling to. More localised recycling stations can also be utilised, even by desk, if staff feel they are too busy to walk to the main recycling station. Individual staff members can be made responsible for transferring the contents of their localised recycling stations to the primary station, or for collecting and even sorting from all localised stations.

- **Recycle confidential documents**
  Confidential documents can be shredded prior to recycling. You can also check if your recycling provider has a confidential recycling service.

5.7 Waste: Checking for Special Disposables

- **Recycle printer toner cartridges**
  Printer toner cartridges contain harmful materials which should not be directed to landfills. Some companies will take back their cartridges for refilling. You may also be able to sell your used printing and toner cartridges to certain companies.

- **Dispose batteries safely**
  Batteries contain heavy metals which can leach into the earth and nearby waters if they are disposed of in landfills. You can ask whether your recyclable waste collector or recycling centre will take your batteries. Alternatively, larger vehicle batteries can be sold to workshops or even given to some 'old newspaper' collectors. Mobile phone batteries can be disposed of in most cellular phone service centres. Large supermarket chains may also have battery disposal services.

- **Dispose Compact Flourescent Lightbulbs (CFLs) safely**
  Unfortunately there are currently not many services in Malaysia which safely dispose of CFL. If your workplace is in the Selangor/Kuala Lumpur area, IKEA[10] and IPC shopping centre[11] will take them. Additionally, several shopping malls have areas where CFL can be dropped. For a list, please refer to The Electrical and Electronics Association of Malaysia[12].

5.8 Commitment to Green Office Purchases

The purchases an office makes also have an impact on the natural environment, both:

a) Upstream, through an office's consumer power (your purchasing decisions can act as a 'vote' to signal to manufacturers that you want more environmentally friendly products); and

b) Downstream, through how the products you purchase affect the environment from the point of purchase, through their use or how they are disposed of at the end of their lifetime.

Equipment
- **Think of longevity, reusability and being refillable**
  When buying office equipment such as printers, photocopiers or fax machines, check that they accept refillable ink cartridges. By purchasing products with a long lifespan, or that are reusable and refillable, you will reduce the number of purchases you need to make in the long term and therefore reduce the amount of materials used. In the same vein, check how easily the product can be repaired or upgraded, so that you can extend the lifetime of the product.

- **Look for energy efficient labels**
  Office equipment should conform to at least 'Energy Star' (an international standard for energy-efficient electronic equipment) requirements. 'Energy Star' labels are available for computers, monitors, copiers, printers, scanners, fax machines and televisions as well as air conditioners, ceiling fans, refrigerators and dishwashers. Energy Commission 'Energy Efficient' labels are also available for air conditioners, fans, refrigerators and televisions.

- **Purchase low-energy equipment**
  Look for low-voltage computers with low-energy hard drives and energy saving features. Similarly, as printers spend a lot of time idling, compare energy usage while in idling mode across different models.

- **Purchase multi-purpose equipment**
  In offices where equipment is not used often, consider purchasing equipment that combine printing, fax, and/or scanning capabilities to decrease equipment purchases and idling time.

- **Purchase plain-paper fax machines**
  Opt for fax machines that use plain paper rather than coated thermal paper, which contains more chemicals that increase the environmental impact of producing the paper and complicate the recycling process.

- **Buy recycled**
  Look for products made from recycled materials, to reduce the amount of new material used to make your product and encourage suppliers to supply recycled products.

- **Buy recyclable**
  Purchasing recyclable products reduces the amount of waste going to landfills and ensures that materials can be reused in new products.

- **Buy water efficient equipment**
  Opt for low-flow faucets and double-flush toilets.

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[10] The Star: Choong, 2013.

[11] https://www.ipc.com.my/ipc-recycling-buy-back-centre

[12] http://www.teeam.org.my/news-event/energy-saving-compact-fluorescent-lamp-cfl-recycling-project/

Other

- **Buy recycled paper**

  Using recycled paper does not necessarily mean a reduction in quality. Recycled paper that is the same or greater quality than non-recycled paper can be purchased. Look for paper that is made from post-consumer recycled fibre or which has the Forest Stewardship Council (FSC)'s '100% Recycled' or 'Mixed Source' logo. While the costs of recycled paper can be higher, reducing your paper use can help offset this cost. See Section 5.4 for more details.

- **Buy sustainable paper and paper products**

  When you cannot obtain good quality recycled paper and stationery, ensure your paper is from a sustainable source.

  o Use FSC-certified paper – FSC certified paper comes from responsibly managed forests and plantations.

  o Use the WWF 'Check your Paper' database to check the environmental friendliness of various paper brands at http://checkyourpaper.panda.org/papers/search/country_id_1/158.

  o For more information please see WWF's Guide to Buying Paper at http://wwf.panda.org/how_you_can_help/live_green/fsc/save_paper/paper_toolbox/the_wwf_guide_to_buying_paper/.

- **Buy green furniture**

  When purchasing new or replacement furniture, consider furniture made from recycled content if available. Also look out for FSC and Malaysian Timber Certification Council (MTCC) labels for wooden furniture.

- **Provide green/sustainably produced corporate gifts and customer incentives**

  Ensure that corporate gifts and customer incentives reflect your company's commitment to becoming green. In some instances, you could consider providing local services such as spa treatments or restaurant coupons as an alternative to material goods.

5.9 Certification

Certifications of energy and water efficiency can be obtained and displayed on products and / or your website. Obtaining certification helps to assure customers that your company is doing its part for the environment and may be an important factor in their purchasing or supply chain decisions.

National

- Businesses can apply for **Green Office Certification** from the Penang Green Council. A business outside Penang can also apply for this; however the cost is dependent on your distance from Penang. Application costs from RM650 upwards, depending on where your office is located. Certification lasts for 2 years. For more information go to http://pgc.com.my/index.php/application-procedure-fees.

Regional

- **Penang**

  o Businesses can obtain Aqua Save certification from Penang Green Office Council starting April 2015. For more information please visit www.pgc.com.my.

5.10 **Green Office Examples**

SURUHANJAYA SYARIKAT MALAYSIA (SSM)

SSM's Corporate Headquarters

In 2009, the ultra-modern 31-storey corporate headquarters for Companies Commission of Malaysia (SSM) was completed at Kuala Lumpur Sentral (KL Sentral). The building is strategically located within the focal point for the rail transport systems in the city, such as the light rail transit (LRT), KTM commuters, monorail and the express rail link (ERL) to the Kuala Lumpur International Airport.

The construction of **Menara SSM@Sentral** commenced in 2006 and was completed in December 2009. With a land area of 34,970 sq meters and a total built-up area of 280,890 sq feet, it boasts state-of-the-art facilities in line with the modern architecture of the building. Menara SSM@Sentral stands at 131.15 metres tall, with a total of 31 floors comprising 24-storey office floors and 7-storey elevated car parks with a total of 349 parking lots for both the employees and visitors of SSM. The auditorium at Menara SSM@Sentral has a seating capacity of 324 persons, while its surau (Muslim praying area) can accommodate a total of 130 people at a particular time. There is also a cafeteria to cater to employees as well as the public located on the 11th floor. In line with the notions of corporate responsibility, the building also hosts a crèche centre to cater for the children of SSM employees. Other facilities include a gymnasium, mini library, computer laboratories, an executive dining room, lecture halls, classrooms and a moot court.

Menara SSM@Sentral features various green features. They are incorporated into the design, development and operational aspects to ensure energy efficiency and environmental sustainability.

Building Orientation

The physical orientation of a building has significant impact on its energy consumption. Where the windows of a building face east, they will trap the morning sun, whereas windows that are facing the west will let in the afternoon heat. Both these attributes will make the building warmer and consume more energy for cooling down. For the avoidance of the direct absorption of heat from the sun, it is best for the main facades of the building to avoid facing direct east-west direction. This concept has been adopted in the building orientation where the main building facades are slightly angled facing north-west and south east direction, thus reducing the direct absorption of heat as shown in the layout plan below.

Menara SSM@Sentral

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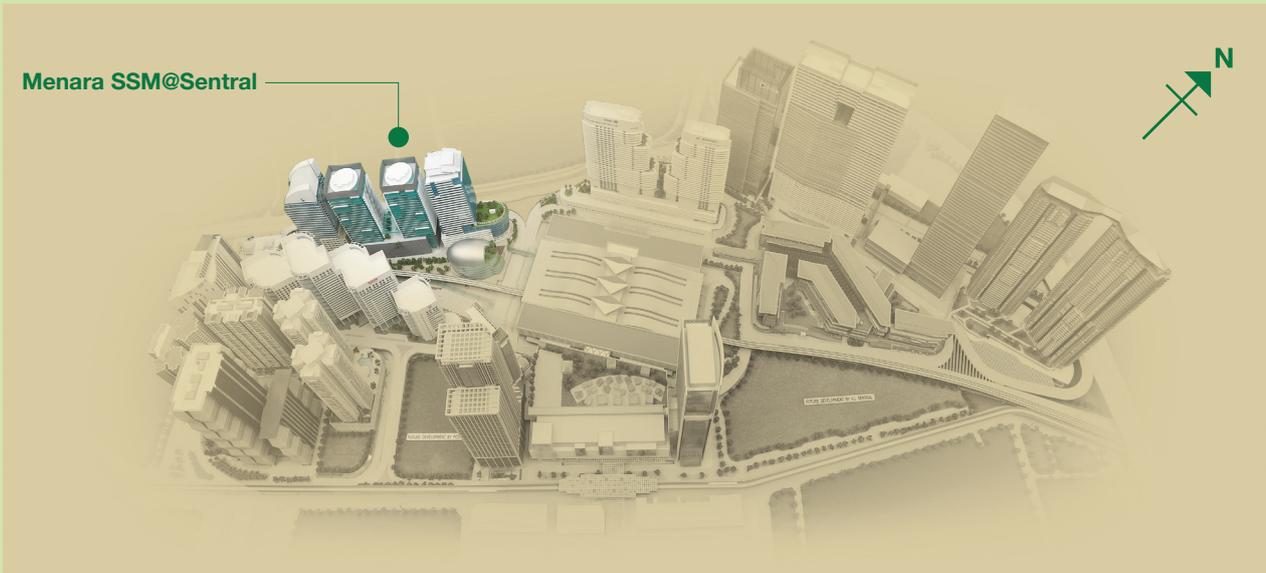
Façade Treatment - Glass Curtain Walls

The windows and external walls of the building are protected by appropriate shading mechanisms to allow for maximum light penetration whilst minimising the transfer of heat. This feature will enable the building to have natural light coming in during the day to minimise electricity light usage and at the same time bounce the heat away to maintain the office's interior coolness.

The aluminium fin screens and sun shades prevent the direct penetration of sunlight and at the same time reflect sun rays into the room. This diffusing action takes away much of the heat while allowing sufficient light to enter, thereby improving energy savings and user comfort as illustrated in the diagrams below.
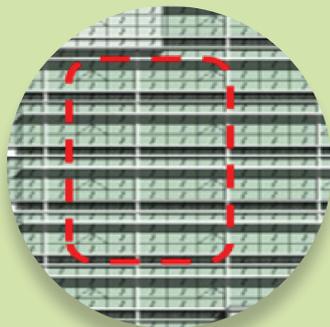
Sun shades installed at office floor windows

Sun heat is bounced onto floor ceiling for absorption

The added protection against heat is afforded by the 8 - 10mm thick light green tempered glazing on the panes which allows 65% of the available daylight in while keeping 49% of the heat out, thereby reducing air-conditioning usage. Car park louvres are arranged to allow daylight to penetrate while at the same time becoming an external visual screen as shown in the diagram below.

Building Deck

The SSM office building was constructed on a platform above the existing Keretapi Tanah Melayu (KTM) and Express Rail Link (ERL) railway tracks. This has the advantage of maximising the development with limited usage of land.

As such, forest and vegetation were not cleared to make way for development of SSM's building. The advantages of this elevated design concept are:

- Minimal earthworks were required as compared to the construction of underground basement parking where huge earthworks excavation is required;

- The elevated car park acts as buffer against vibration and sound to the building occupants;

- Car parks above ground allow natural cross-ventilation thus omitting the need for mechanical ventilation as shown in the diagram in the following page; and

- Maximisation of natural daylight into the car parks that reduces energy usage during day time.

Optimisation in Floor Layout

The floor layouts were designed to allow the optimisation of natural daylight. The depth from the curtain wall to the building core, permits more light inflow thus reducing usage of electrical lightings as shown in the diagram below.
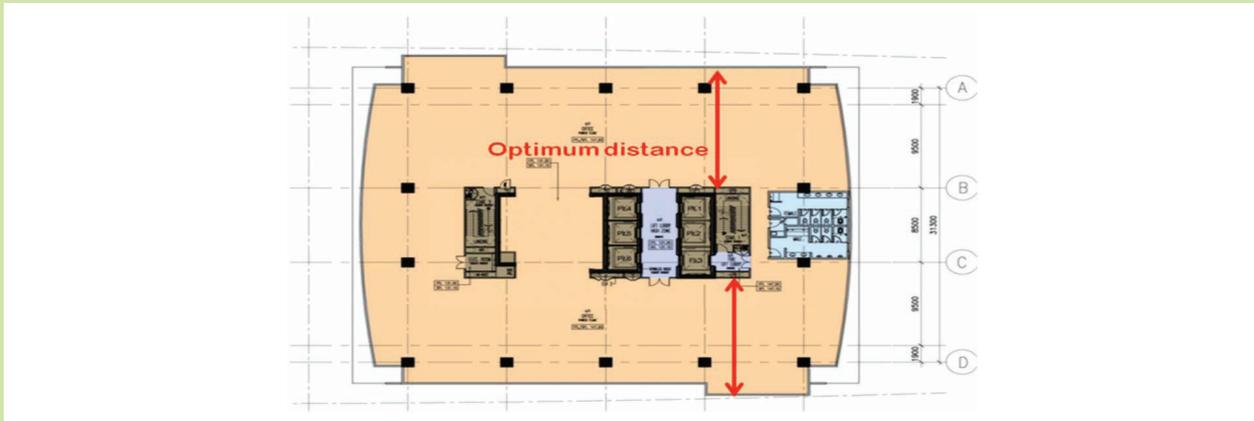
Building Materials

Non-toxic building materials and finishes selection were predominantly used and mostly derived from natural products. The formworks used during the concrete construction were the MIVAN formwork system which has the advantage of being reused repeatedly as opposed to the plywood-type formwork which has limited usage before being discarded.

