NET ZERO INITIATIVE

2020-2021
Final Report

carbone4

NET ZERO INITIATIVE

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Executive summary

Context

In April 2020, Carbone 4 published the Net Zero Initiative reference framework, laying the foundations for a new interpretation of the issue of "net zero emissions" at the corporate level.

Since the only scientifically valid definition of net zero so far applies only to the planet[1], and possibly to state actors[2], the Net Zero Initiative has sought since its creation to **think of the company not as an object that can be "neutral" in itself, but as one that should contribute at the right level to the objective of global and national carbon neutrality.**

Consequently, the notion of a "net zero" or "neutral" company has been abandoned in favor of independent indicators that measure a company's climate performance against the global net zero requirement at any given time.

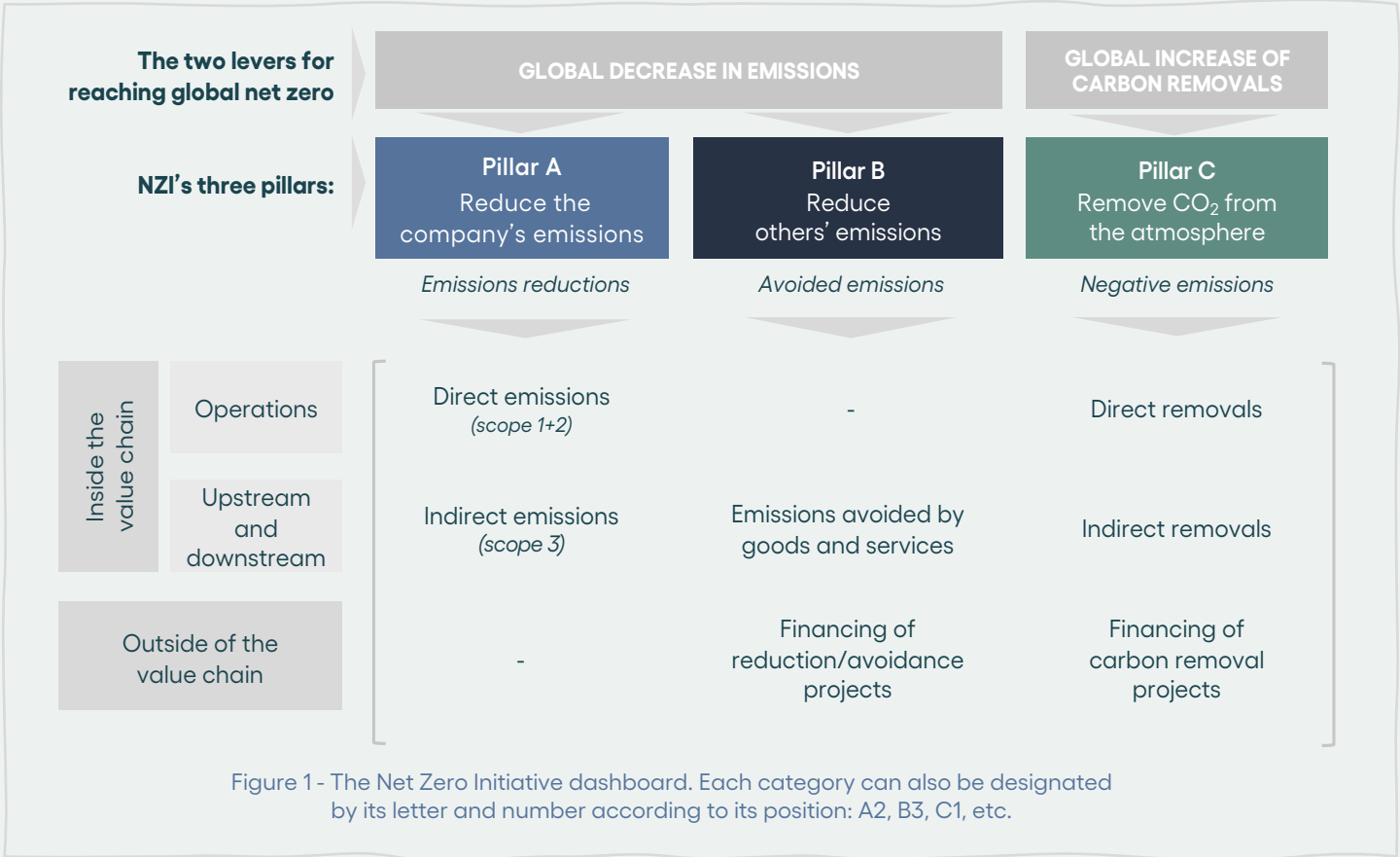


Figure 1 - The Net Zero Initiative dashboard. Each category can also be designated by its letter and number according to its position: A2, B3, C1, etc.

