



UK Government



UK-ASEAN  
ENERGY EFFICIENCY ACCELERATOR

GUIDEBOOK

# The Journey to Net Zero for SMEs



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## Purpose of this guide

This guidance will provide assistance for small and medium sized enterprises (SMEs) to manage their energy use and align to Net Zero, providing clear information and case studies for reduction initiatives. As SMEs cover multiple sectors, this guide is designed to help on both reduction initiatives and opportunities for SMEs.

# 1. Introduction

## Purpose of Net Zero

The widespread global adoption of Net Zero targets is an important lever for driving ambitious climate action. Deep cuts to emissions in line with a 1.5°C pathway and the permanent removal of any remaining greenhouse gases will be needed in order to achieve these targets – both of which are critical to addressing climate change.

The Paris Climate Agreement was approved by 197 nations at COP21 in 2015 and agreed to hold the increase in global average temperatures well-below 2°C and pursue efforts to limit the increase to 1.5°C. Presently, global temperatures have risen by 1°C since pre-industrial levels. Holding warming to 1.5°C could mean that 11 million fewer people are exposed to extreme heat, 61 million fewer people are exposed to drought and 10 million fewer people are exposed to rising sea level impacts<sup>1</sup> compared to 2°C warming. Governments and companies setting and achieving Net Zero targets will be key to limiting warming to 1.5°C.

# 1. Introduction

## What does Net Zero mean?

While there is no standard definition for Net Zero, the objective of this commitment is to ensure that the greenhouse gases (GHG) emitted into the atmosphere are balanced through removals. The Paris Agreement has also emphasized the need for Net Zero requiring countries to **'achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century'**.



**The Science Based Targets initiative (SBTi) states that to reach a state of Net Zero emissions for companies implies two conditions:**

1

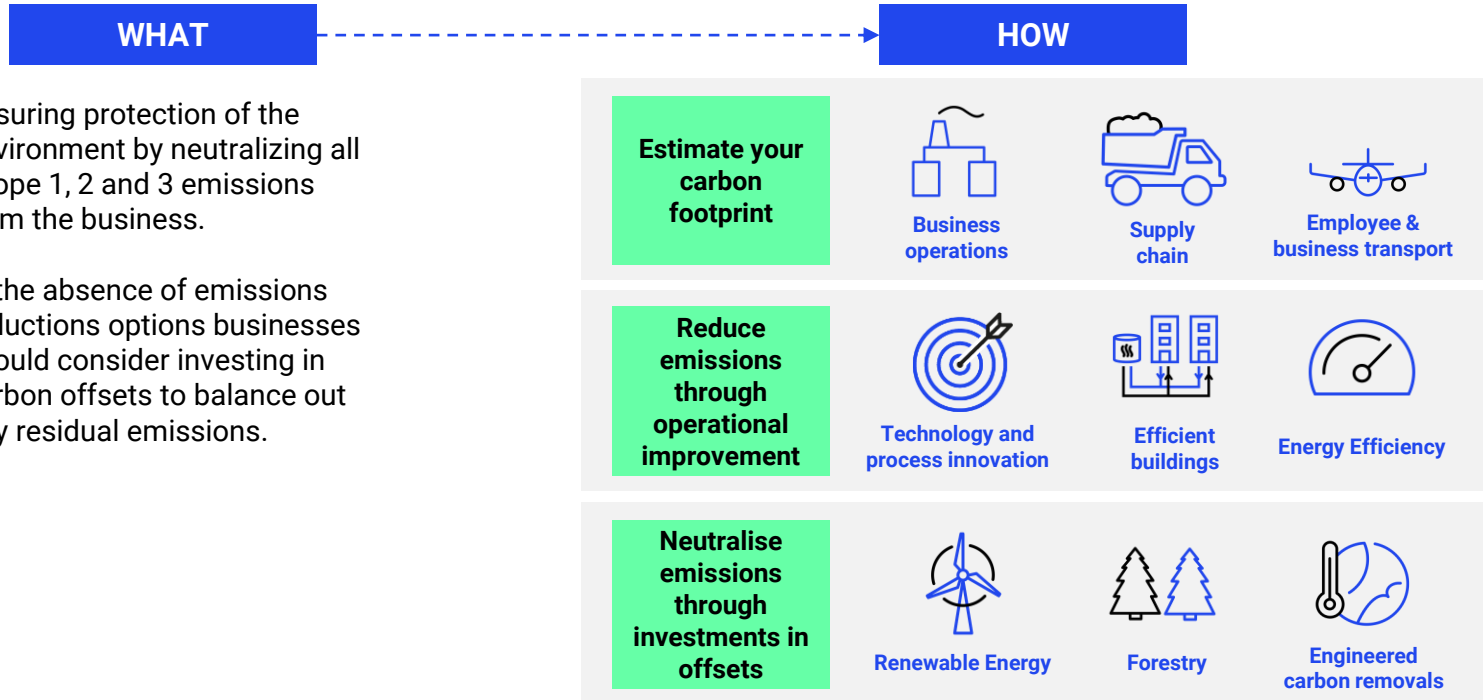
To achieve a scale of value-chain emission reductions consistent with the depth of abatement achieved in pathways that limit warming to 1.5°C with no or limited overshoot

