

AIB

For the life you're after

Food Manufacturing Sustainability Guide

Sustainability is at the heart of our strategy.

As a financial institution at the heart of the economy, we recognise that the scale and impact of our business gives us a responsibility to the wider economy and society. We have committed to do more to help ensure a greener tomorrow, by backing those building it today.

AIB has a target to achieve Net Zero in our own operations by 2030 and an ambition that green/transition lending will account for 70% of overall new lending by 2030, with a target to achieve Net Zero in our financed emissions by 2040 for our lending portfolio (2050 including agriculture).

To support our customers on their own sustainability journey, AIB has developed a series of sector specific sustainability guides. These guides aim to provide practical tips and information which can be used by businesses to transition their operations to a more sustainable footing.

This series has been produced in partnership with Arthian, a leading independent sustainability, engineering, planning and safety consultancy firm. To view the full series of guides, please visit: www.aibni.co.uk/sustainability

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Section 1

Sustainable Food Manufacturing

1.1 Food Manufacturing

The UK and Ireland have a large number of food and drink businesses, manufacturing high quality products for domestic and international markets.

In the UK, Food, Feed and Drink (FFD) exports totalled £24.6 billion in 2024, with the value of exports increasing by almost 55% in the past 10 years. Consumers are increasingly prioritising sustainability in food manufacturing businesses. According to recent research by YouGov, 64% of UK consumers would pay up to 10% more on sustainable packaged food and drinks and 57% would be willing to spend up to 10% more on sustainable meats and fresh produce as well.(1)

Nowadays, people are more environmentally and socially conscious and want to align their personal values with their professional lives. As a result, companies that adopt sustainable practices can benefit both the environment and their employee retention.

Regulation also plays a part in food manufacturing and other industries' sustainability focus. Some examples are the UK Sustainability Reporting Standards (UK SRS) and the EU's Corporate Sustainability Reporting Directive (CSRD). While smaller businesses are typically out of scope for such reporting requirements, many might find themselves subject to sustainability information requests when they are included in the value chain of larger in-scope companies.

Having a strong focus on embedding sustainability will offer food and drink manufacturers a competitive advantage in an ever-changing global marketplace.

This guide is crafted specifically for small and medium food and drink manufacturing companies and looks at key resource intensive areas for the industry, including:

- Raw material and supply chain sustainability
- Energy
- Transport
- Water and wastewater
- Packaging
- Waste management
- Social sustainability
- Biodiversity

Each section identifies challenges faced by food manufacturing businesses across a broad range of sub-sectors highlighting potential ‘hot spot’ areas. To assist, actionable ideas and practices are presented to empower businesses with the knowledge and tools required to address these issues.

Through the implementation of these strategies, businesses can make a tangible impact on both their environmental footprint and financial bottom line, contributing to a more resilient and sustainable food manufacturing sector.

For SMEs embarking on their sustainability journey, AIB also has a dedicated ‘Steps to Sustainability’ guide on its website, with six easy to follow sections. These are practical actions that businesses can undertake straight away to become more sustainable. See section 11.0.

(1) Source: www.yougov.com/articles/49155-sustainability-premium-53-of-consumers-willing-to-pay-10-extra-for-sustainable-food-and-drink

1.2 Sustainability Priorities in Food Manufacturing

The UK's commitments surrounding food and drink sustainability are driven by key legislative requirements such as the Climate Change Act 2008, the Climate Change Act (Northern Ireland) 2022 and the UK Government Food Strategy.



Additionally, **The Food and Drink Federation's (FDF) Ambition 2030** is the flagship strategy for food and drink manufacturing and sets out the sector's important role in tackling these challenges and how every business can make its contribution.

Building on the previous Ambition 2025 programme, the strategy shares five targeted Ambitions for the next five years, highlighting the industry's commitment to reducing its impact on the planet, by tackling emissions, driving a circular economy, sourcing sustainable ingredients, minimising food waste and supporting biodiversity.

Based on five key pillars, the strategy outlines new Ambitions that the food and drink manufacturing industry is pledging to reach by 2030:

Net zero

Food and drink manufacturers will support the agrifood supply chain's target to reduce its emissions by 50%, in line with the industry's pledge to achieve net zero by 2040.

Nature restoration

This is becoming ever more urgent.
By investing in nature restoration projects including regenerative agriculture, manufacturers will contribute to the UK's Nature Positive ambition to halt and reverse nature loss by 2030.

Sustainable commodities

Agricultural commodities are vital for food production, from cattle feed to ingredients in manufacturing, however it is critical that these only come from sustainable sources. By halting commodity-driven deforestation and conversion by 2030, the sector will prevent further biodiversity loss due to commodity production.

