Future-Fit
Business Benchmark

Action Guide

BE06

Operations emit no greenhouse gases

Release 2.2

Future-Fit
Foundation

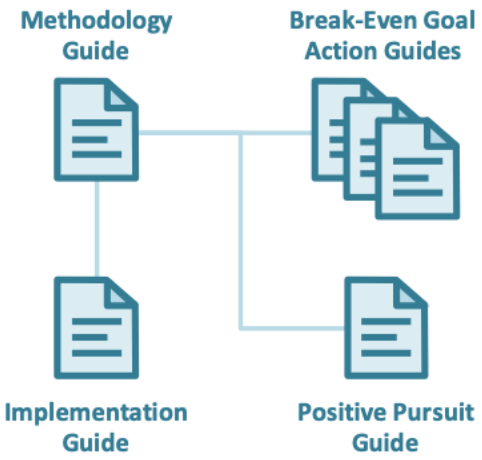
About this document

This document forms part of Release 2.2 of the Future-Fit Business Benchmark.

Action Guide

This document is an Action Guide, offering specific guidance on how to pursue future-fitness with respect to a particular aspect of the business.

The text is written to be accessible to a general business audience: no academic or technical knowledge about systems science, sustainability practices, or other specialist topics is assumed.



Documents included in Release 2.2

Methodology Guide

The scientific foundations and concepts underpinning the Benchmark, together with details of its key components and how they were derived.

Break-Even Goal Action Guides

Guidance on how to transform business operations, procurement practices, and products in pursuit of future-fitness. There is one Action Guide for each of the 23 Break-Even Goals.

Positive Pursuit Guide

The kinds of activities that any business may undertake – above and beyond its pursuit of Break-Even – to speed up society's transition to future-fitness.

Implementation Guide

Supplementary guidance on how to begin pursuing future-fitness and how to assess, report on and assure progress.

All Release 2.2 documents are available for download here.

Contents

Goal BE06

Operations emit no greenhouse gases

1. Ambition

A Future-Fit Business emits net zero GHGs as a result of its own operational activities, including energy it consumes.

1.1 What this goal means

There is no longer any doubt that the systematically increasing concentration of greenhouse gases (GHGs) in the atmosphere resulting from combustion and other human-caused processes is contributing to climate change and ocean acidification. Companies should respond accordingly, to ensure that their operations cause no GHG emissions.

Nature can safely absorb some human-made GHGs every year, but the Future-Fit imperative is for companies to eliminate all operational GHG emissions. That's because we are dangerously close to reaching atmospheric GHG levels that will be catastrophic for society, and any attempt to divide up the remaining carbon budget across companies is likely to be too complex, contentious and/or time-consuming to result in the scale and speed of reduction that is now needed.

To be Future-Fit, a company must emit net zero GHGs as a result of its own operational activities and its energy consumption. Net GHG emissions here means total GHG emissions, less any emissions that are permanently sequestered or adequately offset.

1.2 Why this goal is needed

As with all Future-Fit Break-Even Goals, a company must reach this goal to ensure that it is doing nothing to undermine society's progress toward an environmentally restorative, socially just, and economically inclusive future. To find out more about how these goals were derived based on 30+ years of systems science, see the **Methodology Guide**.

These statistics help to illustrate why it is critical for all companies to reach this goal:

- **Current GHG levels are at the highest levels the planet has seen in millions of years, with potentially catastrophic consequences.** In 2015, CO_2 levels passed 400ppm,

more than 40% higher than its pre-industrial value of 280ppm and a level that has not existed on Earth for several million years. [1]

- **Corporate action to eliminate GHG emissions could have a huge impact on the fight against climate change.** Just 100 companies have been the source of more than 70% of the world's GHG emissions since 1988. [2]
- **It is possible to grow the economy while reducing emissions.** In 2016 the global economy grew by 3.1%, but CO_2 emissions from energy generation remained unchanged. CO_2 emissions in Europe, the United States, and China also fell. [3]

1.3 How this goal contributes to the SDGs

The UN Sustainable Development Goals (SDGs) are a collective response to the world's greatest systemic challenges, so they are naturally interconnected. Any given action may impact some SDGs directly, and others via knock-on effects. A Future-Fit Business can be sure that it is helping – and in no way hindering – progress towards the SDGs.