2

To neutralise the impact of any source of residual emissions that remains unfeasible to be eliminated by permanently removing an equivalent amount of atmospheric carbon dioxide

# 1. Introduction

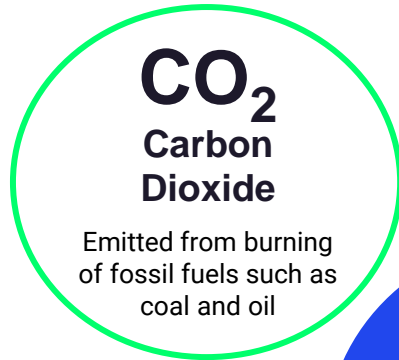
## What does Net Zero mean?



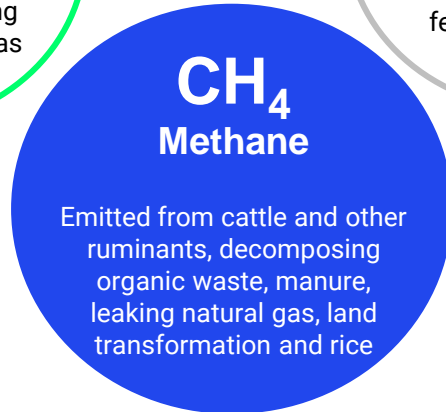
# 1. What is carbon footprint?

## Greenhouse Gases

The primary step in moving towards a low-carbon transition is to understand your carbon footprint, otherwise known as greenhouse gas (GHG) accounting. The primary GHGs and their sources are described below:



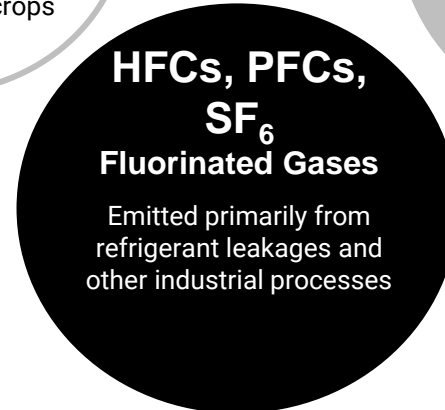
**CO<sub>2</sub>**  
**Carbon Dioxide**  
Emitted from burning of fossil fuels such as coal and oil



**CH<sub>4</sub>**  
**Methane**  
Emitted from cattle and other ruminants, decomposing organic waste, manure, leaking natural gas, land transformation and rice



**N<sub>2</sub>O**  
**Nitrous Oxide**  
Emitted from agriculture through fertilizers and crops



**HFCs, PFCs,  
SF<sub>6</sub>**  
**Fluorinated Gases**  
Emitted primarily from refrigerant leakages and other industrial processes



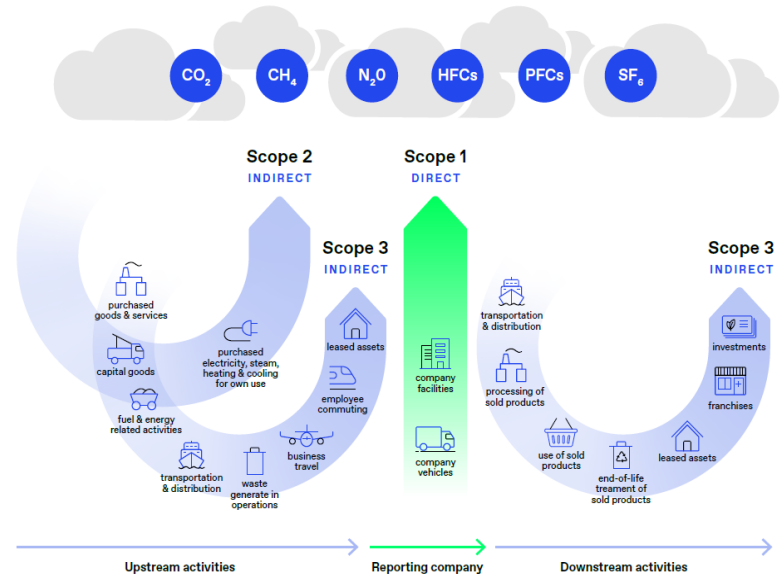
**NF<sub>3</sub>**  
**Nitrogen trifluoride**  
Primarily produced in manufacturing products

# 1. What is carbon footprint?

## Carbon Footprinting

The Greenhouse Gas Protocol classifies emissions sources into three “Scopes”, with Scope 1 and 2 emissions being related to own operations and Scope 3 emissions relating to the wider value chain.