Variable Refrigerant Volume (VRV)
Air Conditioning System

The air-conditioning system used for the building is the VRV system. This air-conditioning system is purpose-built for energy saving where its function and operation are based on the actual usage demand. This system incorporates a device called the inverter, which is an intelligent control unit which can control the system working capacity to the demand load.

Other advantages of the VRV are:

- Lower operating cost as compared to a chilled water system;
- Flexibility in operation where every zone is controlled individually, thus enabling energy savings;
- Energy efficiency especially during part load conditions (weekends and after-hours);
- Individual thermostat provides precision control of every zone;
- Self-diagnosis system which identifies problems quickly and accurately, ensuring efficient serving and maintenance;
- 'Intelligent Manager' system that provides effective centralised monitoring and control of the whole VRF system; and
- Refrigerant used is R410A which is environmentally-friendly and chlorine-free.

Building Automation System (BAS)

The building is installed with the BAS which provides the following functions for the purpose of energy conservation:

- All common lightings such as lobbies, car parks, toilets and staircases are time-scheduled controlled by the BAS, thus ensuring energy savings;
- All compound and facade lightings are also time-scheduled by the BAS, ensuring energy savings; and
- Mechanical equipment such as the air-conditioning system, toilet exhaust fans, plant room exhaust fans and pre-cooled AHUs are all time-scheduled by the BAS to conserve energy.

Internal Green Initiatives

SSM's staffs are encouraged to reduce power consumption by switching off all electrical lights during lunch. A consumption report is generated every month for each floor of the building and circulated to all staff via e-mail for easy monitoring and records.

The air-conditioning system is automatically switched-off at 5.15 pm, the end of the official working hours.

Printing paper provided for usage is sourced from 100% renewable fibre. A consumption report (circulated to staffs for monitoring) is also generated every month for each Division/Section in the Headquarters and for State Offices and Branches nationwide.

An internal drive *'to save the environment'* was also conducted to encourage staffs to take action in areas that can contribute to environmental conservation.

Posters for the drive are distributed to all Divisions/Sections at the Headquarters and all State Offices and Branches. The posters are also displayed in the common public areas of the Headquarters building.

Most administration submission such as application of leave, traveling claims, loan facility, medical claims, training, personal loan and stationery is automated where all applications are submitted online and paperless.

All corporate responsibility related publications by SSM are printed on recycled paper. To minimise re-printing, the same publications are also available online for easy download by stakeholders.

SSM reduces the number of photocopiers and printers in the Headquarters. Every floor is equipped with a photocopier machine and printer which is located in the OA room for communal use.

SSM's Poster for internal environmental drive

REGISTERED CHARITY – WWF-MALAYSIA

WWF-Malaysia is a registered charity focused on environmental conservation, whose headquarters are based in Petaling Jaya, Selangor. Due to the nature of the organization, there is little effort needed to convince staff to behave sustainably. However, sustainable behaviour is made easier by the way the office is run, and normal day to day office activities are greened through the office set-up.

The office benefits from natural lighting through floor to ceiling windows. Fluorescent lighting makes up the rest, with switches controlling lighting in different areas. Individual air-conditioning units rather than central air conditioning reduce electricity usage as temperature can be controlled for different parts of the office. The elevator is situated in the stairwell, making both options equally accessible. Employees are encouraged to take the stairs for health reasons and to reduce electricity usage. The staff is given laptops to use rather than desktop computers, as laptops are more energy efficient, and monitors and keyboards are provided for plugging into laptops if requested. Two machines act as photocopiers, printers and scanners for the whole of the office, and one of these also acts as a fax machine. At the end of the day, staff members switch off lights, air-conditioning and printing/photocopying machines. Thus, carbon emissions generated by flights made by employees for work are offset by the office environment.

Additionally, the office also has other initiatives like the 'work from home' and 'flexi hour' policies that enable the reduction of overall carbon emissions by reducing employee travel time and operation time of office equipment. These policies have also helped attract talented individuals into WWF employment.

The office has also reduced the number of servers used from six to four by moving 70% – 80% of office applications to the Cloud[13]. By assuming average server power consumption, IT staff estimate that this has resulted in a reduction of 360 kWh of energy consumed per month, on server usage alone. It is likely that electricity is also saved from reduced air conditioning used to cool down the servers.

Water is saved through the installation of dual-flush cisterns in the main toilets and aerators in faucets.

All paper and toilet roll used in the office are FSC certified and boxes are provided by printers for unneeded single-sided printed paper for drafting. Envelopes are also re-used for post between WWF offices.

To reduce waste, there is a ban on polystyrene within the office and staff are encouraged to bring their own food containers for take-away if needed. Recycling facilities are also available for paper and plastic. Water dispensers use filtered water from the mains rather than bottled water. Whenever possible, machines, including office laptops, are repaired rather than replaced and receive regular maintenance to prolong their lifespan.

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[13] Cloud computing means that external servers handle the application computing needs of many offices, leading to more efficient use of servers. This cuts down on overall electricity and materials use.

5.11 Mainstreaming

Many suggestions for greening the office cannot be undertaken without the support of all employees working within the office. It is therefore important that employees understand and are onboard with the green office concept and empowered to take actions requested of them for creating a greener workplace.

Providing context for changing behaviour: Setting and committing to environmental targets.

You can use the 'SMARTER' mnemonic (Specific, Measurable, Actionable, Relevant, Time-Bound, Evaluate, Reevaluate) to introduce and mainstream the concept of a green office to employees. Set Specific environmental goals which are Measurable, Actionable, Relevant and Time-bound, and Evaluate and Re-evaluate progress to goals and goals themselves. This can be done by:

1. **Identifying the current situation**
   Keep a record of current:

   a) Electricity and water consumption (from bills);

   b) Paper usage (through frequency and quantity of paper orders and current stock of paper);

   c) Amount of waste generated (and recycling, if currently available); and

   d) Other metrics, such as sustainability of office equipment and availability of reusable crockery, cutlery and mugs.

2. **Setting targets to achieve a green office**
   Set separate, quantitative targets for electricity and water consumption, paper usage, waste and recycling. These can be set as overall percentages of current use or by consumption by number of employees in the office (in case this number changes in the future). Set qualitative targets for other metrics, if needed, such as replacing or upgrading office equipment or installing energy-saving devices. Remember to set targets that are measurable, actionable and relevant to a green office.

   Make the targets time-bound: set dates for targets to be achieved by. Interim targets and dates can also be set to keep the office on track. Achievement of interim targets can also rekindle enthusiasm for green office endeavours.

3. **Writing up a green office policy**
   Outline what measures you will take to achieve targets and how you will measure your progress towards targets. This helps ensure that your targets are both measurable and actionable, and provides a plan for employees to follow.

4. **Commit to targets and policy**
   Commit to and ensure all employees are informed of the green office targets and policy. Incorporate your green office policy into company policies and make green targets and policy a recurring part of the agenda in regular office meetings. You may also think about informing suppliers, who may be able to help you achieve your targets, and customers, who might include your targets as part of their decision making process on purchasing your goods or services.

5. **Regularly check progress towards targets, and set new targets if needed**
   Set a regular interval for undertaking an environmental audit and checking office progress towards targets. Keep a record of the results to track progress and re-evaluate targets if needed.

Suggestions for changing behaviour

Even when employees know about your office's drive to become a greener office and may agree with it, it might be difficult to encourage behaviour changes to pro-environmental behaviour. A study[14] that looked at techniques to encourage pro-environmental behaviour found that techniques can be broadly divided into four (4) groups:

1. Convenience techniques – making pro-environmental behaviour easier to do or providing prompts or reminders to perform a certain action.

   a) **Automate**
      Sometimes it is easier to automate a process rather than rely on specific types of behaviour change from your employees, who may already be overloaded with other behaviour changes. Consider setting timer or sensor switches for lights and equipment.

   b) **Give responsibility to a single staff member**
      A single staff member could be given responsibility for the implementation of the whole of the green office policy, or individual staff members could be given responsibility for different parts. For example, one staff member could be given the responsibility to turn off all shared equipment at the end of the day and another to check that monitors are switched off during lunchtime. Giving a single person responsibility will avoid a scenario where staff members believe that 'somebody else will do it'.

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[14] Osbaldiston & Shott, 2012.

c) **Make tasks easier**
Where some changes can take relatively high time and effort, such as sorting recycling and bringing it to a central point, consider ways in which you can make this easier for staff. One way could be for each staff member to have their own personal recycling point by their desk which they empty at the end of the day or week at the central recycling point, or assign responsibility to a single member of staff to sort and empty everybody's recycling.

d) **Fix easy to read and eye-catching reminders**
Even where there is intent to be green, people might forget when preoccupied with other tasks. Stickers and signs help remind people of their intents. Signs with information about CO_2 savings (e.g. switching these lights off overnight will save x CO_2 a year, the equivalent of a car driving x km) can also help spur people to save energy. Place energy-saving signs near light switches and exits and water conservation signs in bathrooms and kitchens. Green office posters with targets, progress at last audit, and reminders of staff's role can also be placed in central office areas such as notice boards, pantry or canteen.

Research has shown that signs that verbalise a social norm are the most successful for changing behaviour, and messages emphasising the benefit for the institution to be least successful. For example 'Join your colleagues in helping to save the environment' will be more successful in changing behaviour than 'Help [your business name] save energy'[15].

2. Information techniques – these include both justifications to perform behaviour (e.g. information on the amount of CO_2 saved) and information on how to achieve a goal (e.g. use less paper by printing double-sided).

a) **Educate staff on reasons for a green office**
Explain to staff the reasons for a green office to ensure that staff are aware of the reasons for behaviour change. This can be done through meetings or discussions, leaflets or e-mails, or documentary viewings.

b) **Fix easy to read and eye-catching reminders**
(See point 1d. above).

3. Monitoring techniques – giving feedback on extent/impact of behaviour (e.g. energy/CO2 saved) and/or giving rewards/incentives for pro-environmental behaviour.

a) **Provide information on office progress**
Display past energy, water, and paper consumption records on notice boards or send through mass e-mail.

b) **Provide incentives**
Consider providing office-wide incentives for achieving energy, water, and/or paper conservation targets.

4. Social-psychological techniques – these techniques involve people interacting with and influencing each other.

a) **Write pledges**
Ask staff to write pledges to partake in pro-environmental behaviour. These can be personal or group pledges.

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[15] American Psychological Association, 2005.

6.GREEN PROCUREMENT

6.1 Introduction

All businesses procure products, materials or services as part of the operations of their businesses. These materials then become part of their own products, or products or services that help other businesses to operate. Green procurement means making procurement decisions that take the environment into account when considering a product's value. Common environmental considerations are the amount of resources expended and the use of toxic and hazardous chemicals/materials during the lifecycle of a product, from manufacturing to use and disposal.

Benefits

Environmental considerations into product's value

Taking environmental considerations into account when considering a product's value can allow procurement decisions that reduce environmental impacts, save money, and create a healthier work environment. Green procurement decisions will follow the environmental ethos of your green business by ensuring that the products your business uses are sustainable and in turn reinforce and reward other green businesses by purchasing from them.

Practice green procurement to enhance company's environmental reputation

By practicing green procurement your business will reduce its greenhouse gas emissions, conserve energy and water, and reduce waste and the amount of toxic pollution used to produce your products. Demonstrating your commitment to running a green business by practicing green procurement will enhance your company's environmental reputation, to both your customers and your employees.

Increase engagement from employees

Demonstrating that your business is operating based on your professed values will increase engagement from employees, which research shows decreases company turnover and increases productive. This, in turn, impacts on organizational and financial performance[16]. Employees will also enjoy a healthier workplace when procurement decisions omit products containing hazardous chemicals/materials, leading to fewer sick days and increased productivity. The prospect of reduced occupational hazard can also attract a better pool of talent as employees.

[16] Gomez, 2009

Financial benefits

Financial benefits from green procurement will come from increased employee engagement and a healthier workplace, lower running costs of more efficient machines, decreased outlays for procurement of new products from longer lasting, upgradeable products and customers responding positively to an increased environmental reputation. It is also important to consider that energy costs are likely to rise as the Government reduces energy subsidies; products which are more energy efficient can save money in the long-term.

Overview

This section looks at green procurement decisions you can make in your supply chain (Section 6.2) and in selecting transport options (Section 6.3). Examples of green procurement strategies from different sectors are given in Section 6.4, followed by incentives that could support your business in your green procurement strategy (Section 6.5). Finally, Section 6.6 gives you suggestions on how to mainstream a green procurement strategy.

6.2 Supply Chain

Green procurement means purchasing products that have been produced or distributed in a way which reduces harm to the environment and/or have been produced by a 'green' company i.e. one which has taken steps to reduce its environmental impacts as much as possible.

> ' Malaysia is water rich, however we are not using this precious resource wisely. The amount of water we use is rising rapidly. In 2012, Malaysia used 3,659 million litres of water per day on non-domestic uses. This rose to 3,790 million litres in 2013 (SPAN, 2014). This is equivalent to using 1.84 litres of water a year per RM of GDP (DOSM, 2014). '

It would be difficult to investigate the environmental credentials of all the possible products you may purchase. However, there are a few rules of thumb that you can follow. These are listed below by category:

Materials and Manufacturing process

- **Choose products with authorised third party environmental labelling**
  These are products which have been independently verified to be produced to certain environmental standards. For example, the MyHijau Directory is a Government-supported directory of Malaysian products that have acquired authorised third party green certification. It can be accessed at www.greendirectory.my. The Green Purchasing Network is a Malaysian NGO with a directory of green products which can be accessed at www.gpnm.org. Paper and wood products with the Malaysia Timber Certification Council (MTCC) or Forest Stewardship Council (FSC) labels have been verified by the MTCC and FSC to be produced according to their respective environmental standards.

- **Check to see if materials used were sustainably harvested**
  This might already be evident from third party certification, such as FSC, MTCC, RSPO (Roundtable on Sustainable Palm Oil), MSC (Marine Stewardship Council), ASC (Aquaculture Stewardship Council), RTRS (Roundtable on Responsible Soy) labels. Similarly, avoid products from threatened or endangered plants or animals, or from threatened environments.

- **Choose products that are made from recycled material**
  Products made from recycled material use less original material and energy to produce. Look for the highest percentage of post-consumer recycled content.