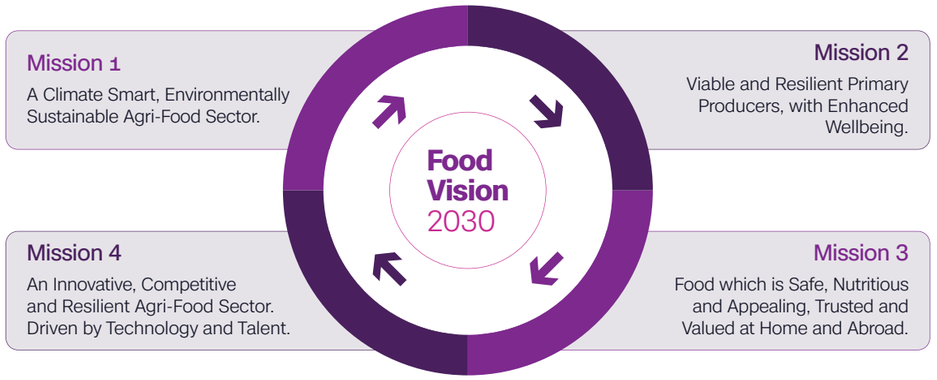
Food waste

Manufacturers will build on the substantial progress they have already made by halving food waste from the manufacturing process by 2030. However, with households accounting for 70% of the UK's edible food waste, the sector will also work with partners across industry and with government to reduce household food waste.

Packaging

FDF members are committed to establishing a circular economy in the UK. By working in partnership with government, the sector will contribute to the creation of a world-class packaging recycling system in the UK.

As well as the five overarching ambitions, the strategy gives detailed and practical guidance on measurement, target-setting and reporting to help food and drink manufacturers take action, no matter where they are on their journey. Whether at the entry, developing or advancing stage, the programme has been developed to help every business drive real change by embedding sustainability into their business plans [(2)]



(2) Source: https://www.fdf.org.uk/fdf/our-work/our-campaigns/ambition-2030/

Section 2

Developing a Sustainability Strategy

Food and drink manufacturing businesses have traditionally delivered on sustainability indirectly or directly through operations such as procurement (supply chain sustainability credentials), lean manufacturing processes (resource efficiency and waste minimisation), facilities (energy efficiency), and health and safety (safe storage of hazardous materials and wastes).

Sustainability-specific roles are now becoming more significant across the sector, bringing operational practices together with their own sustainability priorities such as legal compliance, customer requirements and corporate sustainability aims under a 'sustainability strategy' approach.

2.1 Developing a Sustainability Strategy

Consider these key factors to enhance your business's sustainability strategy and credentials:

1. **Understand the environmental impact of your business:** Some of the sustainability frameworks, policies and reference points to consider include the United Nations Sustainable Development Goals (SDGs), Environment, Social and Governance (ESG) frameworks such as Global Reporting Initiatives (GRI), FDF's Ambition 2030 programme. Further details are available in Section 11.

2. **Create a sustainability role or team** to implement and manage sustainability within the business. This may require some training internally and externally on sustainability to improve awareness and competence dependent on responsibilities.

3. **Conduct an environmental review or a materiality assessment**. Consider customer sustainability demands, your surrounding environment and business strategy among others, and outline priority areas to set targets across the short and longer-term.

4. Consider internal and external **sustainability reporting** to monitor, measure and report progress to demonstrate good governance.

5. Consider **behavioural change measures** such as training and standard operating procedures (SOPs) as well as **engineered controls and equipment upgrades**.

6. Gain **buy-in from leadership** to ensure adequate resourcing (human, technological and financial) for the sustainability strategy. Agree a suitable time-frame for your sustainability strategy, example, a 3-5 year period is most common with an annual review of progress and updating of the strategy.

7. Set **targets** for each priority sustainability topic across the strategy period. Share with management and sustainability teams for feedback before finalising.

2.2 SMART Targets

Follow the SMART acronym below for a sustainable strategy. This helps set out appropriate targets and achieve positive outcomes.

- **Specific:** ensure the focus is clear to all.
- **Measurable:** ensure the target performance is measurable and compared to a baseline.
- **Achievable:** ensure actions have been identified and implementation can support meeting the target.
- **Responsibility:** ensure responsible employees are assigned where they are competent and available.
- **Time-bound:** ensure milestones and a time-line is set to ensure progress up to the target date.



Section 3

Raw Materials and Supply Chain Sustainability

3.1 Raw Materials Sustainability Credentials

Sustainability improvements for food and drink products start with their raw materials. Food and drink manufacturers often demonstrate their sustainability by increasing the percentage of raw materials certified by credible third parties.

These certifications can be reported separately for key raw materials or can be combined into a single metric, such as the percentage of raw materials with sustainability certification. Below are some examples:

- Red Tractor Assurance is the largest farm and food assurance scheme, ensuring food safety, animal welfare, traceability, and environmental protection throughout the supply chain for beef, dairy, horticulture, eggs, poultry, pig-meat, lamb and feed.
- The Agricultural Industries Confederation (AIC) is an independent, not-for-profit organisation that works on behalf of members in the agricultural supply sector and manages several assurance schemes such as:
  - Feed Material Assurance Scheme (FEMAS)
  - Trade Assurance Scheme for Combinable Crops (TASCC)
  - Universal Feed Assurance Scheme (UFAS)
- Forest Stewardship Council (FSC) (relating to packaging materials).
- UTZ Rainforest Alliance.
- Fairtrade.

The raw materials used in food manufacturing processing contribute to environmental impact and sustainability performance. One of the most effective ways to improve the efficiency of raw materials is to ensure they are being used to their fullest potential and used at their highest value possible. Often, collaboration with procurement and suppliers can improve material efficiency.