- **Scope 1 emissions** account for direct emissions that result from activities within an organisation’s control (for example, fuel combustion, company vehicles, process and fugitive emissions).
- **Scope 2 emissions** are indirect emissions associated with procured energy (for example, electricity, heat, or steam purchased and used).
- **Scope 3 emissions** are all other indirect emissions across an organisation’s value chain. There are 15 categories of emissions defined by the GHG Protocol (including, for example, purchased goods and services, business travel and end-of-life treatment of sold products).



**Figure 1: The Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Standard**



## 2. Key drivers for SMEs to start their journey to Net Zero

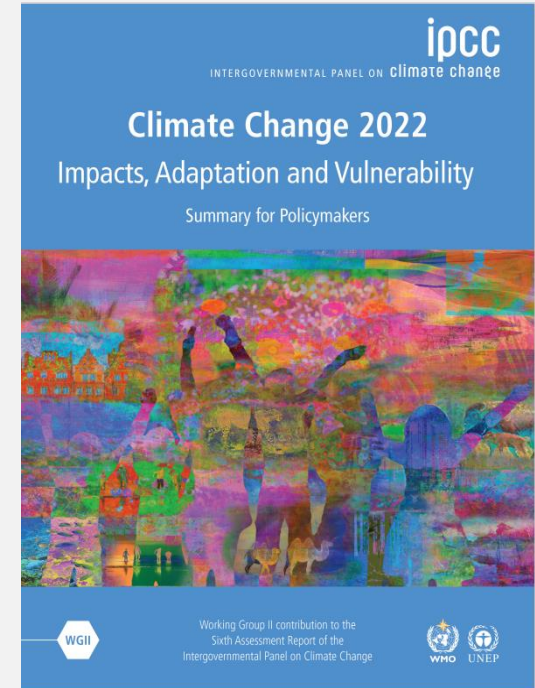
### Climate Change – A top security concern for Southeast Asia

The Paris Agreement was approved by 197 nations at COP 21 in 2015 and agreed to hold the increase in global average temperatures well-below 2°C and pursue efforts to limit the increase to 1.5°C. Presently, global temperatures have risen by 1°C since preindustrial levels. Holding warming to 1.5°C could mean that 11 million fewer people are exposed to extreme heat, 61 million fewer people are exposed to drought and 10 million fewer people are exposed to rising sea level impacts compared to 2°C warming .

Southeast Asia is highly vulnerable to the effects of climate change with climate change being ranked among Southeast Asia’s top security concerns for the past few years. Despite this, the region has witnessed one of the highest increases in greenhouse gas (GHG) emissions.

The UN Intergovernmental Panel on Climate Change (IPCC) in its 2022 report has outlined the following key impacts for the Asia region - variations to monsoon patterns, heatwaves, cyclones, droughts, rising sea levels, food and water insecurity, health risks (water-borne, vector-borne diseases) amongst others.

Such evidence base proves that the private sector must be at the forefront of climate change mitigation by implementing straight forward opportunities through the right use of technology options before tackling longer-term, more complex initiatives.



## 2. Key drivers for SMEs to start their journey to Net Zero

### SMEs to play a bigger role in the fight against climate change

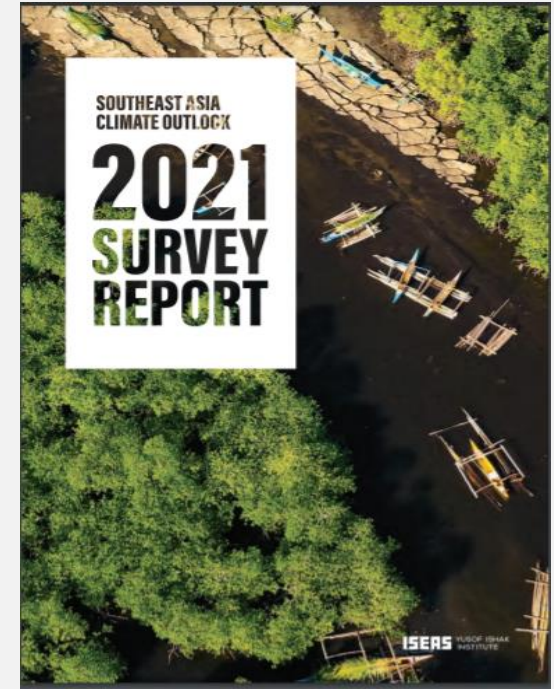
Small and medium enterprises (SMEs) are the backbone of the economy in Southeast Asia, with more than 70 million SMEs comprising 99 per cent of private sector companies.

SMEs in Southeast Asia are estimated to produce 29.7 million tonnes of greenhouse gas emissions annually, which exceeds the total of annual national emissions of Brunei or Cambodia.

The ASEAN region in particular has the threat of seeing its GDP reduce by 35% by 2050 due to exacerbating risks from climate change and natural hazards that could impact sectors such as agriculture, tourism and fishing while causing additional downstream impacts on health and labour productivity.