- **Choose products that are made from biodegradable non-toxic material**
  Products made from biodegradable non-toxic material can be safely deposited in landfills once they can no longer be used or recycled.

- **Choose products manufactured following 'green' processes**
  Check if production methods were water, energy and waste efficient and designed to minimise waste and pollution, including toxic waste, and look out for products manufactured using renewable energy. See Section 7 for more information on Green Production. Products produced under green processes can be hard to identify. However, it is likely that marketing or branding will identify these products for you.

- **Seek alternatives to toxic or hazardous chemicals/materials**
  Avoid products that have 'Caution', 'Danger', or 'Warning' on the label, which are clear warning signs that the contents contain hazardous chemicals. You should also check Safety Data Sheets to find out about hazards associated with a product or constituent. Avoid products which contain or release:

  o Toxic chemicals that emit toxic air pollutants such as benzene, perchloroethylene and methylene chloride; and/or

  o Ozone depleting substances such as chlorofluorocarbons (CFCs), hydrochlorfluo-rocarbons (HCFCs), halons, and methyl bromide.

  You might also reconsider how often you use these products. Perhaps you only really need them for one type of use but are also using them for other purposes because you already have them. For example, harsh cleaning products may be necessary for places where strict hygiene is needed, but may not be essential for other places such as workspaces. For such areas, you can opt for more environmentally friendly cleaners.

- **Choose products or services from environmentally friendly businesses**
  Opt for businesses that also follow green business strategies, including green procurement policies. For example: conduct business meetings at a green meeting facility or hotel, engage a printing company that uses recycled paper and non-toxic inks, or use a delivery service which employs low-emission vehicles.

Use and Maintenance

- **Choose energy and water-efficient products**
  Check and compare products for the amount of energy or water they use during normal usage, including stand-by modes if applicable. Sometimes third party labels can help with identifying more energy or water efficient products, such as Energy Star or the Malaysian 'Energy Efficient' star labels.

- **Choose products with less or better packaging**
  Purchase products with less packaging or packaging made from recycled or recyclable content.

- **Choose products with a long anticipated lifespan**
  Products with a long anticipated lifespan do not need to be replaced often and may also be straightforward to maintain, service and repair. This includes:
  - **Products that can be upgraded**
    Being able to upgrade products means that products will stay relevant for longer.

- **Choose products designed to minimise waste and/or pollution**
  Look for products that use fewer resources to perform the same function.

Disposal

- **Choose products that are reusable or have reusable parts**

- **Choose products that are made up of material that can be recycled**
  Check whether the material can be recycled locally, or can be returned to the manufacturer for recycling or re-use.

Choosing products based on the above rules of thumb can be difficult when the information you need is not available, and sometimes the types of products you are attempting to procure may not currently have the environmental options you want. At this point you should start communicating with your preferred vendors. They may be able to answer questions you have about the production processes of products and/or take your environmental purchasing preferences into account for future purchasing or production decisions. In this way you can start affecting change down your supply chain. Section 6.6 has more information on this.

If you are a business with significant sourcing activities, you will find the UN Global Compact guide to Supply Chain Sustainability useful. It goes into more depth about communicating and effecting change down your supply chain. This can be downloaded from: http://www.unglobalcompact.org/docs/issues_doc/supply_chain/SupplyChainRep_spread.pdf.

6.3 Transport

Depending on the nature of your business, emissions from transport can play a big part of your company's greenhouse gas emissions. This can include deliveries, shipping, employee travel and employee commuting.

Reducing transport emissions means finding lower emission alternatives. This can mean moving material shipping from road to rail or sea, opting for internet meetings rather than face-to-face, or clustering meetings that need personal attendance so that employees only need to take one trip rather than several. You might even reconsider the placement of different parts of your business to reduce transport distance or to make different types of transport options (such as sea or rail) possible. For road vehicles, including material transport and company cars:

- **Ensure that vehicles are regularly serviced and maintained so that they are running as efficiently as possible**

- **Teach green driving techniques to drivers, including slowing down and reducing idling time**
  It is estimated that there is a 14% saving in fuel and emissions from every fifteen kilometres per hour reduction in highway speed to 65-95 km/h, depending on your vehicle. Generally larger and broader vehicles run most efficiently towards the lower end of this spectrum and smaller, more aerodynamic vehicles run more efficiently towards the higher end of this spectrum.

- **Use appropriate sized vehicles**
  Using the smallest sized vehicle for your needs will save fuel and GHG emissions. Purchasing smaller-sized vehicles with smaller engines will reduce the amount of materials used to produce the vehicle and ensure a reduced fuel usage over the lifetime of the vehicle.

- **Consider opting for low emission vehicles such as hybrid, electric or biodiesel vehicles**

6.4 **Sector Examples**

Hewlett Packard

Hewlett Packard (HP) is one of the world's largest technology companies and a recognisable household brand. In 1998 they released their environmental procurement policy. Transportation was one of the areas chosen. One of the changes they made was to switch from using wooden pallets to lighter plastic pallets for shipping and logistics, reducing the need for using virgin wood and saving 7000 tons of CO_2 emissions annually in Asia-to-Europe notebook and camera shipments. While the plastic pallets cost more, these costs were outweighed by the savings HP made in air freight. They are also moving shipments from air to ocean and from road to rail, saving on both costs and GHG emissions. This also leads to longer transport times, but this has been addressed by better planning and coordination.

HP is a member of WWF's Global Forest and Trade Network (GTFN) and a signatory on the GTFN Corporate Tiger Declaration. Corporate signatories agree to reduce their impact on global tiger habitats through the responsible procurement of wood and paper products. HP is also a member of the Forest Stewardship Council (FSC) and set and reached a goal that 40% of HP branded paper would be FSC certified, or have more than 30% of postconsumer waste content by the end of 2011.

However, HP have also reached down to green their suppliers; in 2000 HP launched their supply chain Social and Environmental Responsibility (SER) programme with a long-term vision to help improve supplier labour management standards, human rights, and environmental performance. HP's hard drive suppliers in Thailand and Malaysia have been included in the SER programme. In 2002 HP released their Supplier Code of Conduct, and in 2003 their suppliers were carrying out self-assessments against the said Code of Conduct. HP achieved their goal of assessing their Top 40 suppliers by the end of 2003. Since then HP have, amongst other successes, audited suppliers (including 5 in Malaysia in 2011 and 8 in 2012), held forums for suppliers on their Code of Conduct, initiated a programme to help suppliers to improve their own SER management and in turn help their (HP's second tier) suppliers, as well as reported on 95% of their suppliers' GHG emissions and 39% of their suppliers' water consumption. Production suppliers representing 89% of HP's supplier spend now have GHG emissions - reduction targets.

Information from HP Global Citizenship Reports, 2011 and 2012 and Accenture Report, Lowitt and Grimsley (2009).

Intermovers Sdn Bhd

Intermovers is a local moving company working with international relocation management service company, UniGroup Relocation.

Intermovers offers all customers who are moving locally within Malaysia the option to re-use packaging materials from inbound shipments coming into Malaysia. This has resulted in 100% of packaging from international inbound shipments being re-used and saves Intermovers RM10,000 per month (RM120,000 per year) on new packaging materials. Additionally, Intermovers does not use plastic adhesive tape and opts for brown gum tape, which uses water-based glue and can be recycled together with the cardboard boxes.

For reducing environmental impacts from transport, Intermovers runs a 5-tonne truck which runs on biodiesel and meets the latest EU emissions standards for their daily trips between Johor Bahru and Kuala Lumpur 6 days a week. They also ensure company vehicles are regularly inspected and serviced and decrease the amount of transport required by ensuring accurate and efficient operations scheduling. Intermovers also encourages carpooling amongst employees for trips to warehouses and has a 'work from home' schedule for their sales staff.

Intermovers uses energy efficient lighting in warehouses and offices, purchases from local companies whenever it can and regularly holds workshops for employees to spread awareness and share ideas on reducing, reusing and recycling within the workplace. Company incentives for green workplace behaviour include bonuses, company dinners and recreational activities.

Information from personal correspondence with Julien Wilkinson, International Sales Manager at Intermovers Malaysia Sdn Bhd.

6.5 Incentives

The **Green Technology Financing Scheme (GTFS)** provides soft loans of up to RM 10 million per company over 10 years for costs from the use of a product, equipment or system categorised as Green Technology. The Government will bear 2% of the interest rate charged by the financing institution. More information can be found on the GTFS website at www.gtfs.my.

6.6 Mainstreaming

Transitioning to a green procurement strategy can be a big process, depending on the size of your organization and the current level of commitment and knowledge about green procurement and environmental issues. Generally, green procurement should be part of a larger process of greening your business. Thus, it is important to introduce staff to the reasons behind adopting a green procurement strategy, as well as the goals you hope to achieve.

Depending on the nature of your business and the types of goods and services you tend to procure, mainstreaming your green procurement strategy can also mean communicating your strategy with your suppliers, with the aim of helping them help you achieve your green procurement goals.

If you are a business with significant sourcing activities, you will find the UN Global Compact guide to Supply Chain Sustainability useful. It goes into more depth about communicating and effecting change down your supply chain. This can be downloaded from http://www.unglobalcompact.org/docs/issues_doc/supply_chain/SupplyChainRep_spread.pdf.

If your business does not have significant sourcing activities, an eight-step process for mainstreaming your green procurement policy is given below, which includes getting both employees and suppliers onboard to ensure that your green procurement goals are met[17].

Eight steps to green procurement

1. Write up a policy and commit

To write up a coherent green procurement policy (GPP), you may wish to first examine or write up your green business vision and goals to identify what goals you wish to achieve for your GPP. Emphasise environmental considerations such as low carbon, non-toxic, and sustainable, or give a preference to eco-labelled products. You should give a clear picture as to what you expect to the purchasers in your organization as well as to your suppliers.

Your procurement policy should take into account your organization's existing arrangements on purchasing (i.e. centralized or decentralized), your organization's size and buying power and how or whether this can influence suppliers and contractors, and any constraints you might have.

Where management might have concerns about promising too much, use language such as 'consider', 'give preference to', 'favour', and 'work with' within the policy. These can be strengthened by clearly stating how your organization will favour green products and services.

Once your GPP is written, ask senior management to commit to the policy; strong leadership and commitment from management will send a clear message to staff that the company is committing to greening through a greener procurement process.

2. Publicise commitment

By publicising your GPP you demonstrate your commitment to operating a green business. Publicise your GPP internally to your staff through training and notice boards or newsletters, and externally to customers, suppliers, other stakeholders and the public. This can be done through your website, correspondence and marketing materials.

3. Staff buy-in

Provide information and/or training throughout your organization on the importance and value of specifying and procuring green products and services.

Ensure that all staff members that are involved in specifying and procuring goods and services are involved with incorporating greening into contracts, and ensure that they understand their role in delivering sustainable choices. This process should be led by staff members who are fully integrated with the procurement process. You should also ensure that:

a) Employees understand that what they purchase says a lot about your organization;

b) Budget holders are not able to ignore or reject environmentally preferred products or services; and

c) Consistent messages are being sent to your suppliers by the different departments or individuals in your organization.

4. Benchmark

Assess your organization's current progress in achieving your green procurement goals. Benchmarking your current progress will help you prioritise areas for improvement and give you a base level to measure future progress against (Step 7).

Table 6-1 is a framework for self-assessment that focuses on the levels of progress across the following five (5) disciplines:

a) People (staff);
b) Policy, strategy and communications;
c) Procurement process;
d) Engaging suppliers; and
e) Measurements and results.

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[17] These steps are based on a ten-step process from Zero Waste Scotland's Supply Chain Management and Sustainable Procurement guide for SMEs in Scotland.

5. **Communicating your needs to suppliers**
   Make it clear to your suppliers that you will be considering environmental considerations as part of their goods and services and value for money. You can send them a copy of your green procurement policy including any specifications you may have; such as minimising material that may become waste, such as packaging, reducing the amount of hazardous material in products and increasing the use of recycled material in products.

6. **Procurement and working with suppliers**
   Your business may already procure a wide range of products and services, and it might be difficult, if not impossible, to attempt to check how all of them measure up against your GPP goals. You will have to prioritise which products and suppliers you wish to speak to first, by identifying products with high environmental risks and products which are most critical to your organization.

   Prioritising products and services will help you reduce your environmental effects quickly, but also protect your business in case of a risk to your organization's reputation (e.g. if your waste contractor is dumping your waste illegally), or to supply (e.g. if a strategically important supplier is unable to deliver due to environmental conditions like water constraints affecting production).

   You can use a set of criteria to ensure your existing and future suppliers meet your standards and set up a vetting process that will help you decide whether to place them on an approved supplier list for your organization.

A vetting process can be done by administering a questionnaire to your suppliers and potential suppliers. For suppliers with which you have good or longstanding relationships, you can discuss your criteria, suggestions for achieving them (pass this Toolkit to them!) and give them a timeframe to work towards achieving the criteria. A sample questionnaire is given in Table 6-2.

7. **Measure performance**
   Regularly measure your performance using the same framework as in Step 4. Set targets of where you want your organization to be on the framework by specified dates and measure your performance against them. You can also benchmark your progress against that of other organizations and best practice.

8. **Publicise success**
   As you progress, publicise your success. This shows customers and stakeholders that you are making progress on your GPP commitments and sends a strong message to customers and suppliers that you are committed, allowing them to consider their future engagement with you within a green context. Employees will also appreciate being able to see the progress they are making and publicity may inspire them to continue making progress.

   Share your success, knowledge and good practice through your website, newsletters, sectoral networks and trade bodies.

Table 6-1 Framework for self-assessment of green procurement

Discipline	Foundation Level 1	Embed Level 2	Practice Level 3	Enhance Level 4	Lead Level 5
People	• Appoint champion • Train key staff	• Train all staff	• Set performance objectives for staff	• Employee induction	• Awards for achievements
Policy, strategy and communication	• Policy in place • Management commitment	• Communicate to staff, customers and suppliers	• Incorporate policy into procedures	• Try to link to Environmental Management System (EMS)*	• Link to EMS
Procurement process	• Identify key contracts	• Consider whole-life cost approach to early stages	• Assess contracts for sustainability	• Life Cycle Assessment** approach for key areas	• Agree performance indicators for suppliers
Engaging suppliers	• Target key suppliers	• General supplier engagement	• Target supplier communication	• Supplier audits and improvements	• Best practice and gain sharing
Measurements and results	• Identify impacts	• Appraisal of impacts	• Link to improvement targets	• Score measures	• Independent audit reports

* More information on Environmental Management Systems and implementing one can be found in Section 7.10.
** A life cycle assessment approach involves assessing the environmental impacts from all stages of a product's life, from resource extraction to when it reaches you.
Copyright, Zero Waste Scotland, 2011 (Appendix 1), Scottish Government Sustainable Procurement Taskforce, 2009 (Figure 1: Flexible Framework)

Some of these levels, such as Level 4 of the Procurement Process, may be beyond your abilities depending on your organization size. However you may wish to keep these in your framework as goals to achieve as your organization grows.

