

Climate solutions framework (CSF)

defining climate solutions and
climate solutions companies

This framework has been developed by Exponential Roadmap Initiative and Oxford Net Zero and was subject to consultation through open surveys, roundtable discussions, and webinars from November 2023 to May 2024.



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1. Introduction

Climate solutions that replace high-emission activities with low- or zero-emission alternatives are essential for decarbonising our economies. These solutions need to be developed and scaled rapidly in order to phase out fossil fuels and other high-emission activities at the pace required. This framework outlines criteria for qualifying climate solutions and climate solutions companies as such, with the aim of encouraging and rewarding the growth of innovations and systems changes that can help counter the risks of global warming.

At global and sectoral levels, we know the kinds of technologies required and these technologies already exist. They are captured in the article “[A Roadmap for rapid decarbonization](#)” (2017), in the [Exponential Roadmap report](#) (2019), in reports by the IPCC (eg the [Sixth Synthesis Report](#)), the UN Race to Zero ([2030 Breakthroughs](#)) and [Project Drawdown](#), among others. Examples include [green steel](#), low-carbon cement and plant-based food. But many of these solutions are only being implemented today at small scales, with their scaling hampered by a lack of standards and uncertainties in financing, regulation, policy and market demand.

For financial institutions to shift money rapidly away from carbon intensive and fossil fuel-dependent products, they need clarity on which products and services can contribute to significant society-wide emissions reductions, and they need plenty of financially viable investment options. [Developing such a framework](#) is crucial for providing a basis for the lending decisions that are necessary to drive climate solutions. Glasgow Financial Alliance for Net Zero (GFANZ) has identified “financing and enabling climate solutions” as one of three key [strategies](#) for financial institutions to support the whole-economy transition. This framework will complement their guidance by defining climate solutions; it can also provide alignment to facilitate discussion and efficient decision-making.

For corporates, the existing frameworks for company pledges, plans and progress reporting – such as greenhouse gas (GHG) inventory accounting, carbon-footprint quantification, 1.5°C-aligned target-setting by companies – are not sufficient for identifying and incentivising development of climate solutions at the product, service and entity levels. In particular, we need to be able to identify with rigor and safeguards which companies can appropriately use GHG-intensity-reduction targets and should be allowed to increase their total GHG emissions. These are the companies defined as climate solutions companies below.

Alongside reducing their own emissions, every company must contribute to global net zero by transforming their portfolio of products and services into climate solutions. This requirement is clear within the voluntary standards landscape, with nearly two-thirds of initiatives recommending companies shift their products and services towards climate solutions ([Becker et al., 2024](#)). One of these is the four-pillar framework presented in the [1.5°C Business Playbook](#), in which “Provide and scale solutions” is pillar 3. Also GFANZ considers climate solutions to be one of four

key transition financing strategies ([Scaling Transition Finance](#), Dec 2023), NZAOA has defined “climate solution investments” in its Target-Setting Protocol ([UNEP/PRI 2023](#)) and the ISO Net Zero Guidelines ([IWA 42: 2022](#)) encourage companies to work with others, including across sectors.

Most companies have no products or services today that would qualify as climate solutions using the criteria outlined in this paper. However, to contribute to global net zero companies must scale climate solutions:

- Companies that already primarily provide climate solutions will need to grow, which means that their total emissions are likely to increase, at least in the near- or medium-term. Current transition plan frameworks assume all companies must reduce total emissions and, under recognition and accountability frameworks, these companies are likely to be penalised rather than rewarded.
- Companies that do not yet primarily provide climate solutions will need to set targets and grow the climate solutions parts of their businesses. These companies’ transition plans will have to chart clear paths for how this transformation will be achieved.

2. Purpose of this framework

This paper sets out criteria anchored in science for defining climate solutions and climate solutions companies. The aims of this framework are to inspire action and innovation across every company and to mobilise talent and investment towards accomplishing the transition to net zero. Our objective is to provide guidelines that are simple enough to be applied rapidly and at scale, with reasonable use of resources – and to do so with precision sufficient to accelerate the required climate transformation and avoid greenwashing. This framework is intended for ‘bolt-on’ use with those standards and guidelines that recommend organisations shift their portfolios or business models towards climate solutions (see Becker, [2024](#) for a list of these). And the [Consultation on Net Zero Recognition and Accountability](#) (May 2024) recommended that the UNFCCC focus the attention of voluntary cooperative initiatives on promoting climate solutions.