Companies may contribute to several SDGs by eliminating operational greenhouse gas emissions, and actively encouraging their suppliers to do the same. But the most direct links with respect to this goal are:

Support efforts to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters, and to integrate climate change measures into company policies, strategy and planning.

1.4 Related goals

The purpose of this section is to help clarify the scope for this goal. It will help you understand which issues are covered by this goal, and where other goals apply instead.

- **Procurement safeguards the pursuit of future-fitness:** The *Operational GHGs* goal addresses emissions generated by the company, either directly or from energy it purchases. GHGs emitted by suppliers are not covered by this goal, but instead are a factor in determining the fitness of the company's supply chains, and are therefore covered by the *Procurement* goal.
- **Operational emissions do not harm people or the environment:** Emissions from operational activities of non-GHG substances are covered by the *Operational emissions* goal.
- **Products emit no greenhouse gases:** The *Operational GHGs* goal covers GHG emissions from operational activities. GHGs emitted (or likely to be emitted) through the use of a company's products are covered by the *Product GHGs* goal.

2. Action

2.1 Getting started

Background information

Regardless of sector, all businesses contribute to the increasing concentration of GHG emissions, if only through their use of energy and reliance on global transport networks which are powered predominantly by fossil fuels.

Companies can start on the journey towards future-fitness by examining their operations to identify all potential sources of GHG emissions across Scope 1 and Scope 2 [4] and to understand any potential challenges in gathering information. This will enable the business to start measuring and managing its GHG emissions, from identifying problematic processes and implementing efficiency improvements, through to off-grid renewable energy generation, GHG sequestration and avoidance.

Questions to ask

These questions should help you identify what information to gather.

Where do the company's GHG emissions come from?

- Which Scope makes up the greatest proportion of emissions? What activities do these emissions originate from?
- Is the company aware of the GHG emissions profile for each of the sites it controls? Have mobile assets and operations (e.g. transport fleets, sales or service divisions that work from client facilities) been assessed?
- Sources of GHG emissions may include, but are not limited to the following:
    - Combustion in owned or controlled stationary sources such as boilers or furnaces.
    - Emissions from the manufacturing or processing of chemicals and materials including but not limited to cement, aluminium, and waste processing.
    - Combustion in mobile sources such as trucks, trains, ships, and airplanes resulting from the transportation of materials, products, waste and employees.
    - Fugitive emissions resulting from intentional or unintentional releases, including equipment leaks, methane emissions from coal mines and venting, HFC emissions resulting from refrigeration and cooling, and methane leakage from gas pipelines.
    - Emissions arising from its consumption of electricity, including those which come from the generation of purchased electricity that is consumed during transmission and distribution. [4]

Does the company have a formal approach to measuring and managing GHG emissions?

- Does the company have internal controls set up to continuously measure and manage its GHG emissions?
- Does the company regularly project its future GHG emissions profile, based on business plans and historical data?

Does the company have a strategy to reduce its GHGs?

- Has any public commitment been made, committing the company to reduce GHG emissions or achieve carbon neutrality? If so, what progress has been made thus far and what steps are already in place to meet these targets?
- Has the company investigated implementing efficiency measures to reduce GHG emissions? If so, what steps need to be taken to implement such measures? Could these measures inadvertently undermine future progress (e.g. investing in efficient petrol cars may tie up capital and postpone a shift to zero-emission electric vehicles)?

How to prioritize

These questions should help you identify and prioritize actions for improvement.

Where are the biggest opportunities to reduce GHG emissions?

- Which aspects of the company's operations emit the most GHGs? Minor changes to these activities might result in relatively large improvements.
- Have the company's distribution systems been reviewed in the context of GHG emissions? If so, are there low-carbon alternatives available? What effect would switching to lower-emission alternatives have on costs and/or lead times?

A note on greenhouse gases

The IPCC has identified seven major GHGs that account for the vast majority of human-caused climate change. Countries that have signed up to the Kyoto Protocol are responsible for reporting on emissions of these gases at a minimum. When starting to assess their operations, companies might start with these gases as they are the most globally significant, and will help companies align with global reporting expectations.

Which actions can the company implement with the lowest investments of time and resources?

- Could any business processes be adapted or changed without significant capital outlays or major training requirements for employees?
- Does the company have the expertise needed to make progress without external assistance? Are there processes or techniques being used in one part of the company

that could be applied more broadly? Are there industry best practices, or other proven methods that can be applied to the company's own operations?