Given their economic scale and contribution, SMEs must adopt more sustainable practices to rapidly decarbonise if the planet's climate goals are going to be met and Net Zero achieved by 2050.

According to the Southeast Asia Climate Outlook 2021 Survey, ASEAN respondents believe that the private sector must adopt green supply chain practices (78.7%), invest in research and development, and technology (46.6%), and adopt greater transparency and accountability in corporate sustainability reporting (34.4%).



## 2. Key drivers for SMEs to start their journey to Net Zero

**SMEs must remain competitive and resilient in the face of climate change**

### **Cutting costs and increasing profits**

Costs can be reduced through measures such as introducing energy management practices, installing smart meters, energy-efficient lighting and heating systems, re-designing products that require fewer inputs without sacrificing utility, reducing volume of packaging and switching to local suppliers to decrease shipping distances, switching to recycled materials, and reusing waste products for other purposes or by selling it onto other companies.

### **Larger companies expecting their suppliers to act**

SMEs need to engage in this process to avoid missing out on future contracts and growth opportunities, as the wider supply chain increasingly demand low carbon products and services, being able to respond to this demand will give your company a competitive advantage.

### **Customer expectation**

Customers expect companies to make ethical decisions on their behalf, and "going green" can attract new customers, business partners and talent.

### **Opening new markets**

Net Zero commitment can help businesses innovate and diversify. Offering innovative "green" products, services or business models may open low carbon business opportunities.

### **Enhancing reputation**

Cutting carbon emissions and helping to combat climate change demonstrates a degree of corporate social responsibility to stakeholders.

### 3. How do you reach Net Zero?

#### What can you do now?

The first step in the journey to Net Zero begins by **making a Net Zero commitment** to reduce emissions. This can be done through organisations such as the Science Based Targets initiative (SBTi) or the SME Climate Hub. Commitments are followed by estimating your **baseline emissions** and thereafter design a robust **Net Zero strategy** with clear indication of solutions to meet the targets.



## 3. How do you reach Net Zero?

### Make a Net Zero commitment

SMEs being small businesses have the potential to see tangible business value from emissions reduction. All organisations need to state their ambition, where do you want to get, when and why. While setting a time-bound commitment analyse the drivers for this transition (clients, investors, employees) and the purpose it is intended to achieve in the long-term. Making a public commitment to Net Zero is key to setting the expectation amongst internal and external stakeholders.

SMEs have many options when deciding to make a commitment:



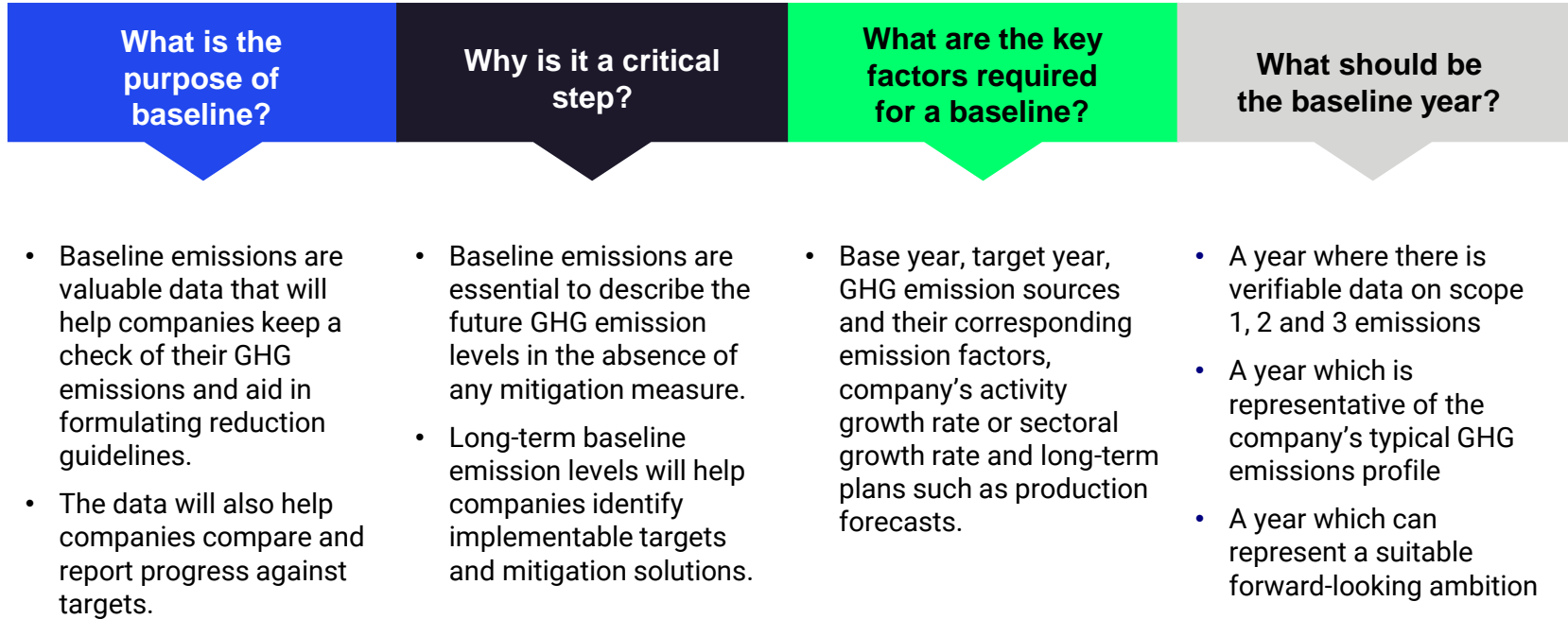
The Science Based Targets initiative (SBTi) invites SMEs to submit targets through a streamlined target validation route exclusive to SMEs. This route enables SMEs to bypass the initial step of committing to set a science-based target and the regular target validation process, and to immediately set a science-based target for their scope 1 and 2 emissions by choosing from one of several predefined target options.