[1] IPCC (2018), Global Warming of 1,5°C (SR15)
[2] ADEME (2021), Les avis de l'ADEME : la neutralité carbone

The Net Zero Initiative framework can be seen as a generalization of the carbon footprint concept, since it integrates it (Pillar A) while enriching it with two additional indicators: the company's capacity to participate in the decarbonation of third parties (Pillar B), and its capacity to develop carbon removals (Pillar C). These three Pillars are strictly independent of each other and are not fungible.

In 2020, the second season of the Net Zero Initiative wanted to explore two major issues:

01

Measuring Pillar B:
what metrics and calculation rules should be applied to measure a company's ability to contribute to the decarbonation of its ecosystem?

02

Setting objectives for Pillar C:
what is the right level of contribution to increasing carbon removals for a company?

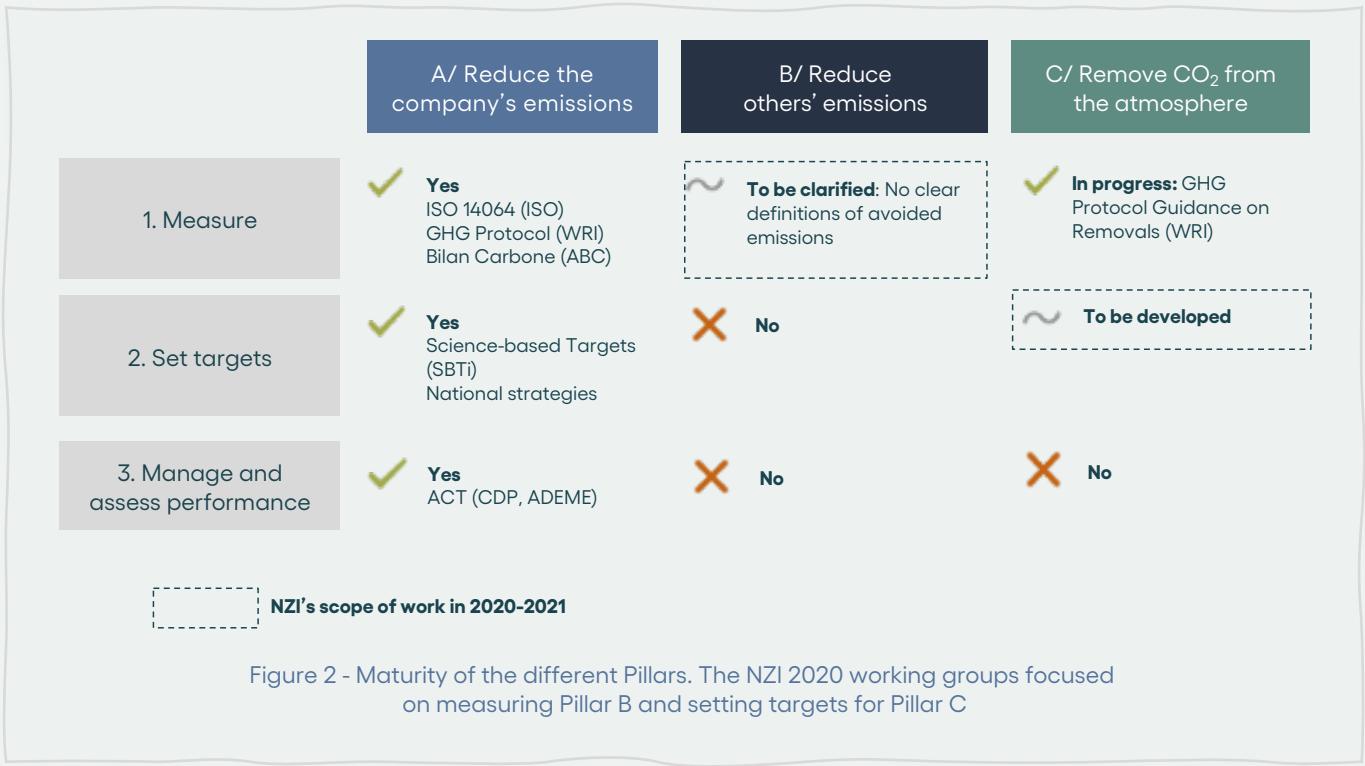


Figure 2 - Maturity of the different Pillars. The NZI 2020 working groups focused on measuring Pillar B and setting targets for Pillar C