Table 6-2 Sample questionnaires for assessing supplier's environmental standards

1) **Does your organization have a policy on environmental issues?**
   (e.g. climate change, carbon emissions, transport, waste/recycling, resources – energy, water, materials, consumables, biodiversity)
   YES/NO If YES, please provide a copy.

2) **Does your organization have an environmental procurement / purchasing policy?**
   YES/NO If YES, please provide a copy.

3) **Does your organization have an environmental management system?**
   YES/NO If YES, is it a recognised accredited system (e.g. EMAS, ISO14001, BS8555)?
   Please specify.

4) **Has your organization identified the specific environmental impacts associated with the products, services or works it provides and has it taken steps to minimise them?**
   YES/NO If YES, please outline here.

5) **Does your organization observe legislation and industry best practice standards with regard to environmental issues?**
   YES/NO

6) **Does your organization communicate its environmental policy to its suppliers?**
   YES/NO If YES, please outline here.

7) **Does your organization check the environmental policy and performance of its supply chain?**
   YES/NO If YES, please outline here.

8) **Does your organization communicate its environmental policy and activities to staff?**
   YES/NO

9) **Who is responsible for dealing with environmental matters in your organization?**
   Please provide details if different to the main contact
   Name: Position:
   Telephone number: Email address:

Copyright, Zero Waste Scotland, 2011 (Table 2: Example of a simple supplier assessment questionnaire for an SME)

GREEN OPERATIONS

RECYCLE

CONSERVATION REUSE ECOLOGY

RENEWABLE ENERGY

REDUCE ENVIRONMENT

SUSTAINABILITY

7. GREEN OPERATIONS

7.1 Introduction

Businesses in the manufacturing sector will find that a large part of their environmental impact comes from the operational part of their business, through manufacturing and beyond, to the end-use of their product. Green operations means reducing waste/pollution and resource use such as materials, energy and water resulting from your product.This covers decisions from the initial design process through production, delivery, end of life, and even remanufacturing.

Benefits

There are a myriad of benefits that can come from green operations, ranging from simple financial benefits to employee health and company reputation and customer loyalty.

Employee health

When manufacturing processes produce less pollution or use safer chemicals/processes, employees will benefit from better health. Healthier employees are naturally more productive and will take fewer sick days, leading to overall better productivity.

Reputation and customer loyalty

A product designed for the environment also means a well-designed, reliable product with great serviceability. This is also a product that consumers want and that will build a good reputation and brand loyalty for your company. In Section 7.2 modular designs are advocated for a number of reasons, of which one of them is modular upgrading of a product. This can mean that your product can grow and stay with your customer for a long time, inspiring long-term brand loyalty.

Reduced liability

By employing safer chemicals and ensuring robust processes for storage and disposal, you reduce the likelihood of accidental release of hazardous chemicals and therefore also reduce exposure to liability. This also helps maintain a good reputation for your company.

Financial benefits

Increased operations efficiency reduces costs by using fewer materials and less energy in operations and packaging,

> *In 2012, Malaysia generated over 1.1kg of waste per capita per day. This is a 70% rise from 0.7kg per capita per day in 2001 and is equivalent to just over 12 Olympic sized swimming pools of waste per day across all of Malaysia. (KPKT, 2013; DOSM, 2014). Urban areas generate more waste than rural areas, averaging at 1.25 kg per person per day (Pandiyan, M.V., for The Star 2014).*

minimising waste and increasing transport efficiency. However financial benefits also result from benefits mentioned above, from healthier employees working more efficiently and with lower turnover, and from increased sales from higher reputation and customer loyalty.

You may also find that by running a green operation you will gain access to new markets; more and more individuals and organization are emphasising green products and a green supply chain. The Malaysian Government is introducing a procurement policy which gives preference to green products and services. While in the short-term they are focusing on certain pilot products, the policy is expected to expand to a larger range of products[18]. Additionally, should you wish to acquire one or more of the twelve ISO 14000 family standards (on environmental management) your products will also be able to meet the demands of individual and industry customers in export markets such as Europe or the USA (for example, US car manufacturers Ford and General Motors require ISO 14001 certifications from suppliers[19])[20].

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[18] Kahlenborn et al., 2013

[19] ISO, 1999

[20] http://www.iso.org/iso/iso14000

Overview

This section on green operations covers a lot of ground. Your first consideration will be on designing your products to facilitate green operations. This is addressed in Section 7.2. Section 7.3 looks at what your organization can do to green your production practices and Section 7.4 looks at dealing with and disposing toxic and hazardous material safely. Section 7.5 considers the decisions you can make on greening your packaging and distribution process while Section 7.6 looks at what you can do to help ensure that every phase of your products remains green, and Section 7.7 looks at possibilities for remanufacturing of your products. Section 7.8 looks at a few sector examples and Sections 7.9 and 7.10 help you implement these processes by identifying incentives for and discussing ways in which you can mainstream green operations.

7.2 Product Design

Designing a product with environmental considerations in mind is perhaps the most important aspect of running a green business, as the environmental impact of your product will probably far outweigh the environmental impacts of any other parts of your business. The first consideration of product design is considering the function of the product. Sometimes entirely new products can be designed with the same function in mind – take for instance, e-readers or e-reading apps on smart phones and electronic files which have become replacements for books.

Where designing entirely new products is not feasible, product redesign based on environmental considerations can be undertaken. The designer must consider the whole life cycle of the product: acquiring materials, manufacturing, delivery, end-use and finally disposal, and consider the possible environmental impact from each stage. Depending on your product(s), the environmental impact of some of these stages will be more important than others and these should be considered carefully. For example, the environmental impacts of the 'end-use' stage of long-life products (such as IT products, refrigerators and dishwashers) will outweigh manufacturing and delivery impacts, while the environmental impacts of single-use products (such as tissues) will be in the manufacturing and disposal process.

The Design for Environment (DFE) concept integrates environmental aspects or considerations into product design. Considerations following each stage of the life-cycle are:

- **Acquiring materials**
  Do materials for production come from a sustainable source, or can the product use recycled material? What processes went into producing these materials? What impacts to the environment will occur from using these products in the manufacturing process? Are there more environmentally friendly alternatives? See also the last bullet point on 'Disposal' and Green Procurement in Section 6.

- **Manufacturing**
  What environmental impact will there be from the manufacturing process? Is there a design that uses less energy or creates less pollution to manufacture? What (if any) by-products will be created, and can these be reduced and/or recycled or disposed of safely? Some of these issues can be addressed in the actual manufacturing process (Section 7.3), but the design process must also take into account what issues can be addressed in the manufacturing process.

- **Delivery**
  Will the design impact the efficiency of delivery? Smaller designs that can be packed closely together will result in a greater number of products in a single delivery than larger designs with awkward shapes that cannot be packed closely together. Other things to take into consideration are temperature and time restrictions; products that can be stored and delivered within a wide range of temperatures and without strict time restrictions will generally take fewer resources to deliver.
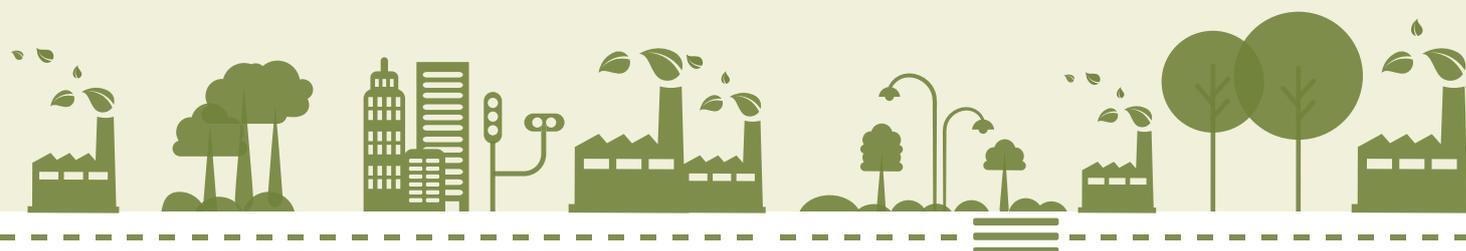
- **End-use**
  Depending on how your product is used, how energy or water efficient is your product? Is it possible for your product to leak dangerous/toxic chemicals, for dangerous/toxic gases to dissipate into the air or for parts of your product to become broken down and left in the environment, such as brittle parts that can shatter or break off?

- **Re-use**
  Can your product be repaired? Can your product be designed in a modular fashion so that parts can be repaired, replaced or upgraded rather than the whole of the product?

- **Disposal**
  Are your materials recyclable and/or reusable? Do they need special disposal? If so, can your company arrange for disposal? Can your product be easily disassembled to promote re-use of components or for separate disposal of materials? Parts should be labelled/marked for reuse and recycling using standards such as the ISO 11469:2000 standard for labelling plastics, the ISO 1629:1995 standard for rubbers or the ISO 18064:2003 for thermoplastic elastomers.
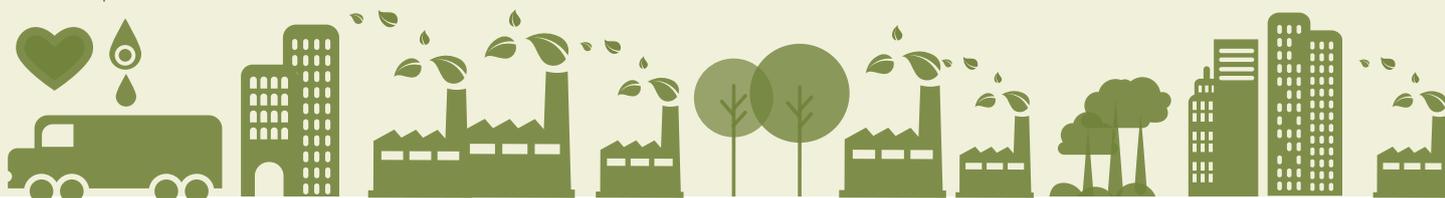
7.3 Production

The considerations that go into creating a more environmentally friendly production process are closely related to both the design process and disposal (Sections 7.2 and 7.4). Section 7.2 addresses the decisions on the materials that go into the production process and Section 7.4 addresses the decisions on how material from the process is disposed of, while this section focuses solely on the production process.

- **Reduce waste**
  Identify the type of waste you produce and consider whether it can be re-used, recycled, sold or given away. This can include raw materials, by-products and factory machinery. You can use the Department of Environment's 'Cleaner Production Implementation Tool' to help you identify opportunities for waste reduction in production (http://cp.doe.gov.my/cpit/login.php).

- **Reduce the amount of water used**
  Audit your water usage, reviewing all the sources of water use within your plant from intake to discharge, paying attention to more than just your major manufacturing processes. Look also at e.g. wash water, utility water and boiler feedwater. This will help you understand what you are using water on and how much you are using. Once your water use has been audited you can see if you can take steps to reduce your water consumption by reducing water usage or recycling/reusing greywater (water not containing human waste) e.g. for WC flushing or landscape irrigation, keeping in mind that technology exists to treat water. Consider using rainwater harvesting to provide some of your water needs. You should also check your faucets and pipes for drips/leaks. More information on reducing your water usage can be found on the Evoqua website[21].

- **Do not dump chemicals**
  Post signs above sinks and drains around your premises to remind employees and patrons not to dump chemicals into the wastewater system and design a procedure for safely discarding chemicals. Periodically check your chemical storage containers to ensure that chemicals are not leaking into the ground. See also Section 7.4.

- **Reduce your energy usage**
  Carry out an energy audit and identify areas where energy use can be reduced. You may be able to identify areas for reduced energy usage yourself, from more efficient lighting to replacing air conditioning filters and purchasing more energy efficient equipment. Check temperature controlled areas are well-insulated and hot/cold air is not escaping through open doors/windows or large cracks between doors and door frames. Insulate building roofs or consider planting shade trees to cool down buildings. Additionally, check Section 5.2 for more suggestions that might be relevant to your working environment. You can also consider hiring a professional consultant to identify more areas for reducing energy consumption.

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[21] For more information on Evoqua, please visit their website at www.evoqua.com.

Siemens has solutions for water technology, information is available at http://news.usa.siemens.biz/press-release/industry/siemens-offers-tips-manufacturers-reduce-their-water-footprint

- **Use renewable energy**
  Consider installing renewable energy generators such as solar panels on unused flat space such as roofs and over car parks. You can also consider installing micro-hydropower if your premises are situated in a convenient location or a biomass plant if your business produces biomass as a by-product. If you need hot water for your processes, consider installing solar hot water heaters.

- **Schedule operations during off-peak hours**
  If possible, schedule the running of your heavy machinery during off-peak hours (10pm to 8am). TNB switches on more power plants during the workday to supply more power during peak hours. During off-peak hours TNB generates less electricity, but most of the supply is not used to its fullest.

- **Improve your power factor**
  A low power factor means a low efficiency level of electricity usage, which means that more energy has to be generated for an equivalent amount of usage. Your power factor is made up of your Working Power and Reactive Power[22] and a higher power factor means a higher efficiency level of electricity usage. To improve your power factor, you should reduce your reactive power by reducing inductive loads, installing capacitors, minimising idling or lightly loaded motors, and avoid operating equipment above its rated voltage. More information can be found on the TNB webpage on the Power Factor Surcharge[23].

- **Explore green commuting options for employees**
  If employees are mostly commuting from the same direction, can you arrange for a single vehicle to pick up and drop off the employees at a point closer to their homes or a public transport hub? This will reduce the amount of vehicles and associated emissions on the road as well as reduce travelling costs for your employees. You may also consider purchasing low-emission company vehicles.