- Which sites does the company control? If the company leases certain facilities, does it have influence over the consumption of energy (to reduce Scope 2 emissions) in those locations?
- Are there locations that fall under legal emissions trading schemes (e.g. EU Emissions Trading Scheme, Regional Greenhous Gas Initiative, California Air Resources Board Cap-and-Trade)?
- Are any locations subject to the risk of penalties due to incoming GHG regulations (e.g. European Union climate commitments under the 2050 Energy Strategy)?

Could the company find ways to *exceed* the requirements of this goal?

- Beyond what is required to reach this goal, is the company able to do anything to ensure that *the environment is free from pollution*? [1] Any such activity can speed up society's progress to future-fitness. For further details see the **Positive Pursuit Guide**.

The next section describes the fitness criteria needed to tell whether a specific action will result in progress toward future-fitness.

2.2 Pursuing future-fitness

Introduction

Fitness must be assessed on the basis of total GHGs emitted throughout the reporting period. This includes usage from any company-controlled building, mobile asset (including transport fleets), or service department that emits GHGs. Note that in cases where emissions occur away from a fixed site, it may be appropriate to evaluate this aspect of operations separately (e.g. off-site construction or maintenance crews that rely on local electricity grids, or that use fossil fuel-powered generators).

Guidance on identifying GHG emission types

To be Future-Fit, a company must eliminate all GHG emissions that result from the following:[2]

- Direct GHG emissions that occur from both stationary and mobile sources owned or controlled by the company (Scope 1 emissions).
- GHG emissions from energy (electricity, steam, heating or cooling) consumed by the company (Scope 2 emissions). [5]

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[1] This is one of the eight Properties of a Future-Fit Society – for more details see the **Methodology Guide**.
[2] Some companies may be unsure whether to capture a specific source of GHG emissions here, or via goal **BE18: Products emit no greenhouse gases** (e.g. a construction company which operates GHG-emitting machinery when undertaking building work). Where such uncertainties arise, see *Differentiating between operational and product-related impacts* in the **Implementation Guide**.

Guidance on calculating total GHGs

For each operational activity that generates GHG emissions, the company should convert the amounts emitted into tonnes of CO_2 equivalent (tCO_2e) to enable summation.[3] Throughout this calculation, companies must document the following:

- The boundary selected for the inventory.
- The name of the standard, protocol or methodology used to collect activity data and calculate Scope 1 and Scope 2 emissions.
- The source for the Global Warming Potential (GWP) values used to convert figures into a consistent format (see Guidance on global warming potentials below).
- Any emission factors[4] applied and their origin.
- Any uncertainty arising out of the collection process.
- Status of verification and/or assurance.

Note that the Greenhouse Gas Protocol offers information on how to define the reporting boundary for the company, and how to handle incomplete data when reporting greenhouse gas emissions.

Guidance on selecting a methodology

While the Greenhouse Gas Protocol is the most widely-used methodology for calculating emissions, many other methodologies exist and can be helpful in different situations. The CDP has identified a long list of methodologies and incorporated them within its Climate Change Reporting Guidance. [6, p. 95]

Note that established methodologies differ on how to quantify and report on Scope 2 emissions. For more information on the approach that must be taken to meet this goal see Guidance on assessing Scope 2 emissions.

Guidance on global warming potentials

The Greenhouse Gas Protocol defines a global warming potential as "*a factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO_2*". [5] Global warming potentials are used to calculate the CO_2 equivalent of different GHGs. Consistent with the Greenhouse Gas Protocol, for the purpose of this assessment, companies must use the 100-year GWP values from the latest IPCC Assessment Report.[5]

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[3] For information on how to do this see, for example, the conversion tables at platts.com.
[4] An emission factor can be defined as "the average emission rate of a given GHG for a given source, relative to units of activity". [25] Examples include kg CO_2e per kilometre driven, or kg CO_2e per kWh generated.
[5] The latest GWP tables are available via the IPCC website and the GHG Protocol website. Companies are encouraged to draw all of their GWP values from the same Assessment Report version, wherever possible. Companies should also note that regulation in certain countries may require alignment with a specific IPCC Assessment Report version.

As an example, the latest IPCC Assessment Report, AR5, highlights that the global warming potential of one unit of methane (CH_4) over 100 years is 28 times greater than that of one unit of CO_2. Hence methane's GWP is set at 28. Carbon dioxide has a GWP of 1, as it is the standard against which all other GHGs are measured.