Things to consider when purchasing raw materials:

- Is the raw material sustainably sourced? Is it covered by a credible sustainability certification?
- Is the raw material necessary? Are there more sustainable alternatives or could its use be minimised?
- Is the raw material sourced locally and if not, could it be?
- Are you maximising utilisation of the raw material? What is the yield (material in vs material out)?
- Are raw material offcuts reusable in a secondary product? For example, fruit or vegetable offcuts being used for juice/smoothie production.



3.2 Supplier Sustainability Credentials

Many businesses are looking to their suppliers' 'organisational' certifications as a route to improve sustainability. This may increase with the knock-on effect of increased demands on organisations with regards to sustainability reporting.

Your business can request information from its supply chain with a target to improve the percentage of suppliers holding valid sustainability certifications. Examples may include, but are not limited to the below:

- ISO 14001 Environmental Management System.
- ISO 50001 Energy Management System.
- Sedex certification which enables organisations to store, analyse, share and report on sustainability practices for supply chain assessments.
- Forest Stewardship Council (FSC) Chain of Custody is a certification that traces the path of products from forests through the supply chain, verifying that FSC-certified material is identified or kept separated from non-certified material throughout the chain.
- The Business Working Responsibly Mark for responsible business is administered by Business in the Community.
- Additionally, a business may develop a SMART target surrounding one or more key suppliers on sustainability initiatives such as financially supporting projects to enhance the supplier's sustainability performance. For example, sourcing from local suppliers or responsible waste management.

Section 4

Energy & Emissions

4.1 Understanding your Energy Consumption

Developing an organisational carbon footprint is high on the agenda of food and drink businesses and their stakeholders' expectations. Your business should aim to have access to good data, such as energy bills with actual meter readings or any energy usage reports related to specific equipment.

The Greenhouse Gas Protocol methodology is a widely used methodology to calculate carbon emissions and Scope 1, 2, and 3 emissions are fundamental in the sustainability efforts of businesses, particularly in the food manufacturing industry. These categories are pivotal for effective carbon accounting and reduction strategies.

- **Scope 1** emissions that are direct GHG emissions which occur from sources that are owned or controlled by the business. For food manufacturing companies, these include emissions from the manufacturing process and company-owned vehicles.
- **Scope 2** emissions account for GHG emissions from the generation of purchased electricity consumed by the business.
- **Scope 3** is a reporting category that allows for the treatment of all other indirect emissions in the company's upstream and downstream value chain. Scope 3 emissions are a consequence of the activities of the business, but occur from sources not owned or controlled by the business. Examples include emissions from raw materials, packaging materials, retailer emissions (from storage of product in a freezer) and customer usage emissions from cooking the product (if applicable) and disposing or recycling of packaging.

Here are some examples of how food manufacturing businesses can reduce / manage energy consumption:

Energy Elimination and Reduction: Can energy be saved by turning off equipment that's not necessary? For example during production breaks, cleaning shifts, breaks, out-of-hours (overnight, weekends).

Energy Efficiency: Is the energy being used providing the desired effect? For example, the equipment in use does not match the requirement (motors are oversized). Is the equipment an energy efficient model with sufficient controls?

Low Carbon and Renewable Energy: While these options can have a positive impact on your carbon footprint, they should be considered after prioritising minimising use and energy efficiency. This is due to the capital cost but also to size them correctly to meet future energy demands if efficiencies are made.

4.2 Energy and Carbon Management Opportunities

4.2.1. Processing Equipment

Food manufacturing sites use different types of processing equipment depending on the nature of the sector they are operating in.

A range of measures can be taken to improve energy efficiency, regardless of what type of equipment is being used.

Measure	Description
Data collection & management	→ Data collection, management and analysis can be done by compiling historical data, installing panel-mounted power meters, and using data analysis software.
Slow down or shut off	→ Power measurement data combined with variable speed drives/motors means machines and equipment can be shut down when not needed or turned down where possible. → Identify key areas of inefficiency and wastage to know where and when to shut off or slow down equipment. Adjust speeds and run time to match production demands.
Operator control	→ Employees must receive training in machine handling to understand best practices and improve equipment efficiency. → Regular refresher courses are essential to maintain commitment to energy efficiency.
Sizing	→ Consider replacing larger, partially loaded motors with smaller, fully loaded ones.
Maintenance, servicing	→ Regular servicing will ensure motors are run as efficiently as possible and highlight where further improvements can be made. Regular cleaning and maintenance of motors is a crucial step in preventing damage and supporting longer lifespan for the machinery.

There are many benefits to increasing the energy efficiency of your site's process equipment. These include:

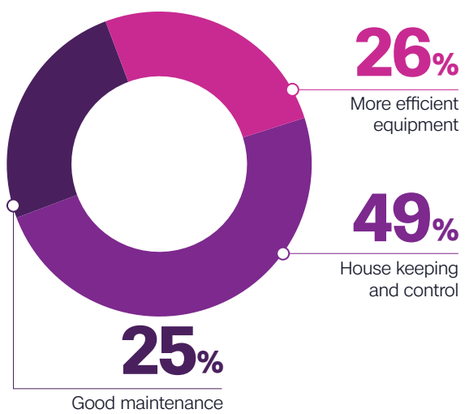
- → Increased output efficiency
- → Reduced cost-of-production
- → Reduced downtime
- → Streamlining production

4.2.2. Refrigeration

Refrigeration is essential for many food manufacturing sites, as it can account for a significant proportion of overall site energy costs. No matter what type of refrigeration equipment you have, it is estimated that up to 74% of energy savings can be made from improving maintenance, housekeeping, and control.