The criteria for defining both climate solutions and climate solutions companies are applicable to large, established companies and start-ups and can be used in procurement and investment decisions (eg by public bodies and financial institutions).

We envisage key rewards for adopting this framework to include:

- Providing a credible way of identifying and comparing products and services we need to promote to reach net zero.
- Preferential treatment by potential buyers (procurement).
- Preferential treatment by banks and other financial institutions and by governments.

- Acceptance from stakeholders that the absolute emissions from a climate solution will increase.
- Acceptance that intensity goals are suitable for climate solutions and climate solutions companies.

For established companies, the criteria can be used to drive transformation of product portfolios. For start-ups the criteria can give the recognition they need to gather financial support to scale disruptive solutions. In procurement and investments, this framework could provide a common language to facilitate efficient decision-making.

The Exponential Roadmap Initiative (ERI) will apply this climate solutions framework to qualify companies and solutions within the Race to Zero campaign. This framework contributes to the overall development of standards providing guidance on climate action and acts as a forerunner at the frontier of best practice in the “[conveyor-belt](#)” system. Any lessons learnt from applying the framework will be incorporated into future revisions and technical guidance. Complementary guidance (eg on assessing contribution to climate justice) can be added as it becomes available.

The criteria in this framework focus on climate impact, with some safeguards around other environmental impacts. However the criteria should not be used without consideration of impacts on people and society. We welcome linkage of this framework to work by others that can be used to define and assess business impacts on wider society, such as the SDGs and climate justice models, and that can capture the potential co-benefits that climate solutions can provide.

3. Definition of a climate solution

We define a climate solution as a product or service that contributes to emissions reductions at a global level by producing significantly lower emissions than current market options. Production and consumption of climate solutions is compatible with the global 1.5°C ambition and will accelerate the transition towards a net zero carbon economy.

We recognise that numerous other ways to understand and define “climate solutions” exist and that the term climate solutions is used variously (eg by [Chan et al., 2023](#) to refer to policies or projects). Climate solutions have also been approached from different perspectives – as investment opportunities for meeting net zero commitments (eg the [IIGCC investor framework](#)), as solutions to climate risks in different geographies and spatial contexts (eg [Lamb et al., for urban climate solutions](#)), or as distinctly nature-based climate solutions (see the [Nature Conservancy](#), for example). Indeed, critiques of climate solutions, and of the climate solutions approach to mitigating the impacts of climate change, also exist (cf, Castree et al., [2014](#).)

4. Scope of the framework

This framework is intended for application to products and services that replace today's options with low- or zero-emission alternatives. This paper approaches climate solutions from the company and market perspectives, focusing squarely on reducing the carbon footprint of comparable market averages for products. As such, this framework is not intended to resolve questions around green growth or the important principles of equity, access and impacts on biodiversity and the environment more generally.

Additionally, this framework is not designed for the following types of products and services, because we believe them to be better addressed by other complementary principles and frameworks:

- Financial products and services.
- The services of professional service providers.¹
- Tech-based enabling platforms (eg 5G networks).
- Other products and services with the primary purpose of enabling others to avoid or reduce emissions (eg GHG calculation tools).
- Nature-based solutions in the context of beyond-value-chain mitigation.

In their capacity as investment decision-makers, financial institutions are a primary intended user group of this framework. However, this framework does not address factors that should be taken into account when making investments decisions. For instance, it's for investors to assess the potential market for a solution. We welcome work by the finance industry to frame all the other relevant considerations for investing in new technologies.

We recognise that the proposed criteria do not allow for labelling incremental technological advances as climate solutions. We support transparent communication about the benefits of products and services that provide incremental improvements (eg a component that increases energy efficiency in a specific process and reduces emissions by 20%) and suggest that these efficiencies be addressed by frameworks accounting for "avoided emissions". However, we think the term "climate solution" should be reserved for products and services that radically, not incrementally, accelerate progress towards a net zero world.

¹ Professional services providers include, for example, management consultants, advertising agencies, engineering consultants and legal firms. The Race to Zero campaign and Oxford Net Zero have produced a paper on the alignment of professional services providers with the 1.5oC ambition, and we see potential use of similar frameworks by tech-based enabling platforms. <https://climatechampions.unfccc.int/wp-content/uploads/2024/05/Professional-Service-Providers-draft-guidance-for-consultation.pdf>

5. Criteria for qualifying products and services as climate solutions

This framework is intended for application to products and services that replace The definition of a climate solution is underpinned by the criteria for the qualification of products and services as climate solutions.