Guidance on emission factors

As noted in the Greenhouse Gas Protocol, *"direct measurement of GHG emissions by monitoring concentration and flow rate is not common"*. [4, p. 42] Normally, direct measurement takes place only in facilities with Continuous Emission Monitoring Systems (CEMS), such as power plants. Instead of direct measurement, many companies calculate GHG emissions by applying documented emission factors to activity data (e.g. tonnes of coal consumed or cubic meters of natural gas burnt).

Identifying the right emission factors is challenging, and depends on the specific materials and processes involved. As an example, emissions from diesel generators vary depending on the type of diesel combusted and the type of generator being used.

Where questions exist, companies should refer to emission factors published by official government bodies, including the EPA in the US, the Department for Environment, Food & Rural Affairs (DEFRA) in the UK and the IEA internationally.

Guidance on 'uncertainty'

Even if a company has been measuring its GHG emissions for a number of years, there will always be some sources of imprecision in the data. These are referred to as 'uncertainties'[6] and they can arise in various ways, including from missing data, collection issues, metering constraints, equipment shortcomings, imprecise emission factors, or limitations in data management systems. These are generally categorized as either *scientific* uncertainties (arising from a lack of precise information regarding the processes generating the emissions) and *estimation* uncertainties (inaccuracies in the way information is gathered and used to calculate the emissions).

Uncertainties cannot be fully eliminated, but companies should be aware of these limitations and seek to identify and disclose any sources of uncertainty to information users. For more detailed information, see the Greenhouse Gas Protocol's guidance.

Guidance on assessing Scope 2 emissions

When determining the mix of purchased energy used to power a company's operations, companies must use a *location-based method*.

Location-based methods use the average proportion of energy sources of grids from which energy consumption occurs (e.g. regional energy mix data, or national average energy mix data). National energy mix estimates can often be found on government

[6] See the *Definitions* section for a detailed description of this term.

websites. This location-based method is likely to provide the most accurate estimate of the GHG emissions that occur as a consequence of a company's activities.

Why is a market-based estimation approach not permissible?

The market-based method of estimating GHG emissions applies emission factors based upon the financial contracts a company has for *purchasing* electricity (and not the emission factors of the electricity which is actually *supplied* to them). This permits a company using unbundled Renewable Energy Certificates (RECs)[7] or other contractual arrangements to claim its electricity consumption does not cause any GHG emissions – and thereby report that is has reduced emissions.

A core assumption that underlies the 'acceptability' of using RECs to reduce Scope 2 GHG emissions is that the aggregate demand for RECs will increase investment in more renewable energy generation, thereby displacing demand for GHG-intensive energy (i.e. from fossil fuels). However, this assumption does *not* hold up in practice.[8] [7] [8] [9]

Guidance on offsetting GHG emissions

A company can take steps to 'cancel out' its emissions, either by enabling others to avoid GHG emissions, or by capturing GHGs from the atmosphere and sequestering them.

But a company must be able to back up any avoidance or sequestration claims with evidence that emission reductions really did occur. In contrast to common practices, it is not enough simply to rely on the purchase of so-called 'offsets' or 'carbon credits', as the market for offsets has proven highly ineffective, and often misleading. [10] [11]

If a company does want to purchase offsets as a means through which to reduce emissions, it must choose schemes whose effectiveness can be thoroughly evidenced. The Gold Standard Carbon Credit Scheme is generally regarded as a credible offset approach, and some localised carbon offset schemes have proven effective.[9] [12]

Beyond offsets, actions that genuinely lead to avoided emissions can be quantified using methods such as ISO 14064-2:2019 [13], The Greenhouse Gas Protocol for Project Accounting [14] or the GHG Protocol's Guidelines for Quantifying Reductions from Grid-Connected Electricity Projects. [15]

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[7] From the US EPA: "Unbundled Renewable Energy Certificates (RECs) refer to RECs that are sold, delivered, or purchased separately from electricity. [They] provide no physical delivery of electricity to customers and as such the customer is purchasing power from a separate entity than the one selling them the REC." [26] In contrast, a REC is *bundled* if it is sold together with the associated electricity.

[8] For more information, see the frequently asked question "*What are unbundled Renewable Energy Certificates and why are they not acceptable?*" in the Break-Even Action Guide **BE01:Energy is from renewable sources**.