Cold rooms are typically the most common method of food manufacturing product refrigeration. Here are the most effective actions you could implement to reduce your site's cold room energy requirements.

Typical Sources of Savings in Refrigeration:[3]



(3) www.carbontrust.com

General housekeeping measures	→ **Keep doors closed:** Introduce good door management procedures and keep cold store doors closed whenever possible. This will keep warm air and moisture out, and energy costs down. → **Do not obstruct evaporators:** Ensure airflow from the evaporators are not obstructed. Obstructing air flow can lead to warm air build up, making your refrigeration system work harder to keep temperatures low. → **Run at the highest temperature for product:** Run your cold store at the highest possible temperature for the product. The UK Government[4] can provide helpful information on the appropriate ways to store chilled or frozen food. → **Keep the product cold during transfer:** Make sure it does not warm up before entering the cold room. → **Switch off lights:** Turn off lights when not needed or out of hours to save energy. → **Ensure the cold room is appropriately stocked:** Overstocking can cause refrigeration systems to work harder to keep things at an appropriate temperature, using more energy.
Maintenance and low-cost saving measures	→ **Repair any damaged door seals:** If you have automatic or rapid-closing doors, make sure they are not overridden and are maintained in good working order. → **Install strip curtains:** Well-maintained strip curtains will keep warm air and moisture out. Insulated curtains are available, offering an improved thermal barrier. → **Upgrade lighting to LED with auto control:** Consider low-power, instant-on lighting which switches off automatically if the store is unoccupied. → **Maintain and repair all wall panel seals:** Ensuring the outside of the cold store is sealed air-tight and well insulated will keep air infiltration and heat gain to a minimum. → **Interlocking doors with evaporator fans:** Install interlocks so fans are switched off when the doors are opened, to prevent cold air from escaping. → **Ensure regular servicing of the system:** Servicing including cleaning can improve the energy efficiency of the system.
Investment measures	→ **Fit automatic/rapid close doors:** If regular access is required, rapid close doors can reduce opportunity for temperature increase. → **Install defrost on demand system:** Doing so can keep the evaporators in better condition. → **Install a variable speed drive on the evaporator fans:** Doing so will match the evaporators fans to the demand of the system. → **For forklift accessible cold rooms:** Install a dehumidifying airlock to reduce ice build-up and the need for defrosting. → **Invest in sliding doors:** When purchasing or replacing a cold room, choose sliding door entry. These have better seals and are less prone to damage.

(4) https://gov.uk/understanding-food-labelling

4.2.3. Compressors

The average manufacturer changes air compressors every 7-10 years, meaning that the initial capital expenditure is only a fraction of how much the compressor will cost in total.

Did you know?

- For every degree that temperature lift is reduced, you will save around 4% of the compressor energy for chill temperature systems and 2% for low temperature systems.
- A typical condensing temperature in a refrigeration system is 40°C all year round. Setting this to float down to 20°C when the weather allows, would typically reduce compressor energy consumption by 25% to 35% for a chill temperature system.

When looking at reducing energy usage at your food manufacturing site, consider the following:

Are compressors located effectively?	→ Make sure the initial air temperature in the location is cool. Air compressors generate their own heat, which means additional heat can cause your machine to overheat and shut down. → Avoid installing compressors in areas higher than 40ºc. Compressors should be located in spaces where there is good air circulation and ventilation to ensure they operate efficiently.
Checking and maintaining your compressors regularly	→ Refrigerant loss is a major cause of direct emissions and system inefficiency. Undercharged systems need to operate for longer to achieve the same cooling capacity, reducing efficiency and putting strain on the system. Systems should be cleaned regularly as part of servicing schedules.
Making use of variable speed drives (VSDs)	→ Production processes often have varying demand levels, causing the compressor to run off-load or idle. Great savings can be made if a fixed speed compressor can be replaced by a VSD as it only produces compressed air as and when required. A VSD compressor saves an average of 35% of energy usage. They can be retrofitted to existing units or new compressor packs can be bought that include variable speed drives.

4.2.4. Heat Recovery

Refrigeration systems produce a lot of heat which is usually 'dumped' externally and lost. Some, or all, of the heat generated by refrigeration systems can be recovered and used elsewhere on site to reduce heating bills associated with space heating, heating for food manufacturing processes and/or for hot water. Consider conducting a walkaround assessment to identify any potential areas for heat recovery from your refrigeration systems.

Heat available from typical refrigeration systems:

- → Up to 10% at 50 – 60°C: Hot water / thermal processes.
- → Remainder at 20-30°C: Supporting space heating / underfloor heating.
- → Heat pumps can be used to boost temperatures by design.

4.2.5. Lighting

Proper lighting is essential for health and safety, but food manufacturers should consider the following to enhance lighting efficiency.

- → **Switch off policy:** Encourage everyone to switch off lighting in areas of low occupancy (for example, offices, storage areas and corridors).
- → Maximise use of natural daylight by **installing photocell control** to turn off lighting.
- → **Upgrade to more efficient lighting:** Replace tungsten light bulbs with light emitting diode (LED) bulbs to achieve up to 80% cost savings. LEDs have the added benefit of longer lifespan, providing additional savings in reduced replacement costs.
- → **Maintenance:** Ensure lighting systems including the lamp and automatic sensors are cleaned regularly to remove dust and other debris which will reduce their effectiveness.
- → **Replace flickering, failed or blown lamps:** These continue to consume energy so remove or replace them immediately.
- → **Occupancy and daylight sensors:** Automatic sensors can achieve savings of 30% to 50% on lighting costs and energy consumption. They are particularly handy in stock rooms, toilets and zoned areas such as areas with skylights and good levels of daylight.