5.1 Core criteria

To qualify as a climate solution, a product or service must:

- Have a carbon footprint that is at least 50% lower^{1, 2}, than the relevant market-weighted average footprint of the products/services being replaced.³

OR

- Fulfil a credible intensity threshold per functional unit for a net zero world, as set out in a robust taxonomy or other science-based paper.

Over time the climate impact of mainstream services and products will gradually decrease, and more credible intensity thresholds for a net zero world will be established. Therefore there will be a gradual shift from using the first criteria above to using the second.⁴

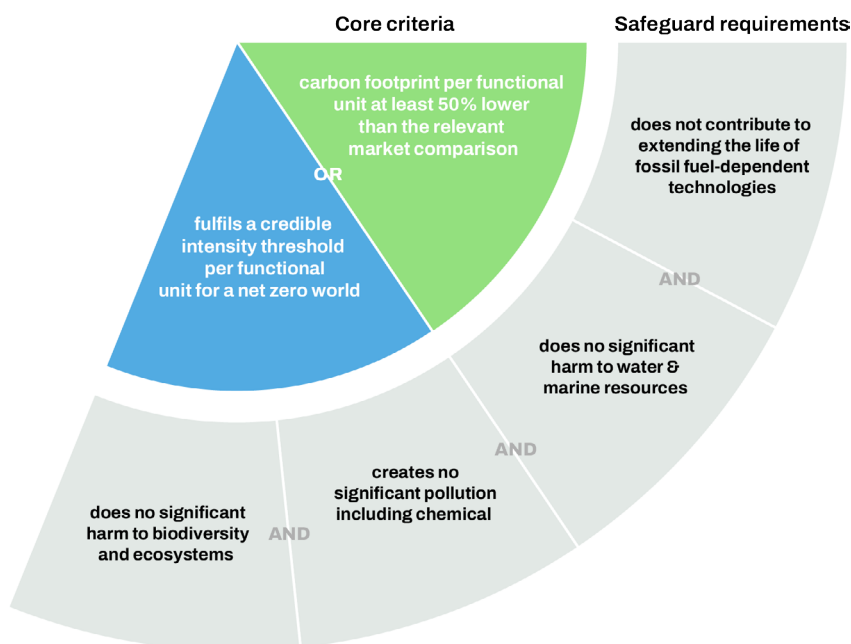


Fig1. Criteria and safeguard requirements for qualification of a product or service as a climate solution

1 See section 6 below for an explanation of the connection between the 50% threshold and the Carbon Law.

2 Preferably the footprint of the solution should be at least 90% lower than the market-weighted average.

3 The assessment is made according to a functional-unit, full-lifecycle perspective including all value chain emissions.

4 Examples of science-based intensity thresholds include the One Planet Plate concept developed by WWF Sweden: <https://www.wwf.se/mat-och-jordbruk/one-planet-plate/one-planet-plate-english/> and the SBTi steel-sector target-setting guidance.

5.2 Underlying requirements

- All quantifications of emissions, both of the product/service and of the comparison to the current market solutions, are fully transparent.¹
- All quantifications include the full life cycle of the product/service.
- All quantifications follow best practice methods and recognised standards, where these exist.
- The carbon footprint calculation does not involve any “net” reduction claimed by the purchase of carbon credits or other investment beyond the value chain.
- The quantification used for the market comparison is the latest available and sufficiently recent² and relevant.³
- Qualification will be on a time-limited basis, subject to regular monitoring and evaluation, to ensure integrity.

5.3 Safeguard requirements

In addition to meeting one of the two core criteria and the underlying requirements, climate solutions must

- Not contribute to extending the life of technologies that depend solely on fossil fuels.
- Do no significant harm to the following:⁴
 - Sustainable use & protection of water & marine resources.
 - Pollution prevention and control regarding use and presence of chemicals.
 - Protection and restoration of biodiversity and ecosystems.

We do not intend for this framework to be used to support investment and scaling of exclusive (luxury) products that are only accessible to a global minority (on the basis of wealth). Development of climate solutions must take into account equity and justice considerations, and we welcome their addition as safeguards when more empirically robust thinking has been presented around issues including human need and scalability.

¹ Transparency entails disclosure: the company needs to publish their methodology and data.