[9] For more information on the acceptability of carbon offsets, see the Carbon Offset Guide.

Fitness criteria

To be Future-Fit a company must reach net zero GHG emissions across its operations.

3. Assessment

3.1 Progress indicators

The role of Future-Fit progress indicators is to reflect how far a company is on its journey toward reaching a specific goal. Progress indicators are expressed as simple percentages.

A company should always seek to assess its future-fitness across the full extent of its activities. In some circumstances this may not be possible. In such cases see the section *Assessing and reporting with incomplete data* in the **Implementation Guide**.

Assessing progress

This goal has one progress indicator. To calculate it the following steps are required:

- The company chooses a reference year for which complete GHG emissions data are available. The reference year is assigned a progress score of 0%.[10]
    - If no historic data exists, the first year measured will be used as the reference year. Until an assessment of GHG emissions has been performed, the company should designate its progress on this goal as **0%**.
- Measure GHG emissions for the current reporting period, each operational activity – including every site, mobile asset, and service department. Ensure records are kept which are sufficient to avoid double counting.
- Calculate the total GHG emissions across all activities for the reporting period.
- Calculate the company's progress as the cumulative reduction in emissions toward zero, relative to the reference year.
- If the company's current GHG emissions are *higher* than or equal to its reference year emissions, then its progress remains at 0%.
- If the company's current GHG emissions are *lower* than its reference year emissions, its progress is calculated as the percentage reduction relative to the reference year.

This can be expressed mathematically as:

[10] This step rewards companies that have a long history of gathering emissions data. Once a reference year has been chosen, it should not be changed. For further details on setting reference points see the **Implementation Guide**.

$$F = \begin{cases} \dfrac{E_R - E_C}{E_R} & for\ (E_R - E_C) \geq 0 \\ 0\% & for\ (E_R - E_C) < 0 \end{cases}$$

Where:

F	Is the progress made by the company, expressed as a percentage.
E_R	Is the level of GHG emissions in the reference year.
E_C	Is the level of GHG emissions in the current reporting period.

For an example of how this progress indicator can be calculated, see here.

3.2 Context indicators

The role of the context indicators is to provide stakeholders with the additional information needed to interpret the full extent of a company's progress.

Total amount of GHG emissions

The company must report the amount of GHG emissions generated within the reporting period, expressed in tCO_2e. Note that this value is equivalent to the value of E_C in the progress indicator formula, so no additional data or effort is required to calculate it.

For an example of how context indicators can be reported, see here.

4. Assurance

4.1 What assurance is for and why it matters

Any company pursuing future-fitness will instil more confidence among its key stakeholders (from its CEO and CFO to external investors) if it can demonstrate the quality of its Future-Fit data, and the robustness of the controls which underpin it.

This is particularly important if a company wishes to report publicly on its progress toward future-fitness, as some companies may require independent assurance before public disclosure. By having effective, well-documented controls in place, a company can help independent assurers to quickly understand how the business functions, aiding their ability to provide assurance and/or recommend improvements.

4.2 Recommendations for this goal

The following points highlight areas for attention with regard to this specific goal. Each company and reporting period is unique, so assurance engagements always vary: in any

given situation, assurers may seek to evaluate different controls and documented evidence. Users should therefore see these recommendations as an illustrative list of what may be requested, rather than an exhaustive list of what will be required.

- Document the methods used to ensure the company has identified all sources of GHG emissions (both Scope 1 and 2) at each of its locations. Describing how these were identified can help assurers to assess whether the company's approach runs the risk of failing to identify sources of GHG emissions.
- Retain any supporting documents to confirm the level and quality of carbon offsets attributable to the company within the reporting period. Assurers may use this information to verify the company's net emissions.
- Retain any supporting documentation or calculations used to determine the total amount of emissions for each mode during the year. Assurers may use this information to understand and verify the approach used.

For a more general explanation of how to design and document internal controls, see the section *Pursuing future-fitness in a systematic way* in the **Implementation Guide**.

5. Additional information

5.1 Example

ACME Inc. sells lemonade products. Its operations consist of two sites: a bottling plant and an office space. The office has always been powered by wind power and causes no GHG emissions. The company has adopted the use of the Future-Fit Business Benchmark this year. The company started measuring GHG emissions from its bottling plant in its first year of production, ten years ago (Year 0). Since then its lemonade production grew rapidly, resulting in steadily increasing emissions up until Year 4 where annual emissions peaked at a total of 1,000 tonnes CO_2e. The company therefore chooses Year 4 as its reference year.