4.2.6. Heating, Ventilation and Air Conditioning (HVAC)

Heating, ventilation, and cooling systems can contribute to significant energy usage in the food manufacturing sector. Here are some quick wins for energy efficiency in each of these areas.

4.2.7. Heating

Space heating management	→ Do you know the recommended temperature for different areas of your site? Check your thermostat for each area to ensure you are not heating spaces higher than you need to. → Do you have zoning in place? Space heating systems can be zoned into appropriate areas (for example, offices, corridors, and production). Timing and temperatures can be optimised for areas that may be less frequently inhabited. → Keep boilers in good condition to ensure maximum efficiency. Leaks and equipment damage make boilers work harder than needed.
Insulation	→ All hot process pipework should be insulated to reduce heat loss. Foil-backed pipe insulation is highly effective and can reduce heat loss by more than 90%. → Valves and pipe fittings lose more heat than pipes due to high surface areas. Consider targeting these areas as a priority.
Heat recovery	→ There may be many areas on site where lost heat could be recovered. Consider whether you could capture heat from: ventilation systems, air compressors, refrigeration systems, steam vents or hot water drains.

4.3 Renewables

Switching to renewable energy can help improve your site's environmental performance by reducing carbon emissions.

Consider various renewable sources based on your budget, energy demands, location and operations.

The renewable options include:

Solar Photovoltaic (PV)	Solar PV panels generate electricity from sunlight and can help reduce grid electricity consumption and carbon emissions. The suitability of a system will depend on factors such as available space, orientation, shading and energy demand.
Solar thermal	Solar thermal panels are highly efficient for heating water and require less surface area and light than solar PV. Regular maintenance is essential for smooth operation.
Heat pumps	Consider installing heat pump water heaters, which extract heat from the surrounding air to heat water. Heat pump water heaters are highly energy-efficient and can provide significant savings compared to traditional electric water heaters.
Wind turbines	These large and heavy structures require a structurally sound ground foundation, as they exert significant force. Turbines generate noise and require optimum wind speeds to operate efficiently. Planning permission will also be required which can limit opportunities in more urban areas.
Battery storage	Can be used to store excess renewables energy from solar and wind during low consumption periods.
Biomass	Biomass boilers can replace oil, gas, and other fossil fuels to provide heating for buildings, water, and other process heat demands. Space and cost of fuel are key considerations.

Section 5

Transport Sustainability

The transport used across your business activities both on site and the outbound transportation of food and drink products can have a significant impact on your environmental footprint. Food manufacturing operations often require heavy duty fuel intensive vehicles, designed to carry large and heavy loads.

Ensuring transport is used as efficiently as possible has the potential to generate significant environmental and financial savings.

Consider the following measures for improved efficiency in your own fleet or indirectly through contractual agreements with external transport partners and distributors:

Vehicle efficiency	→ Look for vehicles with excellent fuel economy and low CO^2 emissions. → Larger, heavier vehicles will generally be less fuel efficient, so consider vehicle size and aim for the smallest appropriate vehicle for the operation. → Speed limiters can improve fuel efficiency. → Use of stop start technology reduces fuel consumption from idling.
Fuel management	→ Monitoring fuel management is considered best practice. Fuel consumption can be tracked through fuel card invoices or employee expense claims. → Telematics software is increasingly being used to accurately collect fuel use data within vehicle fleets. It can provide operators with information such as location, speed, engine diagnostics and driver behaviour.
Replacing inefficient vehicles	→ Data such as mileage, fuel efficiency, disposal costs, salvage value, expected maintenance costs and fuel cost estimates, can all be used to calculate the optimal replacement time for older vehicles. → Setting key performance indicators can highlight when vehicles are past their peak performance. → Leasing can be a useful option for fleet operators who wish to replace vehicles during optimal windows. → Some consultancy expertise may prove useful to assess which routes are viable for electric vehicles.
Driver training	→ Poor driving behaviours such as speeding, frequent braking, and idling are strongly associated with inefficient fuel consumption, contributing to higher fuel and maintenance costs. Sustainable driving awareness training could be offered during fresh start induction sessions or employee refresher sessions. Topics may include: 1. Accelerating only when necessary. 2. Going downhill and slowing down present opportunities to activate the fuel cut-off switch by removing the foot from the accelerator at the earliest opportunity and remaining in gear as the vehicle travels, reducing fuel flow. 3. Early gear changing: The higher the gear (relative to the desired speed), the lower the revolutions per minute (RPM), the better the fuel economy. Moving to a higher gear earlier can help reduce fuel consumption.