The SME Climate Hub asks SMEs to commit to halving emissions before 2030, achieving Net Zero by 2050 and disclosing emissions annually. Once committed, the SME Climate Hub has tools available to support SMEs to measure and reduce emissions. The SME will be recognised by the United Nations Race to Zero campaign, which aims to rally leadership from business, investors and local governments to encourage more ambitious Net Zero targets.

## 3. How do you reach Net Zero?

### Estimate your baseline carbon footprint



### 3. How do you reach Net Zero?

#### Which baseline should be calculated?

Depending on the level of historical data available the companies can choose to estimate one or more of the following types of footprint. For a company which is at the beginning of the Net Zero journey, organisation footprint covering scope 1 and 2 would be ideal and can gradually transition towards estimating the footprint across the value chain.

	Organisational footprinting	Value chain footprinting	Product and service footprinting	Avoided emissions calculation
<b>Definition</b>	Assessment of resources directly consumed by an organisation	Assessment of resources indirectly consumed by an organisation in its supply chain and by its customers	Assessment of resources consumed by a specific product or service	Assessment of the environmental impacts a company or product avoid beyond its own boundary.
<b>Explanation</b>	Identifies opportunities to reduce costs, minimise waste and improve sustainability in areas you control	Identifies resource-related risks and opportunities across your value and supply chain	Identifies specific opportunities to improve and innovate and verify environmental performance claims	Identifies specific products/ services/ practices that enable global emissions reduction, which can drive investment

# 3. How do you reach Net Zero?

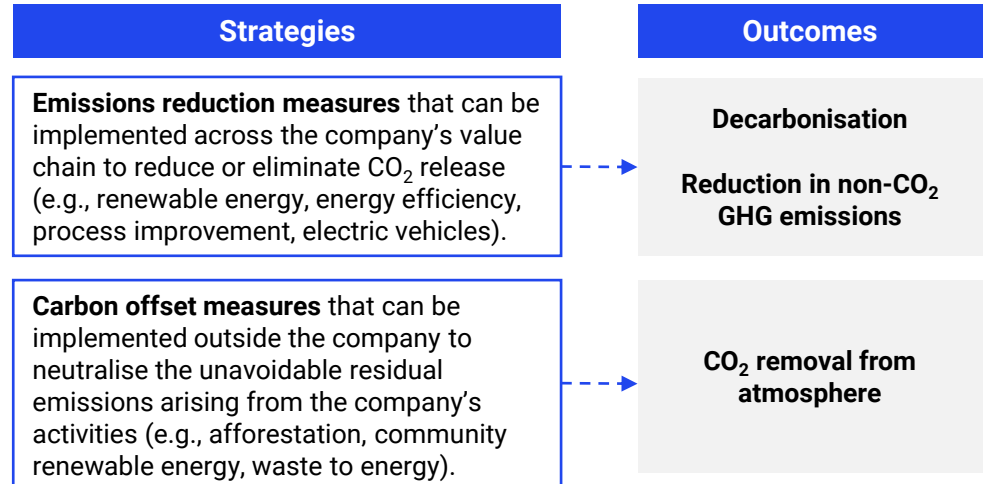
## Build a Net Zero strategy

Once you have a clear understanding of your baseline emissions, creating a reduction plan or roadmap is essential to achieving emissions reduction. A Net Zero strategy requires changes to your operations and must be integrated into the overall organisation strategy and business functions. The strategy should be designed based on a business case so that it can be implemented easily across the organisation. Some of the key steps for designing the strategy are provided below:

### Integrating Net Zero into the governance process

- Embed Net Zero philosophy at the leadership level (CEO and Board)
- Define roles and responsibilities across the organisation for meeting Net Zero targets
- Update organisation vision and mission by integrating Net Zero commitments
- Where possible, identify performance metrics integrated with Net Zero criteria to drive business decisions e.g., procurement, research & development, etc.
- Identify Net Zero champions to drive implementation of the strategy

### Mitigation Solutions for Net Zero





## 4. Carbon reduction opportunities for SMEs

### Energy saving potential by sector

SMEs have the potential to adopt proactive measures covering both energy supply and demand which can thereby result in GHG emissions reductions. SMEs can control and reduce their energy use through the integration of renewable energy solutions in the supply side and a plethora of energy efficiency measures for demand side management. By embedding such measures, SMEs will also be able to achieve the requirements of ISO 14001 and ISO 50001 standards and position themselves as a responsible organisation to their stakeholders.