7.4 Disposing Toxic and Hazardous Material

The Environmental Quality (Scheduled Wastes) Regulations 2005 outline the legal needs for appropriate disposal and treatment of toxic and hazardous materials. You should read these in full and check that you are complying with them. In general, scheduled wastes can be stored, recovered and treated within the premises of the waste generators. Waste can be stored on site for up to 180 days after generation, so long as the waste does not exceed 20 metric tonnes.

Scheduled waste should be identified and evaluated before storage. Sampling for chemical analysis should be done by an independent and qualified person/party. The latest list of accredited laboratories can be accessed at the Department of Standards Malaysia website[24]. If there is any doubt about the classification of waste, you may refer to the Department of Environment State Office or the Hazardous Substances Division, Department of the Environment Headquarters.

Where available, your waste storage manager should inspect a Safety Data Sheet to identify any precautions that should be taken for storing your waste. In particular, they should look out for physical property, reactivity, fire and explosion hazard and regulatory information. For more information on Safety Data Sheet, please download the Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013.

More information on storing toxic and hazardous material safely before disposal can be found in the US EPA Handbook for Hazardous Waste Containers. Please note that while regulations differ between the USA and Malaysia, general safety information remains the same[25].

A Government-recognised scheduled waste contractor should be contracted for disposal of scheduled waste. A directory of contractors and more information on disposing of scheduled waste can be found on the Department of Environment website[26].

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[22] For more information on Active and Reactive Power, please download Suruhanjaya Tenaga's brochure at www.st.gov.my/index.php/ms/download-page/category/89-brochures.html?download=332:powerfactor20mei201312.pdf

[23] http://www.tnb.com.my/tnb/business/charges-and-penalties/power-factor-surcharge.html

[24] http://www.standardsmalaysia.gov.my/directory/lab-directory

[25] http://www.epa.gov/earth1r6/6en/h/handbk4.pdf

[26] http://www.doe.gov.my/portalv1/en/industri/maklumat-untuk-industri/maklumat-umum-buangan-terjadual
DOE also provides Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia. It can be downloaded at http://www.doe.gov.my/portalv1/wp-content/uploads/2014/03/Guidelines-for-Packaging-Labelling-and-Storage-of-Scheduled-Wastes-in-Malaysia.pdf

7.5 Packaging and Distribution

In greening packaging and distribution, you should be looking at reducing waste from packaging and reducing emissions from distribution.

One way is to explore alternatives to distribution. For example if your product is information such as reports or data, check with your client if you can provide this through e-mailing documents or providing them with access to download information from a website.

Similarly, manuals or information that usually accompany products in paper form can be placed on websites. This reduces the amount of paper used to print them on and the amount of total weight of a product to be distributed.

Attempt to minimise packaging and use packaging made from recycled and recyclable material. You might also consider using reusable packaging; either using packaging that the consumer will reuse or, if your company delivers to the end-user, packaging you will reuse.

Ensure that the shape of your packaging does not hinder efficient packing of your products; for example, oddly shaped packaging may mean that less of your product can be packed into a container.

If your organization manages distribution, consider low-emission vehicles (see Section 6.3) and check that your products are not travelling unnecessary distances. If your organization outsources your distribution to a contractor, check how green your contractor is and switch to a greener contractor if necessary. More information on this process can be found in Section 6.6 under Green Procurement.

7.6 Customer Use/ End of Life

At all times, provide opportunities for customers to use your product to its fullest green potential e.g. including instructions in a manual accompanying your product to guide them on using the product as efficiently as possible.

You should arrange for easy servicing and upgrading solutions for the customer. Depending on the product, you can arrange for a call-out service, postal delivery of the product to your servicing centre, or the availability of multiple servicing centres for customer drop-off.

At the end-of-life, if material can be reused or recycled but might not be a frequently accepted recyclable material, you can arrange for material reclamation, through postal service or drop-off points. You could use incentives and marketing to persuade users to return material, such as buying products back off of the user.

Provide eye-catching labels that explain how the product or parts can be reused, recycled or disposed of. Hazardous products and parts such as light bulbs, batteries and printer cartridges should be labelled with cautions and recommendations on correct disposal.

7.7 Remanufacture

Remanufacturing is the process of reclaiming used products and bringing them to a 'like-new' functional state with a warranty. Often, remanufacturers take the opportunity to update the products during the remanufacturing process, to bring the product from old to current standards of performance or energy efficiency.

With ready materials to work from, meaning less resource use and waste, the remanufacturing process is both environmentally friendly and profitable for the company involved in remanufacturing. Remanufacturing practices can take place at both the original equipment manufacturer and at independent remanufacturers. It currently occurs in a number of industries including earth-moving and agricultural equipment, truck and automotive parts, medical equipment, office equipment and ICT products.

The main stages of remanufacturing involve collection of the original product from the customer, product disassembly, cleaning and identification of parts, parts recovery, testing and re-assembly. In order to be suitable for remanufacturing, products should be initially designed with remanufacturing in mind.

For resources on remanufacturing, check the APEC Remanufacturing Resource Guide at http://www.apec.org/~/media/Files/Groups/MAG/20131120_APEC-RemanResourceGuide_Sep2013.pdf.

7.8 Sector Examples

Thumbprints Utd. Sdn. Bhd.

Thumbprints Utd is a printing and packaging company based in Rawang, Selangor. As part of its commitment to social responsibility, the company has carried out many measures to reduce their electricity and water usage and their waste output.

Thumbprints reduces its electricity usage by utilising energy efficient lighting, unplugging equipment and turning off lights at the end of the day, and programming their air conditioning units to be switched off based on work hours in different parts of the plant. The company managed to reduce their electricity use by 12% between 2010 and 2013, reducing their TNB bill by 4% despite the 9.6% increase in electricity rate from 0.35 to 0.38 sen per kWh and the 1% contribution to SEDA. Additionally, the company has 500 kilowatts of solar panels installed on the factory roof. The solar panels operate on the Feed-in Tariff (for more information on Feed-in Tariff, see Section 7.9), generating enough income to cover the factory's electricity use.

The company has also installed a wastewater treatment plant which treats water from the printing and binding processes. The residual solids from this treatment process are used to fertilise the plants surrounding the factory and the water is used to water these same plants. In the future, Thumbprints plans to harvest rainwater to mix with water from the wastewater plant for use in flushing toilets, thus saving even more water.

Thumbprints reduces material wastage by repairing broken wooden pallets and machines, as well as re-selling their plastic used for packaging and giving away wooden pallets that are broken beyond repair. Machines being replaced for efficiency purposes are sold to other printers. Office staff members use single-sided printed paper to print drafts. Paper and card waste from the printing process is segregated into paper types for recycling.

In total, the company has reduced its waste generation from eight bins a month to two, and is attempting to reduce this even further. The company also takes special care to manage its scheduled waste, segregating scheduled wastes and storing them in drums in a special storage area with a concrete floor and a roof to keep off rainwater.

As well as reducing electricity and water use and waste generation, Thumbprints reduces its impact to the environment in other ways. In its printing processes, Thumbprints uses vegetable-based inks instead of petroleum based inks, and inks low in heavy metals, which is verified by independent lab testing. The company also not only offers FSC certified paper as an option to clients, but attempts to make FSC certified paper cost-efficient for clients by buying in bulk, and recommending brown paper (100% recycled) products.

For their efforts, Thumbprints has won a number of environmental and social responsibility awards, both nationally and regionally. Staff members are engaged with Thumbprints's environmental efforts, and have independently formed a 'Go Green Committee', whose aim is to educate all other staff members on the company's '5 Rs' – Reuse, Reduce, Recycle, Refuse and Repair. The company also enjoys the business of international customers attracted to Thumbprints's environmental and social efforts, with 30% of their business coming from overseas.

Fonterra Dairymas

The Fonterra Dairymas site is located in Shah Alam, Malaysia, covering 15,000 square metres of land. In 2012 the company installed water saving guns and optimised clean-in-place regimes[27] for the yoghurt plant, and decreased water flow in the homogeniser. This resulted in a 60% decrease in water consumption by the site[28].

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[27] 'Clean in place' is a method of cleaning the interior surfaces of pipes, vessels, process equipment, filters and associated fittings without disassembly. Clean in place regimes are faster, less labour intensive and more repeatable.

[28] http://www.fonterra.com/global/en/about/our+locations/asia/dairymas+malaysia

7.9 Incentives

Green Technology Financing Scheme

The **Green Technology Financing Scheme (GTFS)** provides soft loans of up to RM 10 million per company over 10 years for costs from the use of a product, equipment or system categorised as Green Technology. The Government will bear 2% of the interest rate charged by the financing institution. More information can be found on the GTFS website at www.gtfs.my.

Feed-in Tariff for renewable energy generators

The Sustainable Energy Development Authority (SEDA) operates the Malaysian **Feed-In Tariff** which pays above market rates for electricity generated from renewable energy generators. Companies generating electricity are also eligible for a number of other incentives including income tax exemption of 100% of statutory income for 10 years, or investment tax allowance of 100% on qualifying capital expenditure incurred within a period of 5 years, and import duty and sales tax exemption on equipment used to generate energy from renewable sources not produced locally, and sales tax exemption on equipment purchased from local manufacturers. More information can be found on the SEDA website at www.seda.gov.my.

TNB Off-Peak Rider

If you are a medium voltage commercial or industrial customer, you can apply for an Off-Peak Tariff Rider from TNB if you schedule your operations to run during off-peak hours (10pm – 8am). This entitles you to a 20% discount on electricity usage during off-peak hours. More information can be found on the TNB webpage[29].

Reducing your Power Factor Surcharge

Improving your power factor (see Section 7.3) can reduce your power factor surcharge. If you improve it above 0.9 for a 132kV electricity supply and above, or above 0.85 for an electricity supply below 132kV, you will avoid the power factor surcharge altogether. The power factor surcharge is calculated as a 1.5% surcharge of your bill for every 0.01 less than 0.85 power factor, and 3% surcharge of your bill for every 0.01 less than 0.75 power factor. So even increasing your power factor a little can save you a lot of money, depending on the size of your electricity bill.

7.10 Mainstreaming

An Environmental Management System (EMS) is a framework that helps companies to achieve their environmental goals through planning, implementation and review, allowing consistent control of its operations. It can be certified with the International Organization for Standardization (ISO) under ISO 14001, which provides credibility and opens markets, as some businesses require their suppliers to be ISO 14001 certified.

We have included the EMS here as a strategy for mainstreaming greener production within your business, but it can be applied across your organization to include greener office and procurement.

There will be costs associated with setting up and implementing an EMS, but these are generally outweighed by the benefits that businesses receive from having the system in place. The main costs from implementing an EMS will come from internal costs of employee time. Other costs are external from hiring a consultant to assist you in setting up and implementing your EMS and from providing training to your employees. However, these external costs are not necessary depending on in-house ability and availability.

The benefits you will receive from an EMS come from using a structured approach to greening your operations to ensure that your business and employees do not forget or neglect to continue with appropriate action after the first burst of enthusiasm subsides. This means that you will continue receiving the benefits outlined in Section 7.1, which include employee health, reputation, product distinction and customer loyalty, reduced liability and financial benefits.

There are many resources on the internet that can help you with developing an ISO 14001 standard Environmental Management System, but here we start by describing implementation for a more basic EMS. This can be updated to an ISO 14001 standard when you are ready.

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[29] http://www.tnb.com.my/business/discounts-rebates-offers/off-peak-tariff-rider.html

An EMS consists of six (6) main stages based on the 'Plan – Do – Check – Act' model:

1. Commit to environmental improvement and to developing and implementing an EMS;
2. Assess your current environmental impact;
3. Set goals;
4. Develop strategies to achieve your environmental goals;
5. Implement your strategies; and
6. Ensure continual improvement through periodical review.

The subsections below will go into more detail about each of these steps.

Step 1: Commit to environmental improvement and to developing and implementing an EMS
A credible environmental management system should start with a commitment from senior management to environmental improvement. This may be suggested and committed to alongside an EMS, if there is no current commitment to environmental improvement.

The idea of implementing an EMS might start with an initiative from senior management themselves or as a suggestion from less senior employees. In any cases, it would be necessary to persuade all employees on the benefits of implementing an EMS. Some suggestions for overcoming possible obstacles are given below:

- **Explain what an EMS is**
  In order to get approval, be ready to explain the purpose of an EMS, why it is needed (this might include explaining how your company affects the environment, see next bullet point), and what the business would have to do to implement one. Be ready also to speak about both the costs and benefits that come from implementing the EMS. Your explanation can be disseminated to other employees once the EMS has been approved.

- **Explain how your company affects the environment**
  You do not need to give a thorough run-through, but point out that the consumption of energy and water, use of raw materials, production of goods, and production of waste all have an impact on the environment.

- **Build EMS knowledge**
  Your company might not have experts in EMS, but using guides like this one and those listed in the references can help employees build knowledge on EMS and undertake their own. External training can also be used or the company might invest in consultants to assist employees in developing and implementing the EMS.

- **Perform a simple cost-benefit analysis**
  If senior management still has concerns about the cost of the EMS, then calculating potential savings from reduced utilities and materials against cost of employee time and potential external costs can help you make a case for introducing an EMS.

- **Start small**
  If management is still wary of implementing an EMS, suggest starting with a pilot system for just one part of the organization and/or targeting only a few key aspects.

Getting senior management to commit to an improvement in environmental performance and to developing and implementing an EMS is crucial as it ensures:

- **Leadership,** ensuring the EMS becomes a priority and in influencing employees and other key members of the organization;

- **Consistency** throughout the organization through example setting by senior staff; and

- **Access to resources,** including staff time and budget.

Step 2: Assess your current environmental impact
In Step 2 you need to first assess your company's environmental impact to get a good idea of how your company is currently performing. The US Environmental Protection Agency suggests an Environmental Impact Assessment Chart which helps you list out your activities, the environmental impacts that occur from those activities, describe the impacts of your company and consider the impact contribution of each activity to your overall company impact. Table 7-1 lays out the chart with descriptions on how to fill out each column and suggestions if relevant and Table 7-2 provides an example of how to fill out the chart by filling out some examples of activities.