Going electric / using alternative fuels	→ Different options have emerged over the last few decades. Multiple models of electric and hybrid vehicles are now available and hydrogen is seen as a longer-term option. → Electric (EV), battery powered electric (BEV) and plug-in hybrid (PHEV) trucks are becoming more popular amongst urban operators. → Increasingly, a 'sustainable last mile strategy' is being adopted by some firms, whereby cargo is delivered to local fulfilment centres such as a smaller warehouse, upon which a lower-carbon vehicle (for example, a bicycle, motorbike, EV or E-van) completes the final delivery to customer homes. → Alternative fuels such as hydro-treated vegetable oil (HVO) and bio-gas have offered lower emission fuel alternatives for internal combustion engines. These can often be used as drop-in replacements for diesel and can have up to 96% less carbon emissions.



Section 6

Sustainability in Water and Wastewater

The food and drink sectors have a high demand for fresh water. In addition to agriculture, significant water use in the food industry includes the cleaning of processing equipment, plants and food products.

Understanding where and how water is used in your business on a quantifiable basis will help manage water usage:

Facts to consider when developing a water profile for daily usage:

- → Is water being used unnecessarily during out-of-hours?
- → Does water use reduce during breaks?
- → Are employees leaving water equipment on?
- → Are there irregular spikes in water usage?

6.1 Water Saving Techniques for Food Manufacturing Processes

Below are some examples of water saving techniques:

Clean-in-Place (CIP) systems	Clean-in-Place (CIP) systems can achieve significant savings through the more efficient in-situ cleaning of pipes, tanks, and other process equipment. This technology is generally used in businesses that regularly clean food preparation/mixing vessels, pipework, and fittings. A good CIP system saves water and has other benefits like reduced use of cleaning chemicals, lower energy and labour costs, and the ability to recover and reuse food ingredients.
Flow controllers	A lot of food manufacturing equipment requires pre-set water flow rates to operate effectively. Equipment often wastes water due to pressure fluctuations, operator interference, or poorly designed control systems. The use of in-line process control or flow limiting technology can minimise water wastage. Consider installing process control devices or flow limiting devices to limit water usage.
Nozzle and spray technology	New advanced nozzle and spray device technology can reduce water use. Nozzle configurations include flat spray, hollow cone and full cone. The nozzle configuration should be matched to process requirement as well as considering nozzle parameters (for example, flow rate, spray pattern, physical and chemical properties of material to be rinsed, spray impact and droplet size). For existing nozzle systems, ensure they are well maintained as blocked nozzles can result in increased water use.
Rainwater harvesting equipment	Increased mains water charges and increasing water supply risks have led to renewed interest in a wide range of technologies for the collection, storage, and treatment of rainwater. Rainwater can be useful in non-potable applications such as cooling and cleaning. Rainwater harvesting equipment has collection, storage, pumping, control and treatment system(s) which can reduce demand for mains water and in turn save money.

Leakage detection equipment	Due to the complex and inaccessible nature of a water distribution network, it is often difficult to identify leakage without the help of leakage detection equipment. Several technologies exist for logging data, monitoring systems, and identifying inconsistencies that may indicate leakage in your water distribution network.
Industrial cleaning equipment	Alternative cleaning equipment can reduce the need for water. For example, scrubber/driers operate by recovering dirty wash water from the floor surface, processing it and then reusing it with dirty effluents stored in a reservoir in the machine. Steam cleaners use high temperature steam to sterilise an area and can kill bacteria and breakdown grease without the need for chemicals.



Section 7

Packaging

Consider the packaging used for your food or drink product. Different packaging materials have different properties which can make them more or less effective for protecting and transporting specific products. The UK Government's 2023 Environmental Improvement Plan set a target to ensure that residual municipal plastic waste does not exceed 42 kg per capita annually, by 31 January 2028. This is equivalent to a 45% reduction from 2019 levels.[5] Additionally, the Plastic Packaging Tax (PPT), effective from April 2022, may apply to those who have manufactured or imported ten or more tonnes of plastic packaging in the last 12 months. Further policy proposals that are in place but yet to be introduced are: a deposit return scheme, simplified recycling collections, and revisiting the existing extended producer responsibility (EPR) scheme.[6]To help you assess if you are using the most effective packaging type for your product, consider these areas:

Material sourcing	→ What type of material is it? → Where is it produced / supplied from? → Is it produced sustainably (e.g. FSC cardboard, made from recycled plastic)? → Is your packaging made from a renewable source? → Can the packaging be sourced with increased quantities of certified recycled materials?
Company policy and awareness	→ Commit to a packaging policy which will influence any decisions made regarding changes to packaging type or materials. → Train employees to identify the value of packaging, where it is, if it is necessary and to operate equipment applying it efficiently.
Functionality and design	→ Can you switch to a more sustainable material without impacting packaging functionality? → How does the weight and size of your packaging impact outbound transportation? → Can your packaging be made smaller to fit more products into a delivery load? → Can you redesign packaging to reduce the number of materials used while maintaining product protection and quality levels?
Minimising packaging	→ Supplier agreements: Partner with suppliers to introduce returnable packaging upstream. → Lightweight packaging elements: Reduce plastic film thickness on paper and board products. → Identify and eliminate causes of defects in the packaging of raw materials and finished goods. → Optimise the thickness of pallet wrap for the weight of the load. → Train employees to use palletisation machines effectively to improve cycle rate, reduce rework and reduce resource use.