² For instance, not more than two years old.

³ For instance, when the exact source and related carbon emissions of hydrogen are unknown, use conservative market emissions factors or credible grid factors.

⁴ The Do No Significant Harm safeguards are inspired by requirements in the EU taxonomy legislation.

6. The 50% threshold

The first of the two options for qualifying a product or service as a climate solution is that its carbon footprint (per functional unit) is at least 50% lower than the relevant market comparison. This level of reduction has been chosen because it means that climate solutions can be considered to move the dial forwards, according to the Carbon Law¹, by 10 years.

This can be interpreted as solutions being at least “10 years ahead of time”, compared to current options. A solution which today delivers emissions reductions of 90% compared to the average footprint of solutions in the market today (eg near zero steel) could be considered to be 20–30 years ahead.

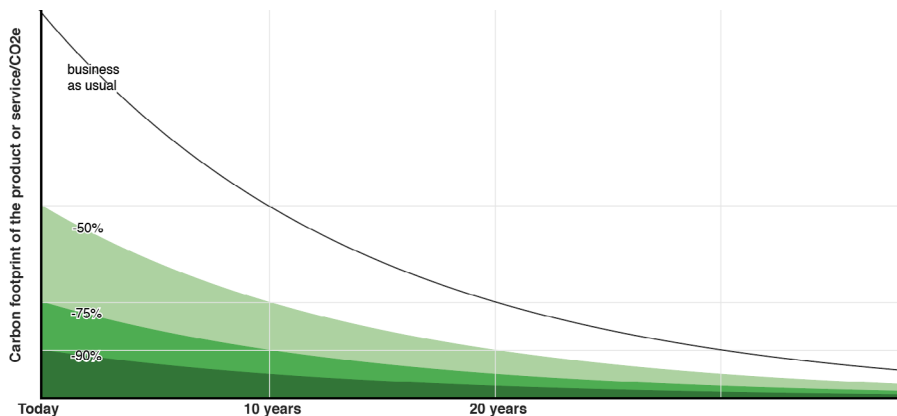


Fig2. Projecting carbon footprint of the product or service/CO₂e.

If we assume that the economy follows the decarbonisation pathway known as the Carbon Law – halving emissions every decade – then business-as-usual solutions would follow a downward exponential curve. So, to continue to qualify as a climate solution, a product or service needs to follow a trajectory which is at least 50% below that curve. A particular electric car may qualify as a climate solution today, but in 10 years’ time, when the other solutions in the market produce lower emissions, that electric car might only qualify as a climate solution if produced with near zero steel and recycled materials and if integrated in sharing business models.

Based on the Carbon Law, it would be possible to create criteria for different levels of ambition, eg for climate solutions that reduce emissions by 50% (halving once), 75% (halving twice) and 90% (roughly halving three times) compared to the relevant market- weighted average carbon footprint for existing products and services being replaced. This is illustrated by the darker green colours in the diagram above.

In addition to being based on the Carbon Law, the 50% threshold ensures that

- the products and services that qualify are contributing to significant shifts rather than incremental ones, and
- the gap between the footprints of the product/service and of the relevant market comparison is wide enough to allow for some uncertainty, since all the necessary calculations will have some uncertainty.

¹ The Carbon Law was formulated in the 2017 article “A Road for Rapid Decarbonisation” <https://www.science.org/doi/10.1126/science.aah3443>.

The case for defining a particular product or service as a climate solution will be more easily made for products and services that can demonstrate carbon footprints much lower than 50% of the footprint of the current options. Those cases in which the reduction compared to the market-weighted average is close to 50% will be examined especially carefully.

7. Complementing other frameworks

This framework has close links to the following:

- **Quantification of scope 1, 2 and 3 emissions and target-setting and planning** for emissions reductions (eg GHG Protocol and PCAF – see Becker [2024](#), for a full list).
- **Methodologies for calculating avoided emissions** written by organisations such as the [GHG Protocol](#)/World Resource Institute (WRI), International Telecommunications Union (ITU) and World Business Council for Sustainable Development ([WBCSD](#)).
- **Guidelines for communication about environmental claims and for labels by organisations** such as the International Organization for Standardization ([ISO](#)), the International Chamber of Commerce ([ICC](#)), the UK Green Codes Guideline and the Australian Guide for Business on Making Environmental Claims.
- **Frameworks for sustainable investment, such as taxonomies** – examples of which include the [NZAOA Target-setting Protocol](#), the European Green Bond Standard, the Climate Bonds Initiative, and GFANZ work on scaling transition finance and the investor methodology by [Project Frame](#).