Summary of the NZI 2020 recommendations

Pillar B measurement

- Categories B2 (emissions avoided by products and services) and B3 (project finance outside the value chain) should be **reported separately.**

- The metric for the calculation of B2 and B3:
  - *B2 (contribution to decarbonation through products and services sold):*
    - The impact should be reported in **avoided emissions (tCO_2 avoided),** making a clear distinction between whether these avoided emissions correspond to a real **reduction** in emissions at the customer (AE_R) or whether they represent only a lower increase in the customer's level of emissions compared to a "worse" situation that could have happened instead (AE_{LI}).
    - The company must also disclose **the share of turnover** corresponding to the sale of the products and services for which the avoided emissions were calculated.

  - *B3 (financing of decarbonation projects outside the value chain):*
    - The impact should be reported both in terms of **emissions avoided** (tCO_2e avoided)[3] and the **amount of funding committed by the company** (euros)[4].
    - **The cost per ton avoided** (i.e. the ratio between the funding and the amount of emissions avoided) can also be reported.

- When calculating the emissions avoided by products and services (B2), the correct **baseline scenario** should be chosen, which aims to describe as accurately as possible what would have happened without the product in question.

- The emissions in the baseline scenario ("what would have happened") are not necessarily stable over time. It is therefore necessary to anticipate its future variation, in particular by considering **the evolution of the market trend** and the state of regulation.

- The reference scenario can be constructed by paying particular attention to the following parameters:
  - **Context of the sale:** is it a replacement of equipment at the customer's premises, or a new piece of equipment?
  - **Geographical context**
  - **Market segments**
  - **Age of the products being replaced**
  - **Customer profile**

[3] Or at least as an approximation, in the case of projects that are not certified by carbon credits and/or cannot immediately claim to have a quantifiable impact (R&D projects, financing of virtuous practices without quantification of CO2 impact, etc.).
[4] It should be noted that the share of avoided emissions allocated to a given project funding should be pro-rated to the share of funding in the total. For example, if a company finances a project for 10% of its total cost, it is only supposed to claim 10% of the total avoided emissions. This is not necessarily the case with all current practices, and in particular with financing through the purchase of carbon credits, which sometimes grant 100% of the avoided emissions to the purchasers of the credits, even though they represent only part of the financing of the project. See the Carbone 4 appendix, The Net Zero Initiative. A benchmark for collective carbon neutrality, April 2020.

- Avoided emissions should always be calculated using a **"life cycle" approach**, i.e. considering all the emissions of a project in relation to the baseline, from manufacture to use to end of life.
- The avoided emissions of a product must be allocated to the actors of a value chain using the same allocation rule as for the emissions of the use of this product (Pillar A).
- The rules for calculating normative targets on B2 and B3 will be the subject of the NZI 2021 work.

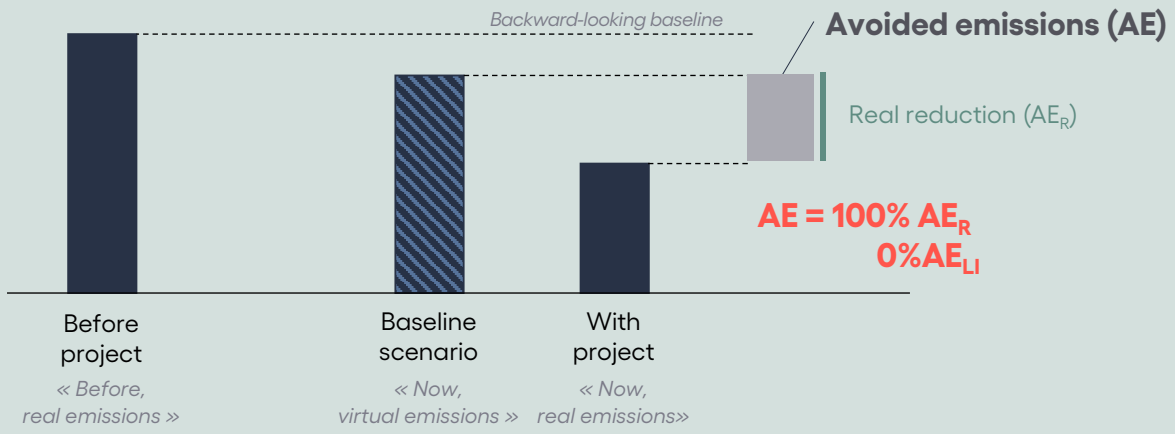


Figure 3 – Illustration of "real reduction" avoided emissions (AE_R): the project reduces the level of emissions compared to the previous state of the system

NB: As AE_R is primarily an avoided emission (AE), its value cannot exceed the total calculated avoided emissions. Here, as the baseline situation is also lower than the initial situation, the AE_R value is lower than the value of the changes in absolute emissions before/after.
Example: energy renovation of a building that would have been renovated anyway, but with a lower performance.