(5) Source: https://commonslibrary.parliament.uk/research-briefings/cbp-8515/

(6) Source: www.gov.uk/guidance/check-if-you-need-to-register-for-plastic-packaging-tax

Disposal	→ Can your packaging be reused? Introduce returnable secondary or tertiary packaging. → Is your packaging recyclable? Design plastic linings or windows so that they can be easily removed from the carcass of the pack to improve purity of waste streams. → Are sustainable disposable methods labelled on the packaging? Make recycling information more salient on packaging to improve waste management.



Section 8

Waste Management

8.1 The Food Waste Hierarchy

There are a variety of streams to manage waste in a food and drink environment, however, the focus is on minimising food waste.

A starting point for any business might be to set food waste reduction targets for the business and measure the waste in a consistent way before taking actions to reduce food waste.

The food and drink waste hierarchy, below, sets out steps for dealing with food waste and surplus to minimise the impact on the environment and maximise the potential of unavoidable food waste. Identifying opportunities that will prevent food and drink waste from occurring should come first, before considering recycling and recovery options.

Most preferable option

Least preferable option

Prevention	• Avoid surplus food generation throughout food production & consumption. • Prevent food waste generation throughout the food supply chain.
Re-use (Human consumption)	• Re-use surplus food for human consumption through redistribution networks and food banks while respecting safety and hygiene norms.
Re-use (Animal feed)	• Feed use of certain food no longer intended for human consumption.
Re-use (By-products) **Recycle** (Food waste)	• Revalorise: i) by-products from food processing and ii) food waste into added-value products by processes that keep the high value of the molecule bonds of the material.
Recycle (Nutrients recovery)	• Recovery of substances contained in Food Waste for low added-value uses such as composting, digestate from anaerobic digestion, etc.
Recovery (Energy)	• Incineration of Food Waste with energy recovery.
Disposal	• Waste incinerated without energy recovery. • Waste sent to landfill. • Waste ingredient/product for sewage disposal.

Examples of food waste measures to consider are outlined below:

Material sourcing	Procurement agreements: Early engagement with suppliers to identify opportunities to reduce or eliminate incoming produce that is not required by your process.
	Grade produce on acceptance as effective. Grading allows more time for redirection to other users.
	Plan production to reduce opportunities for waste such as: → Make to stock rather than make to order if possible. → Just in time production to extend shelf life. → Reduce the number of changeovers where possible.
	Employ lean-based thinking, such as redirecting a production line to reduce the distance to the chiller, as this may reduce the potential for spillage or contamination.
	Resize portions to match the average weight of cuts of meat or fish and prevent offcuts.
	Reduce changeovers such as increasing length runs or reducing the number of stock keeping units (SKU's) can reduce the amount of waste from the start and end of production runs.
	Include potential wastes under hygiene control systems as this preserves the opportunity for them to be reused or redistributed as by-product. If this is not controlled, they can only be waste.
	Conserve surplus production by chilling or freezing surplus to allow it to be introduced into future production runs if appropriate for your products.
	Internal traceability: by capturing and using data about product journeys, you can unlock previously discarded material to be used, e.g. ingredients in damaged packaging are assessed in a segregated area and if necessary or possible, reworked before going into production.
	Manage and service equipment: Operational availability, quality and efficiency may be increased by an enhanced service schedule, or by quickly remediating faults or realigning interfaces between different pieces of equipment.
	Modify equipment (where safe to do so) to be more easily serviceable. For example, chutes that can be rotated to make blockages easier to clear allowing product to be recovered.
	Install catch-plates and belt guards under and around equipment to intercept product that may be ejected from the production line.
	Place filters at drain points for any water-mediated process, such as gutting fish. These materials may be reused to an internal product depending on hazard analysis and critical control point (HACCP) systems and regulations or if not can be more efficiently salvaged for redistribution or recovery.
	Anticipate seasonality: Quality rejects for many fruits and vegetables increase substantially towards the beginning and end of the growing season. Whilst this may not be avoidable, it can be accounted for in production planning and preparation made to maximise value.
	Modified atmosphere packaging can help to extend the shelf life of certain products.
Redistribution	Donate for human consumption: Edible food waste such as quality rejects for aesthetics or short date unfilled orders can be redistributed to organisations such as FoodCloud.
	Donate for animal consumption: Noting that this may require registration as a feed supplier.
Recovery	New product design: Create new products from ingredients previously considered waste.
	Make into other products such as feedstock for another process, for example surplus or quality fail bread could be a feedstock for a microbrewery.
	De-packaging systems: Final product that fails quality inspection is removed from packaging before disposal, allowing better recovery of the individual elements.
	Waste controls: Colour coding bins helps keep wastes separate and increases the opportunity for recovery.
Disposal	Collaborate with contractors to identify opportunities and different disposal routes and opportunities, for example moving up the waste hierarchy such as from incineration to recycling or reuse of waste.
	Anaerobic digestion: The organic content of the waste is recovered into a soil additive in a large reactor that captures methane and heat to generate electricity.
	Composting: The organic content of the waste is recovered into a soil additive.
	Land spreading: Some liquid wastes can be spread directly to land where they add nutrients to the soil.
	Waste management groups: Outside large cities the waste management options may be limited, but businesses working together may be able to drive the development of new services or offer a viable collection route to another contractor.





FoodCloud is a registered Irish charity that tackles the twin issues of food waste and food insecurity by redistributing surplus food from food businesses to community groups.