Table 7-1 Environmental Impact Assessment Chart – Description

Activity Area	Environmental impacts	Impacts of your company	Impact contribution
The different activities your company partakes in that has potential environmental impacts. Suggestions given for production are: • Paper use • Solid waste • Hazardous waste • Lighting • Temperature control • Water use • Raw material • Releases	The environmental impacts that may occur from carrying out the activities in the first column. Suggestions given are: • Air pollution • Erosion • GHG emissions • Water pollution • Habitat loss • Toxics • Resource use • Hazardous waste • Waste disposal • Energy use	Describe, and if possible quantify the activity's impact at your company. Include costs if possible.	Assess the activity's relative contribution to the overall impact of your company. This can be a short description followed by a rating system such as 'very low', 'low', 'medium', 'high', or 'very high'. Some things to consider are: • Volume/size; • Frequency; • Toxicity; • The potential for harm (to employees and the environment); • Direct releases to the environment; and • Indirect harm to the environment (e.g. through air pollution or loss of habitat).

Table 7-2 Environmental Impact Assessment Chart – Example

Activity Area	Environmental impacts	Impacts of your company	Impact contribution
Temperature control	• Air pollution • GHG emissions • Energy use	3 units of 8kW air conditioners turned on 10 hours a day.	Perhaps about 20% of energy usage. Comparatively low energy usage compared to production machines. Also relatively low contribution to air pollution and GHG emissions from energy use. Rating: Low
Water use	• Habitat loss • Resource use • Water pollution	10 cubic metres of water used daily = about 3000 cubic metres used monthly.	Significant water usage could contribute to habitat loss from river/reservoir drying up or future damming projects. Current water usage relatively high. Rating: Moderate

As a rule of thumb, if any of your business activities require a permit, it probably has significant environmental impacts.

Step 3: Set goals

Once you have identified your company's environmental impacts you are ready to set goals for how your company will improve.

You should consider your broad environmental objectives you want to achieve. Senior management should be involved at least at this stage to agree with and commit to these objectives. Some examples of broad environmental objectives are given below:

- Comply with environmental regulations;
- Reduce pollution/waste;
- Reduce energy use/Become zero carbon;
- Reduce water use;
- Produce greener products;
- Healthier employees;
- Organization-wide involvement; and/or
- Achieve green labelling.

Once you have agreed on your environmental objectives, you can start listing out goals on how you will achieve these. Ensure that each objective is addressed by at least one goal. Goals should follow the SMART acronym:

- **Specific** – 'Reduce water use to 150 cubic metres a month' is better than 'Reduce water use';

- **Measurable** – 'Healthier employees' may not be measurable, but you can change this to 'Reduction in average sick days by 1';

- **Attainable** – While goals should be ambitious enough to make a difference, they should still be attainable. 'Reduce energy use to zero' may not be attainable but 'Become zero carbon' might be in the long run;

- **Relevant** – Goals need to be relevant to what you are trying to achieve. 'Double product sales' may be a good goal for your company, but not for your EMS (although this might be achieved indirectly through building your green reputation); and

- **Time-bound** – Be sure to include timeframes for your goals. Goals with large timeframes can be restructured to include milestones within smaller timeframes to make sure your employees stay on track and motivated.

You can use the Environmental Impact Assessment table that you filled in (Table 7-1) to help you make your goals SMART.

Once you have listed out your goals, prioritise these. This can be through a ranking order, or grouping of the goals into 'High', 'Medium' and 'Low' (or you can change the wording, for example to 'Very important', 'Important' and 'Less important') priority. You should consider prioritising depending on which goals will achieve the biggest impact, which goals will be easiest to act on and cost and benefits to your company.

Step 4: Develop strategies to achieve your environmental goals

Once you have your environmental goals you should develop strategies on how you will achieve them. Sections 7.2 - 7.7 can be used for inspiration. You may want to get employees involved in developing strategies as they may be able to identify problems or opportunities in areas they work closely on.

You should ensure that your strategies name the employee responsible for carrying out each activity or strategy and state a timeframe, with milestones if needed. Consider including environmental performance into employee appraisals. This will communicate that environmental performance is a priority for management and make it more likely that employees act on their environmental responsibilities.

Step 5: Implement your strategies

By this stage you should have all you need to start implementing your strategies to reach your environmental objectives. You should ensure that all employees are onboard and understand why the business is undertaking the EMS and what the EMS is. By sharing an initial introduction to environmental issues, the business's environmental objectives and goals, the purpose and structure of the EMS and the prepared strategies, you will help employees understand and accept any changes to their work processes from the EMS.

You should check that the company's goals are clearly translated into strategies and that the strategies are reasonable and that each employee understands their responsibilities. It is also important that managers display leadership in implementing the strategies.
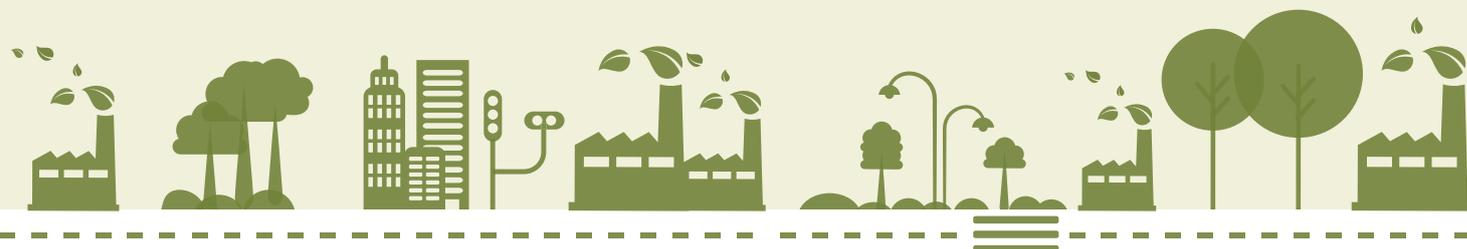
Periodical updates on progress towards goals and awareness of environmental issues can help remind employees of their environmental responsibilities and keep them motivated. You should also recognise good environmental performance in individual employees, departments or employee groups.

Step 6: Ensure continual improvement through periodical review

To ensure continual improvement you need to measure progress, develop a strategy for updating your goals, and continue to become more sustainable over time.

Measuring Progress

Measuring progress helps you ensure that your business is moving on the right track towards your goals and larger environmental objectives by allowing you to evaluate whether your strategies are effective or whether they need to be changed. You should ensure that the outcomes of your strategies are measured, not just the activities you have undertaken. For example, measure how many KWhs you have saved rather than just the number of low energy light bulbs you have installed. Measuring both together can help you decide which of your activities is most effective and which may need more effort or a rethink in implementation.

You should keep records of your progress; if you are reporting to an external organization, e.g. for certification or labelling, your records should be detailed and you should use reliable metrics.

Updating goals and strategies

Set a schedule for reviewing your goals and strategies and the progress your business has made towards them. If goals have been reached or exceeded, set new ones. Conversely, if milestones are being missed consistently or by huge margins, try to identify why this is happening and consider whether you should change your strategies, clarify staff responsibilities, or reset your goals.

Ensure a good line of communication with employees about the EMS and their responsibilities. Encourage feedback on how the new environmental initiatives are impacting their work, whether they think the initiatives are effective in achieving your goals, and if 'green thinking' is being integrated into their daily routine. You should also give feedback to employees about how they are doing and the progress they and the business have made towards the business's environmental objectives.

Continue moving forward

Keep your environmental objectives in mind as you move forward as a business. Senior management needs to continue to be involved and to show leadership, while employees should be empowered to come up with new ideas to continue greening the business. Keep updated on environmental issues and work to make greening an inherent part of the business. This can be through celebrations of reaching environmental goals and milestones, subscribing to magazines about the natural world, celebrating Earth Day annually and/or planning corporate volunteering days.

Plan to review your environmental objectives regularly. You should aim for reviewing them once a year at least. When reviewing your environmental objectives, revisit Steps 2 and 3 and ask yourself the following questions:

- Have we learned more about our organization's impacts and/or what we can do to reduce these?
- Have our environmental objectives changed?
- Are we satisfied with our progression towards being a greener company?
- Are we celebrating our successes in greening?

7.11 Additional Information

Certification

Achieving third party certification will show that your organization's green operations have been verified as running to a national or international standard by an independent authority. This will assure consumers of your green credentials and open up new markets.

International eco-labels are available for a large range of products. You can find a comprehensive list at http://www.ecolabelindex.com/. Some of the more popular international eco-labels and the products available are listed below:

- **Roundtable on Sustainable Palm Oil (RSPO)**
  Palm oil and products that use palm oil.
  (http://www.rspo.org/)

- **Forest Stewardship Council (FSC)**
  Forest plantations, wood and paper products.
  (https://ic.fsc.org/)

- **Marine Stewardship Council (MSC)** and **Aquaculture Stewardship Council – ** Seafood and seafood products. (http://www.msc.org/ and http://www.asc-aqua.org/)

- **Roundtable for Responsible Soy (RTRS)**
  Soy farms and soy products.
  (http://www.responsiblesoy.org/)

You can also apply for the following Malaysian environmental labels:

- **SIRIM eco-labelling**
  http://www.sirim-qas.com.my/index.php/en/our-services/product-certification/eco-labelling-scheme

- **Malaysian Timber Certification Council**
  http://www.mtcc.com.my/

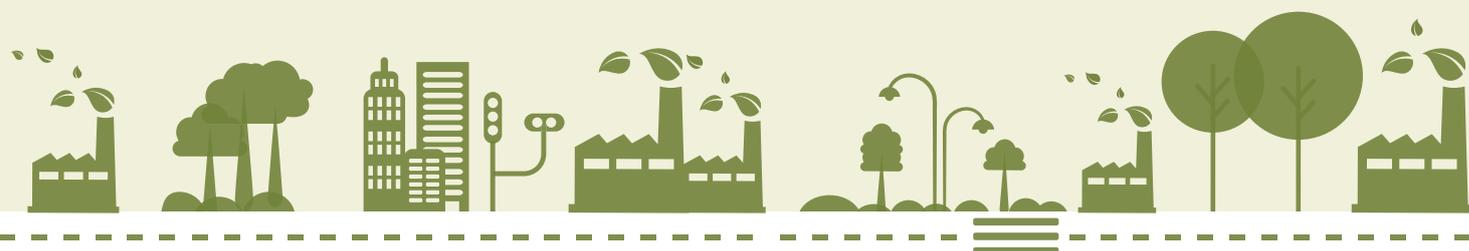- **MyHijau GreenTAG**
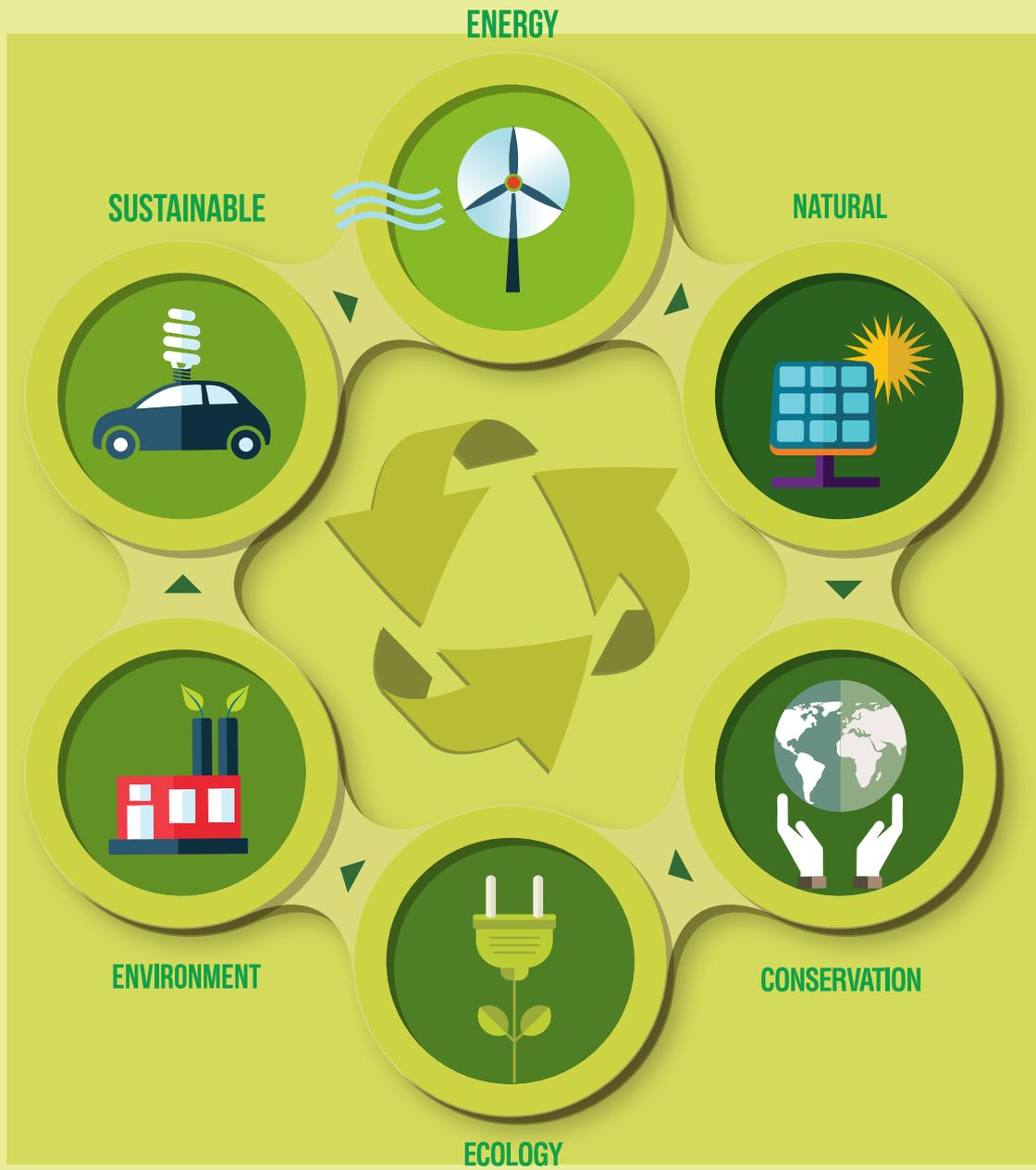 http://www.greendirectory.my/greentag

Green Business Directories

Running green operations and gaining third party certification will make you eligible to be on the Green Purchasing Network Malaysia (www.gpnm.org/e/) and MyHijau (www.greendirectory.my/) green business directories.