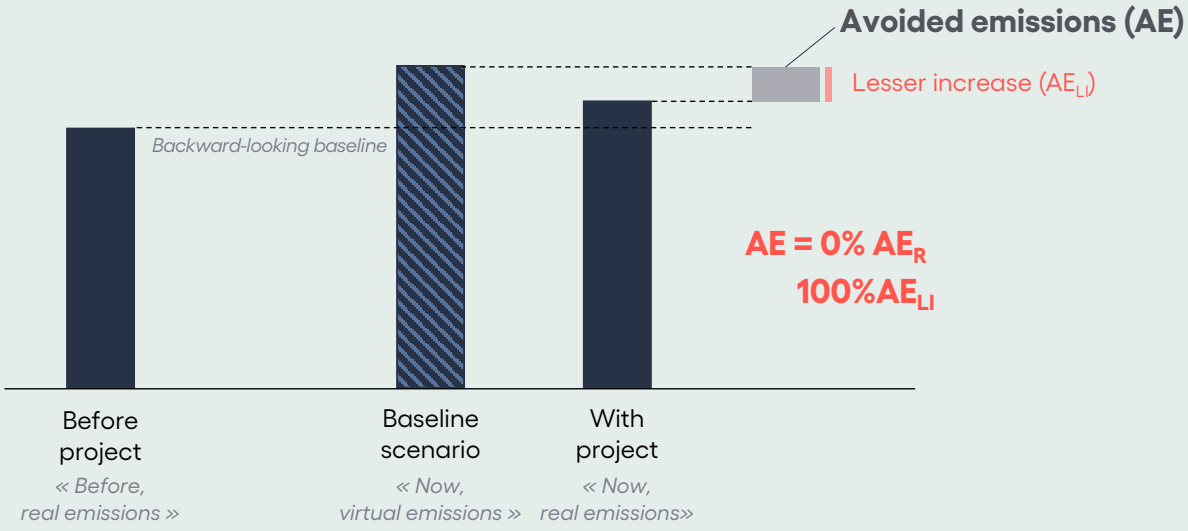


Figure 4 - "Lower increase" situation: the baseline is increasing compared to the pre-project situation, and the project "contains the increase" (but still adds emissions to the atmosphere)

Example: construction of a new low-carbon building which, even if it does better than the new building trend, still means an absolute increase in emissions compared to the previous state of the building stock.

Setting targets on the Pillar C

A company's responsibility for sink development is twofold:

- **Overall objective for pillar C**
  Each company is expected to participate in the development of removals because it is part of the climate problem, as a GHG emitter.

- **Specific objective for sinks in the value chain**
  In particular, companies involved directly or indirectly in the management of sinks have an **operational responsibility to safeguard and develop these sinks**, which is not necessarily linked to their responsibility as an emitter. This responsibility lies **specifically with companies that have sinks in their value chain** (categories C1 and C2).