Since then the company has managed to continue to increase production while lowering annual emissions to 800 tonnes of CO_2e – a total reduction of 200 tonnes CO_2e.

The company can now calculate its progress as:

$$F = \frac{E_R - E_C}{E_R} = \frac{1000 - 800}{1000} = 20\%$$

Context Indicator

Total amount of GHG emissions in the reporting period: 800 tCO_2e.

5.2 Definitions

Scope 1 and Scope 2 GHG emissions

The Greenhouse Gas Protocol defines Scope 1 and Scope 2 GHG emissions as follows:

***Scope 1**: Direct GHG emissions from sources owned or controlled by the company.*

***Scope 2**: GHG emissions from the generation of purchased electricity consumed by the company.*

Uncertainty

We use the definition from the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories: [16]

***Statistical definition**: An uncertainty is a parameter, associated with the result of measurement that characterises the dispersion of the values that could be reasonably attributed to the measured quantity.*

***[Emissions] inventory definition**: A general and imprecise term which refers to the lack of certainty (in inventory components) resulting from any causal factor such as unidentified sources and sinks, lack of transparency, etc.*

Major greenhouse gases

The Kyoto Protocol identifies seven major greenhouse gases: carbon dioxide (CO_2), methane (CH_4), hydrofluorocarbons (HFCs), nitrous oxide (N_2O), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), nitrogen triflouride (NF_3). [17, p. 4] These GHGs are called 'major' because they make up a large percentage of the total impact on climate caused by humans.

5.3 Useful links

The Greenhouse Gas Protocol

The Greenhouse Gas Protocol is a widely recognized accounting tool for quantifying GHG emissions.

For additional guidance on setting a baseline year for emissions, see Greenhouse Gas Protocol's Scope 2 Guidance, Chapter 9, Setting Reduction Targets and Tracking Emissions Over Time. [5]

CDP Reporting Guidance

The CDP (formerly called the Carbon Disclosure Project) Reporting Guidance is comprehensive and freely available for download from the CDP website. This guidance

offers information ranging from how to select a baseline year through to a comprehensive list of Global Warming Potentials.

Carbon Offset Guide

An initiative of the Stockholm Environment Institute and Greenhouse Gas Management Institute, the Carbon Offset Guide was launched to promote offset programs and policies that maximize potential benefits, while minimizing potential risks. It provides descriptions of different types of carbon offsets and explains their relative effectiveness.

5.4 Frequently asked questions

How does this goal relate to Greenhouse Gas Protocol Scopes?

The calculation for this goal covers all Scope 1 and Scope 2 GHG emissions relating to the company's own activities.

While the Greenhouse Gas Protocol allows companies to use both market-based data and location-based data for meeting GHG reduction targets, only the location-based approach is considered acceptable for the purpose of this goal. For more information see Guidance on assessing Scope 2 emissions.

In addition, Scope 3 emissions are covered by other Break-Even Goals as follows:

- **Procurement safeguards the pursuit of future-fitness**, which holds a company mutually accountable for all cradle-to-gate GHG emissions associated with purchased *product inputs*, as well as those caused by suppliers of any *outsourced core functions*.
- **Products emit no greenhouse gases**, which holds a company accountable for the GHGs emitted (or likely to be emitted) through the use of its products.

What about GHG emissions from livestock?

GHG emissions resulting from natural processes – such as animal digestion – are not intrinsically unfit. However, GHG emissions associated with the large-scale rearing of animals in the meat and dairy industries are huge. We therefore recommend that companies rearing livestock should consider this asset to be just another form of 'operational equipment' that emits GHGs.

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Appendix 2: Licensing

The Future-Fit Business Benchmark is free to use, share and modify with a few conditions.

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We must all play our part in society's journey toward future-fitness – and we'll get there faster if we work together.

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Who we are

Future-Fit Foundation is the non-profit developer, promoter and steward of Future-Fit Benchmarks. Our vision is a future in which everyone has the opportunity to flourish. Given where we are today, this vision can only be realised through a rapid and radical shift in the way the global economy works.

Our mission is to catalyse that shift – by translating systems science into practical, free-to-use tools designed to help business leaders, investors and policy makers respond authentically and successfully to today's biggest challenges.

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