Even if you are not third party certified, you can apply for the GreenTag endorsement from MyHijau, provided that you can prove you are taking steps towards greening your organization, and be eligible to be listed on the MyHijau directory.

MyCarbon Portal

The MyCarbon portal allows and helps you to publicly report your carbon emissions. Reporting your emissions shows corporate accountability and distinguishes you from competitors by showing the reduction in your GHG emissions achieved from energy savings. It also helps the Ministry of Natural Resources and Environment (NRE) to measure Malaysia's progress towards achieving Malaysia's commitment of a 40% reduction in emissions intensity of GDP by 2020 based on the 2005 level. Reporting is free of charge. More information can be found at the MyCarbon website: http://www.mycarbon.gov.my/.

8. ADDRESSING SME

Small and medium-sized enterprises (SMEs) are not only one of the main contributors to economic growth but also play an important role for job creation, particularly for low-skilled workers and young women, who are usually the biggest proportion of the unemployed in emerging economies. In the ASEAN region, SMEs account for 95%-99% of all enterprises within the ASEAN member states with contribution up to 43%-97% in domestic employment, 23%-58% to GDP and 10%-30% in total exports.[30] In Malaysia, SMEs account to 645,136 of total business establishments with 90% in the services sector, 5.9% in the manufacturing sector and 3.0% in the construction sector. The remaining 1.0% and 0.1% are respectively in the agriculture and mining and quarrying sector.[31] In terms of GDP, SMEs contribution has steadily increased from 29.4% in 2005 to 31.7% in 2008 and further to 32.5% in 2011.

The Government has long recognised the importance of SMEs to the Malaysian economy with policy framework introduced in all three (3) of the Industrial Master Plans (IMPs)[32] to support SMEs, particularly those in the manufacturing sector.

As a set-up, SMEs conduct diverse and complex activities across different sectors. Although their individual footprint in environmental issues may be insignificant, their collective impact may exceed that of large businesses. Also, the small size of SMEs means that the owners/managers need to shoulder many different responsibilities. This results in SMEs placing environmental issues as less important compared with core business decisions.

When making the transformation to adopt sustainable practices, SMEs generally will face size-related resource constraints, skills deficit and knowledge limitations. Coupled with the widespread misconception that protecting the environment is associated with technical complexity, burdens and costs together with lack of resources often leads SMEs to being risk-adverse and less willing to invest in new technologies.[33]

8.1 Green Procurement

As an important source of local supply and service provision to larger corporations, SMEs are increasingly expected to reduce the negative impact of the components of products and services they provide. With media and consumers continuously analysing the ethics of production, large corporations are pressured to impose requirements on their SME suppliers as a pre-condition of their purchase order to minimise their carbon footprints or to discharge their environmental reporting obligations.

1. **Large corporations to SME suppliers - Procurement**
    Key points under green procurement is making the decision to purchase products and services that cause the least adverse environmental impact. This has to be balanced with the traditional rule on purchasing for pricing, performance and safety issues.

    Generally, a supply chain including SMEs comprises of contractors and sub-contractors in a multi-tier system of intermediaries. Large corporations usually monitor up to first tier suppliers, but stakeholders are increasingly demanding assurances that environmental impacts are being observed further down the supply chain.

> 'This section offers SMEs simple solutions under green procurement and green operations to adopt sustainable practices. By going green, SMEs can cut costs as energy efficiency and waste reductions means more savings. SMEs can also benefit with increase revenues and likewise, attract employees with better commitments and motivations.'

[30] OECD, ASEAN SME Policy Index 2014. [Accessed 7 August 2014] http://www.oecd.org/globalrelations/regionalapproaches/ASEAN%20SME%20Book%20to%20Bali%20Final.pdf

[31] Department of Statistics Malaysia, SMEs Census Report 2011. [Accessed 7 August 2014] http://www.statistics.gov.my/portal/images/stories/files/LatestReleases/BE/BI/BE2011_SMEsBI.pdf

[32] Industrial Master Plan 1 (1986-1995) laid the foundation of manufacturing industries while Industrial Master Plan 2 (1996-2005) broadens manufacturing capability through strategies of cluster-based industrial development. Towards attaining developed nation under Vision 2020, Industrial Master Plan 3 (2006-2020) sets out to attain higher level of global competitiveness.

[33] Mazur, E. (2012), "Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements: Achieving and Going Beyond Environmental Requirement", OECD Environment Working Papers, No. 47, OECD Publishing. http://dx.doi.org/10.1787/5k92r8nmfgxp-en

On decision for purchasing, large corporations are always mindful of the following characteristics of SME suppliers:

a) SME suppliers have flexibility of the business as they are less bureaucratic and are more responsive. This enables them to have faster internal communication mechanisms.

b) The leadership styles of SME suppliers are often characteristically dynamic and entrepreneurial. This enables them to develop extensive local knowledge of resources, supply patterns and purchasing trends.

What can the large corporations do? Large corporations can ensure that purchasing decisions enhance environmental quality, be resource responsible and contribute towards sustainability. In every possibility, purchases should be made for environmentally preferred products which perform satisfactorily and are available at a reasonable price. Also, large corporations can insist on purchasing from suppliers in their local areas to reduce the environmental impacts associated with transporting products over long distances.

To foster better relationships and also assist SME suppliers to develop social and environmental management systems, large corporations can conduct periodic meetings and trainings for SME suppliers.

Other specific actions that large corporations can undertake to ensure that their SME suppliers share similar commitments to reduce environmental impacts are listed below:

a) **Consider using SME suppliers that can provide environmental data on their products and services**
Product data can range from whether the products are made from recycled materials, whether it is less toxic or whether it uses less packaging. Data on services may include provisions that SME suppliers provide for taking back packaging after delivery.

b) **Consider using suppliers that provide maintenance service**
SME suppliers could also specify the frequency and type of maintenance that will be required for the product to perform to its optimum capability.

c) **Consider SME suppliers that can be flexible**
Are the SME suppliers flexible and able to meet standards for environmental performance?

d) **Consider making the procurement process transparent**
Large corporations that provide a simple webpage with basic information about goods and services required and the procurement officer's contact information would help small businesses with the necessary information.

Initial actions/steps
Seek out:

- How purchasing is managed in the organization?
- Who manages the purchasing?
- Who are the preferred suppliers?
- What green products are currently purchased?

2. **SME suppliers to large corporations – Procurement**
Supply chain pressures may produce results to influence the environmental behaviour of SME suppliers. However, large corporations should also provide their commitment to working with SME suppliers. Meeting green qualities to fulfill supply chain requirements can be challenging for most SME suppliers which also face growing pressures to reduce costs. To facilitate, large corporations could provide assistance in sharing of knowledge and technology transfers. As an advantage, SME suppliers who meet these qualities can access environmentally conscious large corporations and also the global markets.

SME suppliers can foster effective supply chain capacity with large corporations by considering the following:

a) **Consider providing products with green characteristics:**

   i) Products made from **recycled, reclaimed or recovered materials.** Other than sourcing paper products as the most common recycled product, recycled-content plastic and construction products can also be sourced as materials.

ii) **Bio-based** products are products made from biological materials and can be recycled and biodegradable. Common bio-based products are compostable sugar cane products which are made into tableware, biodegradable hydraulic fluids and biodegradable natural absorbents.

iii) **Organic** products are made from plants or animals without any use of fertilizers, pesticides, growth hormones, genetic modification or antibiotics.

iv) Products manufactured locally using **local raw materials** which can reduce environmental degradation as it lessens the impact from transportation and fuel use.

b) **Consider large corporations which can offer flexibility in support to maximise environmental improvements and expectations of the large corporations.**

Further information on procurement and working with suppliers can be found on page 33 of the Toolkit.

8.2 Green Operations

For many SMEs, going 'green' is perceived as not relevant to their operations on the basis that their organization is either not of an industrial nature or seemingly too insignificant to make any difference.

Evidence shows that it is not a common practice for SMEs to employ integrated management practices and holistic approaches in the bid to reduce their environmental impact.[34] When SMEs do engage in efforts towards environmental measures, they normally undertake the measures in piecemeal and usually as a respond to urgent cost pressures.[35]

There is an opportunity for SMEs to integrate environmental measures into all aspects of the product development cycle. Measures could be undertaken to address stages and aspects of the product from 'cradle to grave' i.e. from concept and design to manufacturing, packaging, delivery and possible recycling of the product. As a step further, SMEs may also consider products with aspects from 'cradle to cradle'; where the product's design and

manufacturing process eliminates the disposal phase of the product's lifecycle. This is done by ensuring that the material for the product either has the potential to biodegrade naturally or to be fully recycled into high-quality materials to create other products.

The following paragraphs will address the measures that an SME can undertake in the different stages of the product development cycle. The measures are segregated in stages for (1) Sustainable Product Design/Eco-Design and (2) Green production. (3) Environmental Management System (EMS) explains a voluntary approach that SMEs can undertake to improve environmental performance.

1. **Sustainable Product Design/Eco-Design**[36]
   Sustainable product design takes into account the material selection, resource use, production requirements and the final disposal and recyclability of the product.

   When large corporations place commitments to sustainability, certain delivery of these commitments may be placed on their supply chain which may also include SME suppliers. Since 50-70% of costs are locked-in at the design stage, SME suppliers at the front end of the product cycles could consider the following aspects of the product to address these commitments.

   • **Consider product life cycle:** Increase a product's lifespan by improvement to its durability or designing it for easy upgrades. This will also increase its value and longevity while reducing waste.

   • **Consider material choices:** Search for the availability of green materials to substitute traditional materials. This may include creating a remanufactured product out of high quality used parts, sourcing materials with higher recycled content, or substituting a greener or non-toxic material and at the same time taking into account traditional product attributes such as quality, cost and functionality.

   • **Consider recyclability of the product:** By taking into account the end of a product's life cycle, making it easier and safer to disassemble products and recycle into component parts.

[34] OECD, Working Party on SMEs and Entrepreneurship (WPSMEE) – Green Entrepreneurship, Eco-Innovation and SMEs. [Accessed 15 August 2014] http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=CFE/SME%282011%299/FINAL&docLanguage=En, page 80

[35] Ibid

[36] Industry Canada. [Accessed 18 August 2014] http://www.ic.gc.ca/eic/site/csr-rse.nsf/eng/rs00178.html

2. Green production[37]

As a general guide, green production uses processes that minimise negative environmental impacts, conserve energy and natural resources while at the same time being economically sound. The following is a step-by-step approach to green production that SMEs could adopt to set a strong foundation for environmental sustainability in the organization.

i. Find your starting line

Aim : To establish a general understanding of your positive and negative environmental impact by mapping your activities and determining which affect your performance.

Action : Organize information and actions for follow-up. It would be helpful to capture these follow-up actions with specifications for individual or parts of the business accountable for implementation, with clear timeline for feedback.

Key questions here would be:

- How does your organization define 'green' or 'sustainability'?
- Is green a top priority?
- Do your policies and processes support or hinder progress on environmental sustainability?

Quick Wins – Areas where you know you can have a rapid impact e.g. improving energy efficiency.

Urgent issues – Areas where there is an existing concern e.g. complaints from local community on emissions from manufacturing facility.

ii. Measure inputs used in production

Aim : To assess raw material input and intermediate products used in the production process.

Action : Identify how materials and components used in the production processes influence environmental performance. Separate inputs into (1) non-renewable/finite materials (e.g. metals or critical minerals

such as rare earths, rhodium, platinum and manganese), (2) restricted materials (e.g. materials toxic to health and the environment) and (3) recycled/reused materials (e.g. Polyethylene terephthalate [PET] plastic).

Consideration

- Using less non-renewable/finite materials - reduces expenditure on materials.
- Using less restricted materials – reduces costs related to handling, storage and treating.
- Using more recycled/reused materials - reduces waste disposal requirements.

iii. Measure outputs used in production

Aim : To assess the amount and types of outputs that is generated through production.

Action : Identify opportunities and improve current outputs practices to reduce costs and lessen environmental impact. Outputs can be in the form of goods, services and waste segregated into (1) direct output and (2) indirect output.

Consideration

- Direct outputs include solid and liquid waste, scrap paper, chemicals and other human-made or organic compounds and substances produced as a result from manufacturing.
- Indirect outputs could include emissions at a supplier's facilities.
- Certain waste outputs present an opportunity for revenue ad may be valuable resource for another organization.

iv. Assess the operations of your facility

Aim : To assess the key processing and manufacturing functions plus the design of the facility and emissions that result from these operations.

Action : Monitor key processing and manufacturing indicators covering (1) water, (2) energy and (3) residuals and (4) residual releases to air.

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[37] Ibid

Consideration

- **Water** - is not always consumed in the production process but it is often used for cooling, heating or washing. With the increasing demand and the rising insecure water supply, water has become a commodity in certain areas.

- **Energy** - inclusive of habitats, fossil fuels and uranium. Ideally, actions should be taken to ensure that energy consumption will decrease sufficiently so that even with increased production, the total energy consumption remains stable or decreases. Energy efficiency could be improved by replacing outdated equipment or properly maintaining existing equipment. Within the facility, conservation can be improved by monitoring where losses occur (e.g. escaped heat, equipment in standby mode and unused or excessive lighting).

- **Residuals** – represent a cost to the company and often have negative environmental impacts. Reducing residuals will improve profitability by ensuring that a higher proportion of the purchased materials are used. It may be possible to reduce residuals by changing materials or fuels, reusing materials and components rather than recycling outside the facility.

- **Residual releases to air** – inclusive of sulphur dioxide (SO2) from industrial processes and fossil fuel combustion which can contribute to acid rain. Ground level ozone and fine particulate matter can also contribute to the formation of smog, aggravating respiratory and cardiac conditions. Although it might be difficult or insignificant to track, it is recommended to track the releases to air from overhead as well as production processes.

3. **Environmental Management System (EMS)**

   Large corporations can advise SME suppliers on developing an EMS. EMS enables organizations of any size or type to identify and control the environmental impact of their activities, products or services, while setting and achieving environmental targets and demonstrating that these targets have been achieved. It provides a structured approach to planning and implementing environmental protection measures.

   Further information on EMS can be found on Section 7.10 of the Toolkit.

9. CONCLUSION

We hope that by reading through this Toolkit will give you a good idea of where to start greening your business, why you would want to, and where you can get potential help from.