**Table 1: Summary of carbon reduction measures across sectors**

Business Sector	Energy Supply Management	Energy Demand Side Management
Food manufacturing	Renewable energy (on-grid, off-grid solar), solar thermal for hot water / process heating	Lighting, refrigeration, motor-driven processes and compressed air
General manufacturing/engineering	Renewable energy (on-grid, off-grid solar), solar thermal for hot water / process heating	Lighting, industrial systems (boilers, furnace) and motor-driven processes, compressed air
Office based	Rooftop PV, Building integrated photovoltaics (BIPV)	Lighting, cooling and IT systems
Retail	Rooftop PV, BIPV	Lighting, cooling and refrigeration
Hospitality	Rooftop PV, solar thermal for hot water	Lighting, cooling and catering equipment
Construction		Compressed air, mobile plant

## 4. Carbon reduction opportunities for SMEs

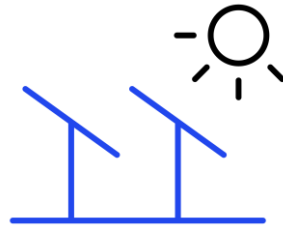
### Renewable Energy

#### Integrate renewable energy for energy supply

The success of SMEs can be linked to the approach followed to use energy for its business operations. Availability of reliable and cleaner source of power remains a challenge and could limit the operations.

Switching to renewable energy for electricity and thermal energy requirement provides SMEs access to clean, safe and affordable energy as they do not contribute to scope 2 GHG emissions.

Electricity is the major source of energy for all major systems for SMEs. While renewable energy may not be available for 24 hours in a day, it can still be an alternate option for meeting the day-time electricity demand.



#### Case study 1

A beverage manufacturer in Malaysia installed a solar thermal hot water system as an alternative to an electric boiler for meeting steam required for their process. This project resulted in reducing the cost of electricity by 50% per year (USD 12,800/yr.) and leading to emissions reduction of 90 tCO<sub>2</sub>/year.

#### Case study 2

A food manufacturer in Malaysia installed a solar thermal hot water system to minimise the high LPG consumption. This project resulted in reducing the LPG use by 50% per year and yielded 50% LPG expenditure savings of around USD 10,000 per year.

## 4. Carbon reduction opportunities for SMEs

### Lighting

Lighting is a significant energy cost for most business sectors and good savings can be achieved both through upgrades and improved control and management.

#### Install low energy lighting

Upgrading from conventional lighting to LED luminaires could deliver cost savings of up to 80% for your business. LED luminaires use less energy, last much longer and reduce maintenance costs compared to regular lighting systems, meaning you'll make back the cost and more.

#### Switch-off policy

Involve staff and increase awareness of the importance of switching off lighting through emails, web-based reminders, staff meetings, placing stickers above light switches and putting posters around the building. Light switches should also be clearly labelled to help staff to select only the lights they need. A good nighttime shut down routine is also beneficial.

#### Utilise timers and automatic controls

Set timers to match lighting operation to occupancy hours and consider the use of daylight dimming sensors or presence detection to switch off or dim lighting when not required.



## 4. Carbon reduction opportunities for SMEs

### Cooling

Cooling is required in a variety of forms by many small SMEs. Air conditioning, refrigeration and process cooling are the most common uses that are considered here.

#### Measure and monitor

Installing sub-meters to see how much electricity individual cooling processes use will help to identify areas where energy savings can be made. Monitoring will identify any deterioration in system performance, show the effects of operational changes and confirm the level of savings resulting from any actions taken

#### Effective controls

Review target temperatures for rooms, areas, refrigeration systems and processes. Monitor the actual temperatures achieved under normal working conditions and identify if there is any overcooling (or underperformance). Overcooling could be reduced by simply increasing set-points, reviewing controls or making operational changes.

#### Case study: Cooling improvement at JBTEC Flavors and Blends (Philippines)

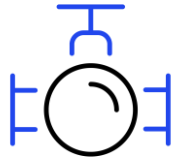
During an energy audit that was conducted at this food processing SME, it was identified that food refrigeration is the major energy use area for the business. The following energy efficiency opportunities were identified for this process:

- Replacement of refrigeration units with an inverter-installed model can reduce energy consumption, has a potential savings of up to 30%.
- Individual parts upgrades to reduce the overall system consumption
- Replacement of R22 refrigerant to modern variants such as R-410A or R407 can reduce the environmental impact of operation

The payback period for the above measures was estimated to be 4.5 years while saving PHP 4,110,000 (USD 78,567) per year.