FoodCloud collaborates with leading retailers, food companies, non-profit organisations, government and the wider business community using surplus food to build resilience in all types of communities, driving progress towards a circular economy for our food systems.

Across 6 markets, since 2013 up to the end of H1 2024, FoodCloud redistributed more than 317 million meals, that is 133,277 tonnes of surplus food redistributed, to over 7,000 charities nationally and internationally, saving approximately 404,599 tonnes of CO_2-equivalent emissions from going to waste.

8.2 Other Waste Streams

General Waste

Typically, general waste is considered any waste that is disposed of in a mixed waste bin that cannot be segregated for recycling, is non-hazardous and not food waste.

Examples can include personal protective equipment and food hygiene materials such as gloves, hairnets, boot covers, food contaminated plastics, among others.

Regular audits of general waste bins will improve recycling rates by identifying sources of poor segregation and challenging this behaviour.

Using transparent bin bags on operational floors helps identify opportunities as will two-way communication with employees to generate ideas on a regular basis.

Packaging Waste

Consider if efficiencies can be made:

- By purchasing in bulk, larger order quantities often mean that more units can be delivered in the same volume of packaging.
- By returning packaging to the supplier for reuse.
- By reusing inbound packaging internally.
- Selection of more sustainable packaging materials such as renewable materials, recycled content.

8.3 Circular Economy

The circular economy is an economic model that is restorative and regenerative by design.

The circular economy aims to keep materials, components, and products in-use in the economy for as long as possible.

In circularity, the key objective is to design consumption and production systems to create and retain value. Key areas that could be tackled in a circular economy plan are; plastics; textiles; food; water and nutrients; construction and building; electronics; batteries and vehicles.

Re-framing waste as a resource could also support food manufacturers' move up the waste hierarchy and improve their environmental impact. Consider if you could adapt your current practices to more circular ones by exploring your wasted resources:

- Is there a need for it to be used at all?
- Is it possible to recover and reuse it?
- Is it possible to use this as a resource within your current product?
- Is it possible to use it to create another product?
- Can another company use it instead of wasting it? Or can you use their waste instead of new materials?
- Can it be a part of a take-back scheme to keep items in circulation?

Section 9

Social Sustainability

Social sustainability is becoming increasingly part of the discussion when businesses look to set sustainability targets. Key points to consider include:

9.1 Employee Wellbeing

- Depending on your business size and progress with diversity, equality and inclusion (DEI), you may plan to start some simple actions considering the focus areas below or creating a DEI strategy.
- Prioritise the well-being of your employees by providing fair wages, safe working conditions, and opportunities for professional development.
- Implement policies that promote work-life balance, mental health support, and inclusivity within the workplace.
- Promote diversity and inclusion within your workforce, reflecting the demographics of the community.

9.2 Community Engagement

Community Engagement is about considering your wider stakeholders in the local community and those communities where your business operations interact with internationally such as your suppliers or customers.

- Establish partnerships with local community organisations to support initiatives that address social issues, such as poverty, education, and health.
- Contribute to community development projects, leveraging resources to positively impact the areas surrounding business premises.
- Educate customers about sustainable choices, offering information on healthy products, and providing incentives for making environmentally and socially responsible purchases.
- Empower consumers with the knowledge and tools to make informed decisions, fostering a sense of responsibility and consciousness about their shopping and eating habits.

9.3 Charitable Initiatives

- Engage in charitable initiatives and events that align with your company's values, contributing to social causes and reinforcing your commitment to community betterment.

Section 10

Biodiversity

The importance of biodiversity is increasingly gaining traction at a global level. The UK has published its Blueprint for Halting and Reversing Biodiversity Loss: the UK's National Biodiversity Strategy and Action Plan for 2030.(7)

The food production industry is well positioned to foster sustainability by consumption and to support the protection of biodiversity.

Consider the following points for integrating biodiversity into a sustainability strategy for your business.

- Trees and woodland planting.
- Orchards planting.
- Hedgerow planting.
- Riparian / River fencing.
- Bird boxes and bat boxes.
- Hedgerow fencing and nest boxes.
- Green roofs.
- Bee banks, bug hotels.
- Wildflower meadows.
- Ponds.
- Peatland restoration.

After selecting your focus, conduct a baseline survey for annual comparison to track project or site improvement.



(7) Source: https://www.gov.uk/government/publications/uk-national-biodiversity-strategy-and-action-plan

Section 11

Additional Resources

Click the links below to explore funding opportunities and resources.

- **AIB Green Living Business Hub** contains support and guidance to help businesses become more sustainable.

  Steps to Sustainability

- **Agricultural Industries** Confederation provides an assurance system to ensure that feed destined for UK livestock meets safety requirements defined by legislators and industry

  Homepage | Agricultural Industries

- **FoodCloud** is a social enterprise with a mission to transform surplus food into opportunities to make the world a kinder place.

  FoodCloud: Hungry for a kinder world

- **The Food and Drink Federation** is the voice of the food and drink manufacturing industry and sets out the sector's important role in tackling sustainability issues through its Ambition 2030 strategy

  Homepage | FDF Ambition 2030

- **The Greenhouse Gas Protocol** provides standards and tools that help countries and cities track progress toward climate goals.

  Homepage | GHG Protocol



Notes



Arthian are a leading independent sustainability, engineering, planning and safety consultancy with offices throughout Ireland and the UK.

www.arthian.com

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