We would however like to iterate that the Toolkit is just a start. Once you have gone as far as you can with these suggestions, you will probably find there is still a lot more to be done. Reading up on issues and possible solutions and discussing with your colleagues, employees and even other players within your industry can help you generate ideas on how to go further.

As you decrease the environmental impacts of your business, you will find your business reaping the benefits of becoming more sustainable – initially through cost savings from greater energy efficiency, and later, as you continue your commitment towards sustainability, through a loyal customer base and an enhanced ability to withstand the inevitable price and supply shocks resulting from climate and environmental changes as well as resource availability. Additionally, there are a number of awards in Malaysia to recognise green/sustainable businesses. Besides being a way to gain recognition, awards also enhance customer trust. The most prominent awards are listed below:

- **Prime Minister's Hibiscus Award** is a private sector environmental award for business and industry in Malaysia. The award has one category for large enterprises and one category for SMEs[38].

- **Malaysia Greentech Awards** includes a category for Industry to recognise organizations that have adopted or deployed green initiatives and/or technologies as a fundamental part of their business models and/or business operations[39].

- **Malaysian Dutch Business Council Sustainability Awards (MSA)** aims to showcase best practices in sustainability. Of the four (4) awards only one (1) can be applied for by non-MDBC member companies. In 2013, the category applicable for non-MDBC member companies was "Best sustainable supply chain" or "Logistics project"[40].

- **ACCA Malaysia Sustainability Reporting Awards (MaSRA)** aims to award good sustainability reporting from Malaysian businesses[41].

Local and regional sector-specific environmental awards could also be available for your industry.

The Government of Malaysia has shown its commitment and a steady progression towards a green and sustainable economy, including committing to a green procurement policy. Starting your own commitment to sustainability now will put your company in the forefront of your industry in sustainability.

Finally, but most significantly, making your business more sustainable and leading the way for others will reduce the environmental problems we see every day. This means that you and your business will play a part in leaving a better world for future generations. Thank you for reading this Toolkit and making the first steps towards this effort.

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[38] http://www.hibiscusaward.com/about_us.html

[39] http://malaysiagreentechawards.com/index.php/award-categories

[40] http://www.mdbc.com.my/sustainability/

[41] http://www.accaglobal.com/gb/en/malaysia_MaSRA2013/about.html

REFERENCES – MAIN

1. WWF, 2014. Living Planet Report 2014.
    [Accessed: 29 Oct 2014]
    http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/

2. SPAN, 2014. Water Consumption 2012 - 2013.
    [Accessed: 29 Oct 2014]
    http://www.span.gov.my/index.php?option=com content&view+article&id=765Itemid=420&lang=en

3. DOSM, 2014. Annual National Accounts, Gross Domestic Product (GDP).
    http://www.statistic.gov.my/portal/index.php?option=com_content&view=article&id=1589Itemid=111&lang=en

4. Energy Commission, 2014. Summary - Final Energy Demand.
    [Accessed: 29 Oct 2014]
    http://www.meih.st.gov.my/web/meih/Statistics?p_auth=uKXv9Zu&p_pid=Eng_Statistic_WAR_STOASPublicPortlet&p_p_
    lifecycle=1&p_p_state=maximized&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=1&p_p_col_count=2&_Eng_
    Statistic_WAR_STOASPublicPortlet_execution=e1s1&_Eng_Statistic_WAR_STOAPPublicPortlet__eventId=ViewStatistic9&ca
    tegoryId=8&flowId=21&showTotal=false

5. KPKT, 2013. Solid Waste Management in Malaysia: The Way Forward.
    [Accessed: 29 Oct 2014]
    http://www.iswa2013.org/uploads/ISWA2013 ARPAH presentation 333 EN.pdf

6. Panandiyan, M.V., for The Star, 9 April 2014. The high price of being dirty.
    [Accessed: 29 Oct 2014]
    http://www.thestar.com.my/Opinion/Columnist/Along-The-Watchtower/Profile/Articles/2014/04/09The-high-
    price-of-being-dirty/

GREEN OFFICE

1. American Psychological Association, 2005. *Shaping Pro-environmental Behaviours: Certain Messages Work, Don't Work.*
    [Accessed: 29 January 2014]
    http://www.apa.org/research/action/shaping.aspx

2. Gomez, 2009. *Cultural Capital: A Fundamental Driver of Financial Performance: Executive Summary. Barrett Values Centre.*
    [Accessed: 28 January 2014]
    http://www.integra-leadership.com/myfiles/documents/Cultural-Capital-A-Fundamental-Driver-of-Financial-Performance.pdf

3. Hanson, Ginger C., Leslie B. Hammer, & Cari L. Colton, 2006. *Development and Validation of a Multidimensional Scale of Perceived Work-Family Positive Spillover.* Journal of Occupational Health Psychology, 11:3 (pg. 249 – 265).

4. IEN Consultants, 2013. *Environmental Friendly Items Purchasing Guide for Home Owners.* IEN Consultants.
    [Accessed: 28 February 2014]
    http://www.mesym.com/en/articles/environmental-friendly-appliances-purchase-guide/

5. Loverock, Diane Turnbull & Rob Newell, 2012. *Pro-environmental behaviours in the Workplace:* Driving Social Change. Community Research Connections.
    [Accessed: 27 January 2014]
    http://crcresearch.org/community-research-connections/crc-case-studies/pro-environmental-behaviours-workplace-
    driving-socia

6. Osbaldiston, R. & J.P. Shott, 2012. *Environmental Sustainability and Behavioral Science: Meta-Analysis of Pro-environmental Behavior Experiments.* Environment and Behavior 44:2 (pg. 257-299).

7. Penang Green Council (PGC): Green Office Tips.
    [Accessed: 27 January 2014]
    http://pgc.com.my/index.php/green-office-tips

8. The Electrical and Electronics Association of Malaysia. Energy Saving Compact Flourescent Lamp (CFL) Recycling Project.
    [Accessed: 05 June 2014]
    http://www.teeam.org.my/news-event/energy-saving-compact-fluorescent-lamp-cfl-recycling-project/

9.   The Star: Choong, Meng Yew, 2013. Discard used bulbs and light tubes with care. January 8, 2013.
     [Accessed: 5 February 2014]
     http://www.thestar.com.my/Story/?file=/2013/1/8/lifefocus/12383186

10. The State of Queensland Carbon Management Unit, 2009. *Queensland Health Green Office Resource Guide for ClimateSmart Buildings.* Queensland Government.
     [Accessed: 23 July 2014]
     http://www.health.qld.gov.au/carbon_management/green_office_guide.pdf

11. WWF International, 2010. *The WWF Guide to Buying Paper.*
     [Accessed: 4 February 2014]
     http://wwf.panda.org/how_you_can_help/live_green/fsc/save_paper/paper_toolbox/the_wwf_guide_to_buying_paper/

12. WWF Suomi, *10 Guidelines for the office.*
     [Accessed: 27 January 2014]
     http://www2.wwf.fi/green_office/guidelines_for_the.htm

GREEN PROCUREMENT

1.   HP, 2012. *HP 2011 Global Citizenship Report.*
     [Accessed: 01 March 2014]
     http://www8.hp.com/us/en/pdf/hp_fy11_gcr_tcm_245_1357670.pdf

2.   HP, 2013. *HP 2012 Global Citizenship Report.*
     [Accessed: 29 March 2014]
     http://www8.hp.com/us/en/hp-information/global-citizenship/reporting.html

3.   Lowitt, Eric M. and Jim Grimsley, 2009. *Hewlett-Packard: Sustainability as a Competitive Advantage.* Accenture Institute for High Performance.
     [Accessed: 05 March 2014]
     http://www.hp.com/hpinfo/globalcitizenship/environment/commitment/accenturestudy.pdf

4.   Greening Cop17: *Green Procurement Guidelines.*
     [Accessed: 12 February 2014]
     http://www.cop17-cmp7durban.com/downloads/Green-Procurement-Guidelines.pdf

5.   Queensland Government Chief Procurement Office, 2012. *Sustainable Procurement: A working definition.* QGCPO, Department of Housing and Public Works, Queensland Government.
     [Accessed: 8 February 2014]
     http://www.hpw.qld.gov.au/SiteCollectionDocuments/SustainableProcurementDefinition.pdf

6.   Scottish Government Sustainable Taskforce, 2009. The Scottish Sustainable Procurement Action Plan
     [Accessed: 25 August 2014]
     http://www.scotland.gov.uk/publications/2009/10/sspap

7.   Thomas, John F., Brian H. West and Shean P. Huff, 2013. ORNL researchers quantify the effect of increasing highway speed on fuel economy. Green Car Congress.
     [Accessed: 26 March 2014]
     http://www.greencarcongress.com/2013/01/thomas-20130117.html

8.   United States Environmental Protection Agency, 2009. *Smart Steps to Sustainability: A guide to greening your small business.*
     [Accessed: 8 February 2014]
     http://www.epa.gov/osbp/pdfs/smart_steps_greening_guide_042101.pdf

9.   UN Global Compact Office and Business for Social Responsibility, 2010. *Supply chain sustainability:* A Practical Guide for Continuous Improvement.
     [Accessed: 13 February 2014]
     http://www.unglobalcompact.org/docs/issues_doc/supply_chain/SupplyChainRep_spread.pdf

10. Zero Waste Scotland, 2011. Supply Chain Management and Sustainable Procurement: A Guide for Scottish SMEs. Zero Waste Scotland, Stirling.
     [Accessed:23 July 2014]
     http://www.zerowastescotland.org.uk/content/supply-chain-management-and-sustainable-procurement-guide-scottish-smes-0

GREEN OPERATIONS

1.   ACCA Global: ACCA Malaysia Sustainability Reporting Awards (MaSRA): About the Award.
     [Accessed: 29 March 2014]
     http://www.accaglobal.com/gb/en/malaysia_MaSRA2013/about.html

2.   APEC, 2013. Remanufacturing: *Resource*.
     [Accessed: 1 March 2014]
     http://www.apec.org/~/media/Files/Groups/MAG/20131120_APEC-RemanResourceGuide_Sep2013.pdf

3.   Cushman-Roisin, Benoit, 2012. *Design for the Environment: What it is and how to do it.* Lecture notes, ENGS171: Industrial Ecology, Thayer School of Engineering, College.
     [Accessed: 7 February 2014]
     http://engineering.dartmouth.edu/~d30345d/courses/engs171/DfE.pdf

4.   ISO, 1999. US Automakers give suppliers ISO 14001 deadline. ISO News 8 (14), Nov/Dec 1999 pg 1-3.
     [Accessed: 30 March 2014]
     http://www.iso.org/iso/livelinkgetfile-isocs?nodeId=15054537

5.   Kahlenborn, Walter, Norma Mansor and Khairul Naim Adham, 2013. *Government Green Procurement (GGP): Short Term Action Plan 2013 – 2014.* Sustainable Consumption and Production Malaysia.
     [Accessed: 28 March 2014]
     http://scpmalaysia.gov.my/images/GGP%20short%20term%20action%20Plan%20-%20250613%20-%20final_3.pdf

6.   Malaysia GreenTech Awards: Award Categories.
     [Accessed: 29 March 2014]
     http://malaysiagreentechawards.com/index.php/award-categories

7.   Malaysian Dutch Business Council: Sustainability.
     [Accessed: 29 March 2014]
     http://www.mdbc.com.my/sustainability/

8.   Parker, David & Phil Butler, 2007. *An introduction to Remanufacturing.* Centre for Remanufacturing & Reuse in partnership with Envirowise.
     [Accessed: 5 March 2014]
     http://www.remanufacturing.org.uk/pdf/reman_primer.pdf

9.   Prime Minister's Hibiscus Award: About Us.
     [Accessed: 29 March 2014]
     http://www.hibiscusaward.com/about_us.html

10. Tenaga Nasional, 2014. *Energy Savings at Work.*
     [Accessed: 27 January 2014]
     http://www.tnb.com.my/business/energy-savings-at-work.html

11. Tenaga Nasional, 2014. *Power Factor Surcharge.*
     [Accessed: 12 February 2014]
     http://www.tnb.com.my/tnb/business/charges-and-penalties/power-factor-surcharge.html

12. Tenaga Nasional, 2014. *Off-Peak Tariff Rider.*
     [Accessed: 12 February 2014]
     http://www.tnb.com.my/business/discounts-rebates-offers/off-peak-tariff-rider.html

13. US Environmental Protection Agency, 2014. *Publications | Design for the Environment (DfE) | US EPA.*
     [Accessed: 3 June 2014]
     http://www.epa.gov/dfe/pubs/index.htm

14. US Environmental Protection Agency: Office of Small Business Programs and Asbestos Small Business Ombudsman, 2009. *Smart Steps to Sustainability: A Guide to Greening your Small Business.*
     [Accessed: 12 February 2014]
     http://www.epa.gov/osbp/pdfs/smart_steps_greening_guide_042101.pdf

15. Waste and Resources Action Programme (WRAP), 2013. *Your Guide to Environmental Management Systems.*
     [Accessed: February 28, 2014]
     http://www.wrap.org.uk/content/your-guide-environmental-management-systems-ems

REFERENCES - ADDRESSING SME

1. WBCSD (2007), "Promoting Small and Medium Enterprises for Sustainable Development".
    [Accessed 28 August 2014]
    http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=202

GREEN PROCUREMENT

1. Mazur, E. (2012), "Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements: Achieving and Going Beyond Environmental Requirement", *OECD Environment Working Papers,* No. 47, OECD Publishing.

2. Zero Waste Scotland (2011), "Supply Chain Management and Sustainable Procurement. A Guide for Scottish SMEs".
    [Accessed: 28 August 2014]
    http://www.zerowastescotland.org.uk/sites/files/zws/ZWS_supply_chain_management_v1.pdf

GREEN OPERATIONS

1. OECD (2013), "Working Party on SMEs and Entrepreneurship (WPSMEE) – Green Entrepreneurship, Eco-Innovation and SMEs".
    [Accessed: 15 August 2014]
    http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=CFE/SME%282011%299/FINAL&docLanguage=En

2. OECD (2011), "Sustainable Manufacturing Toolkit. Seven Steps to Environmental Excellence".
    [Accessed: 21 August 2014]
    http://www.oecd.org/innovation/green/toolkit/48704993.pdf

3. RBC Royal Bank (2010), "Greening your business: A guide to getting started".
    [Accessed 25 August 2014]
    http://www.rbcroyalbank.com/commercial/advice/greening-your-business/

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