## 4. Carbon reduction opportunities for SMEs

### Heating - Boilers



#### Maintain boilers and pipe work

A regularly serviced boiler can save as much as 10% on annual heating costs. Boilers, hot water tanks, pipes and valves should be insulated to prevent heat escaping. Payback can usually be expected within a few months of installation, with additional savings in subsequent years.



#### Moving away from fossil fuels?

Whilst the efficiency of natural gas and oil-based heating systems should be improved as much as possible, often significant emissions remain. By investing in solutions such as air-source heat pumps, powered by renewable electricity sources, a positive step change in emissions can be made.

#### Case study: Thermal Energy Efficiency at Future Prelude Sdn Bhd (Malaysia)

A thermal audit at oleochemical SME was conducted to identify any operational inefficiencies around energy used for process heating. The following recommendations were identified for thermal energy improvement:

- **Installation of Flue Gas Economiser:** savings of 14,400 GJ and MYR 495,600 (USD 118,352) per year, and a payback period of 2 years
- **Installation of Air Pre-heater:** savings of 4,100 GJ and MYR 142,900 (USD 34,125) per year, and a payback period of 2.1 years
- **Rectify steam leakage to avoid wastage:** savings of 780GJ and MYR 26,800 (USD 6,400) per year, and a payback period of 0.2 years

## 4. Carbon reduction opportunities for SMEs

### Compressed air

For many manufacturers, compressed air is commonplace, and can be a major source of energy wastage. Improving compressed air systems can typically save as much as 30% where systems have not been well maintained. Some of the key steps that could be adopted by SMEs include:

- **Eliminate unnecessary compressed air usage:** Industrial sites often 'misuse' compressed air through habit or ease of access. Using low-pressure blowers is a more energy efficient way to dry components for example, than using an 'air-knife' which runs on compressed air. Another common misuse is cleaning machinery. Brushes and vacuum systems are often much cheaper alternatives.
- **Reduce air pressure:** Ask equipment and tool manufacturers to specify the minimum air pressure necessary to drive the machinery and then ensure that the system meets, and does not exceed, the requirements. For large facilities, operating separate systems at different pressures can be economical to minimize widespread use of high-pressure air.
- **Check frequently for leaks:** A systematic and regular leak detection programme should be put in place to check for leaks with follow up repair as quickly as possible.
- **Utilise waste heat:** Up to 90% of the electrical energy used by a compressor generates heat. This waste heat can be of benefit to help heat adjacent factory or warehouse spaces or in larger systems can be used to heat water.

## 4. Carbon reduction opportunities for SMEs

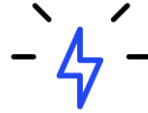
### Process

Manufacturing businesses may have significant process related energy use, the extent of which will vary from company to company. Some of the key areas that can be considered by SMEs are described below:



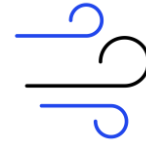
#### Production process

Many manufacturing processes rely on automated systems, for example CNC machines, conveyor lines, plastic injection moulding or extrusion systems to name a few. The biggest influence in energy performance can be made at the design stage, however a review of control strategies, operating times and shut down procedures can yield savings.



#### Motors and drives

Electric motors are often at the heart of industrial processes. The cost of buying an electric motor is just a fraction of its lifetime running cost. In a single year a running motor can cost up to ten times its purchase cost in energy. This emphasises the importance of good procurement practices to purchase high efficiency motors as a starting point. In addition, good maintenance practices can keep overall system efficiency high.



#### Steam

Steam systems are energy intensive. There are a range of short-, medium- and long-term measures which can be deployed to improve energy performance, including: leak detection and repair, insulation, improved condensate return, blowdown improvements, improved water treatment and combustion air pre-heat.

## 4. Carbon reduction opportunities for SMEs

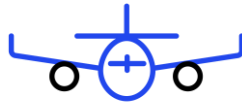
### Value Chain

A key step for SMEs is to reduce value chain emissions associated with the disposal and treatment of waste generated in operations, business travel and employee commuting. SMEs can focus on one or more of the below areas to reduce value chain emissions



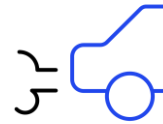
#### Reducing waste

Through effective waste prevention techniques and responsible recycling, you can use less energy and reduce emissions. One of the quickest and easiest ways to reduce waste is by going paperless and switching to digital processes.



#### Business travel

The first question to ask is whether you really need to travel or can tele- or video-conference? Meeting virtually with your employees or clients using phone or video technology is the best way to reduce your emissions associated with travel.



#### Employee commuting

Allowing employees to work from home typically reduces emissions associated with travelling to work and reduces energy consumption within the office.



#### Decarbonising supply chains

Supplier emissions are usually several times larger than a company's own operations, and therefore on the journey to net zero, it is vital to consider how sustainable your suppliers are.