With regard specifically to the EU taxonomy, this framework differs in both its intention and implementation:

- This framework gives criteria for products and services whereas the EU taxonomy addresses broad categories of “economic activities” by companies.
- This framework is applicable across all sectors whereas the EU taxonomy is a sector-specific framework, setting qualifiers for each distinct business-activity category.
- The EU taxonomy sets emissions thresholds for activities. Meeting a threshold is one option in this framework but most products and services will initially qualify as climate solutions in relation to market-weighted averages.
- This framework makes no assumptions about specific products or services being climate solutions by default. Instead, all products and services are compared on a functional-unit basis and are assessed in relation either to the emissions intensity of existing market equivalents or to a credible threshold to be reached for a net zero world.

8. Criteria for qualifying climate solutions companies

These criteria are for application to companies that supply climate solutions directly to markets. See section 4 above on the scope of the framework for more information about the applicability of the criteria.

For a company to qualify as a climate solutions company:

- A. The company has public interim and net zero climate targets covering all emissions (scopes 1, 2 and 3), a transition plan and discloses progress annually.

AND

- B. >90% of the company's revenues come from climate solutions.

AND

- C. The company is working more broadly to transform its sector.

A company that doesn't yet fulfil the above criteria can set a pathway to shift its portfolio towards climate solutions, with the aim of transforming to a climate solutions company. The pathway can be based on targets for increasing sales of climate solutions, eg to go from 5% of annual revenue from climate solutions to 90% in five years. Companies that are transforming their portfolios could then have intensity targets for GHG emissions from their climate solutions and absolute targets for GHG emissions from their other products and services. Examples of relevant key performance indicators (KPIs), as suggested in the [1.5°C Business Playbook](#), would be climate solutions revenue, climate solutions research and development (R&D) and capital expenditure (CAPEX).

Appendix 1: potential examples

	Electric car in shared use	Near zero steel	Vegan food	Recycled concrete aggregates that mineralize CO2
Core criteria	50% lower than market comparison	Meets net zero intensity threshold	Meets net zero intensity threshold	50% lower than market comparison
<i>Note</i>	<i>Relevant market comparison will be region specific</i>	<i>Electricity from renewable sources required</i>	<i>Based on threshold for kgCO2e per kcal</i>	<i>Electricity from renewable sources required</i>
Safeguard requirements				
Not contributing to extending the life of technologies that depend solely on fossil fuels.	Yes, since can be operated on renewable electricity	Yes, since can be produced using renewable energy	Yes, assuming produced using non-fossil inputs	Yes, since can be produced using renewable energy
Does no significant harm to <ul style="list-style-type: none"> a. sustainable use & protection of water & marine resources b. pollution prevention and control regarding use and presence of chemicals c. protection and restoration of biodiversity and ecosystems 	Yes, if produced with minimal impacts	Yes, if produced with minimal impacts	Yes, if produced with minimal impacts	Yes, if produced with minimal impacts

Appendix 2: proposed applications

Who could use the framework?	How could they use it?	How would it help them?
Investors/private equity	<p>To rate or assess the best green bonds and other potential investments</p> <p>To assess the climate credentials of potential investments</p> <p>To set and measure KPIs in portfolio companies for scaling climate solutions</p>	<p>Allows greater level of ambition than taxonomies</p> <p>Affords easier and clearer decision-making</p> <p>Provides a tool for assessing progress by companies transforming their product/ service portfolios</p>
Venture capital	<p>To select start-ups to invest in</p> <p>To set KPIs for portfolio companies for scaling climate solutions and to measure performance</p>	Affords easier and clearer investment decisions
Companies	To reward and incentivise mainstream companies through application of the criteria as an internal metric of their transition	<p>Allows portfolios of products and services to be segregated into climate solutions and non-climate-solutions</p> <p>Facilitates planning and KPIs for transformation of businesses</p> <p>Enhances credibility of green bond issuances</p>
Governments and cities	<p>To identify where strategic investment (tax reliefs, subsidies, ownership) helps meet net zero ambitions</p> <p>To privilege climate solutions in procurement processes</p>	Affords easier and clearer decision-making
Bodies who grant bank loans and decide interest rates	To identify potential high- and low-risk customers	Affords easier and clearer decision-making

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