# 5. Neutralising residual emissions through offsets

## How can offsets help SMEs?

Once you have achieved the scope 1, 2 and 3 emissions in line with the 1.5°C pathway there could be any hard to reduce GHG emissions that require to be neutralised.

While the discussion around carbon removals and offsets to achieve Net Zero is still evolving, SMEs should primarily focus on achieving carbon reductions in the short-term across areas where they can deploy solutions.

## Types of offsets

An immediate transition to 100% carbon removals is not currently feasible, and this is where companies can offset emissions that they cannot avoid through carbon offsetting. The following options can be considered by companies when considering offsets:

Offset type	Project category
Avoided emission offsets	<ul style="list-style-type: none"> <li>• Renewable energy</li> <li>• Clean cookstoves</li> </ul>
Emission reduction offsets	<ul style="list-style-type: none"> <li>• Avoided deforestation</li> <li>• Carbon capture and storage (CCS) on industrial factories and fossil fuel power plants</li> </ul>
Greenhouse removal offsets	<ul style="list-style-type: none"> <li>• Afforestation</li> <li>• Soil carbon enhancement</li> <li>• Direct air carbon capture and storage (DACCS)</li> <li>• Bio-energy carbon capture and storage (BECCS)</li> </ul>

## 6. Future Opportunities

### Communicating commitments

- Publicly communicating your commitment to reduce emissions is a key step in aligning to Net Zero.
- Many organisations have communicated targets which seem to be aligned to Net Zero but do not give enough information to make this claim transparently.
- A Net Zero target will be challenging to achieve for a SME and therefore communicating interim science-based targets in the short-term should be prioritised as well as communicating any longer-term Net Zero target.
- The box on the right gives an example of how a target could typically be worded.

2030	2050
Company X intends to reduce scope 1 and 2 emissions by 40% by 2030 against 2018 baseline.	Company X also targets to estimate and reduce scope 3 emissions and aims to reach Net Zero by 2050

# Additional information

## Country specific supporting mechanisms

Country	Supporting mechanism for carbon reduction & energy efficiency uptake
<b>Malaysia</b>	<ul style="list-style-type: none"> <li>• Green Investment Tax Allowance (GITA) offers provision of investment tax allowance for purchase of green technology equipment and income tax exemption on green technology services and systems.</li> <li>• Malaysia Debt Ventures Berhad was established with the objective of providing flexible and innovative financing facilities to develop high-impact and technology-driven sectors of the economy and have disbursed RM12.84B thus far.</li> <li>• MyHIJAU green recognition scheme provides a platform that brings together green products and services that meet national and international standards</li> </ul>
<b>Philippines</b>	<ul style="list-style-type: none"> <li>• Energy efficiency and conservation projects certified by Department of Energy will enjoy the following incentives: (i) tax and duty exemption on imported capital expenditures (ii) tax credit on domestic capital equipment (iii) income tax holiday</li> <li>• Green loans offered by Land Bank of the Philippines, Development Bank of the Philippines and Bank of the Philippines for energy efficiency and renewable energy projects</li> </ul>
<b>Thailand</b>	<ul style="list-style-type: none"> <li>• Energy Conservation (ENCON) Fund has been disbursed using a number of different economic and financial mechanisms, including grants, subsidies, tax incentives, a feed-in premium for renewable energy, etc.</li> <li>• Energy Efficiency Revolving Fund is a debt-financing mechanism that provides low-interest loans to banks for energy efficiency lending</li> </ul>
<b>Vietnam</b>	<ul style="list-style-type: none"> <li>• Low Carbon Energy Efficiency (LCEE) fund support energy efficiency investments in the food and building material sectors with total envelope reaches 6.6 Million USD. Investors in EE will receive either a bank guarantee for the investments, or energy savings awards of up to 30% of the investment cost, depending on the energy savings. Project proponent must be SMEs.</li> </ul>

# Additional information

## Support tools

Organisation / Initiative	Link
<b>Carbon Trust</b>	<a href="https://www.carbontrust.com/resources">https://www.carbontrust.com/resources</a>
<b>SME Climate Hub</b>	<a href="#">Home - SME Climate hub</a>
<b>ISO</b>	<a href="https://www.iso.org/iso-14001-environmental-management.html">https://www.iso.org/iso-14001-environmental-management.html</a>
<b>EV100</b>	<a href="https://www.theclimategroup.org/ev100">https://www.theclimategroup.org/ev100</a>
<b>RE100</b>	<a href="https://www.theclimategroup.org/about_re100">https://www.theclimategroup.org/about_re100</a>
<b>Science Based Targets</b>	<a href="#">Sector Guidance - Science Based Targets</a> <a href="#">Resources - Science Based Targets</a>
<b>GHG Protocol</b>	<a href="#">Scope 3 Evaluator   Greenhouse Gas Protocol (ghgprotocol.org)</a>

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