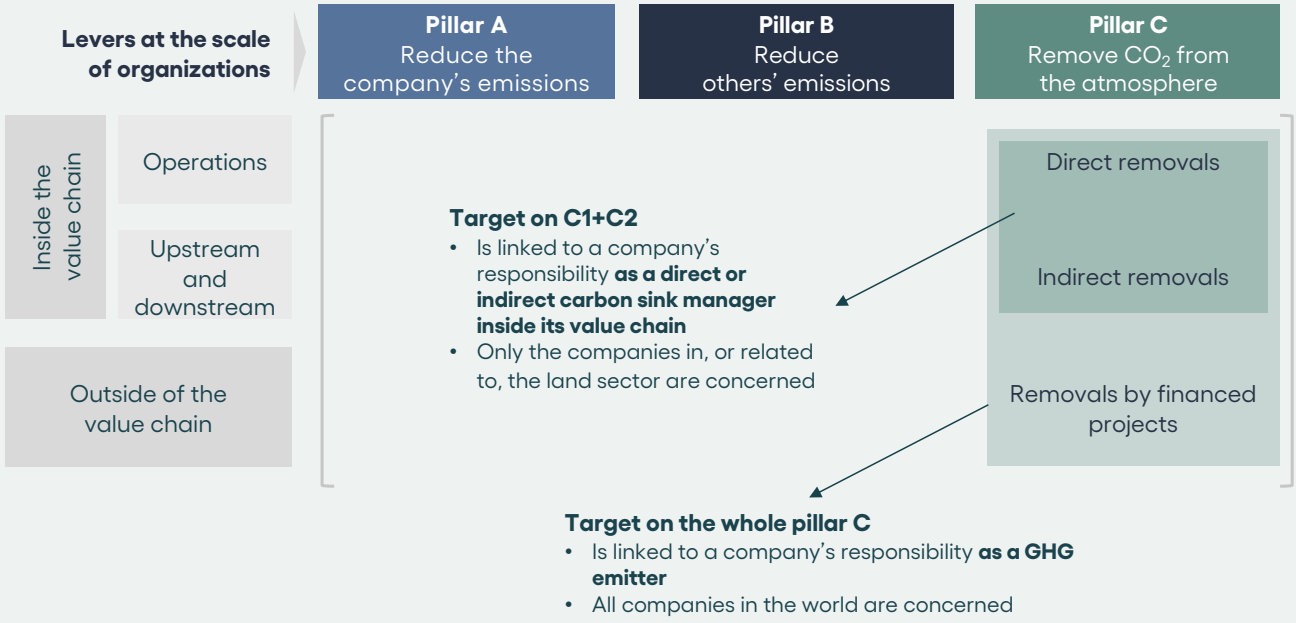


Figure 5 - Two different objectives for the removals

Pillar C target

For a given company, the quantity of removals to be developed in year N is **deduced** from:
- The company's emissions trajectory (Pillar A) in year N, according to a 1.5°C or 2°C scenario;
- The absorption/emission ratio of the territory in which the company is identified in year N, according to a 1.5°C or 2°C scenario.

Thus, at any given time, **the company's ratio (Pillar C / Pillar A) must be equal to the removals/emissions ratio of the territory with which it is identified** (whether it is the planet or the national territories where its activities take place).

The company is invited to start with a simple approach (consider that the territory considered is the planet, or a single national territory), and then to "territorialize" its objectives more and more as its ambition and knowledge of the location of its emissions increases.

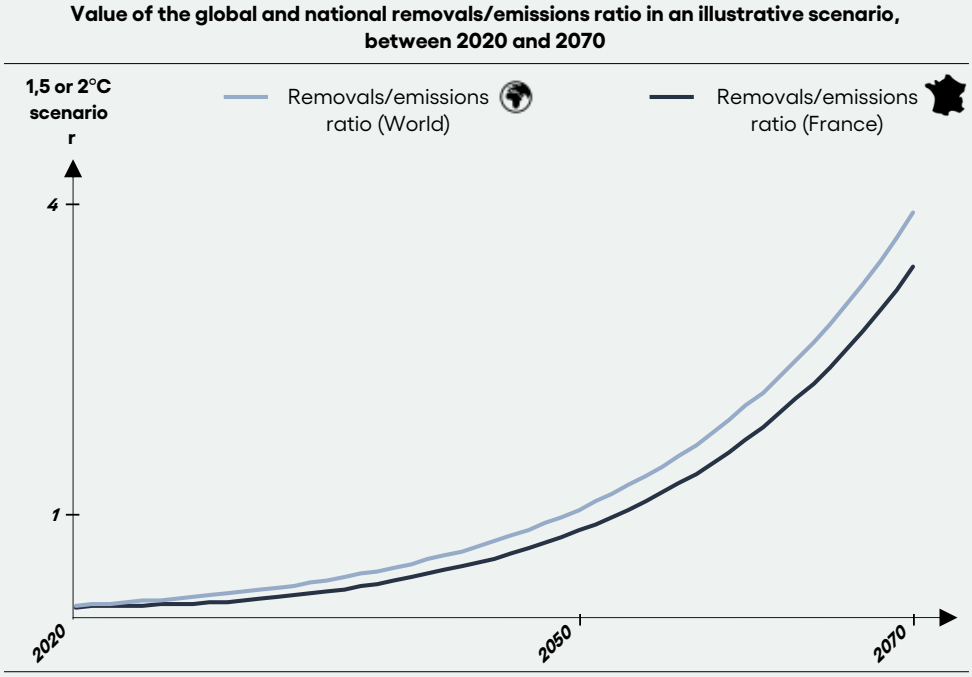


Figure 6 - The removals/emission ratio for each territory of interest (here, France and the planet) is calculated...

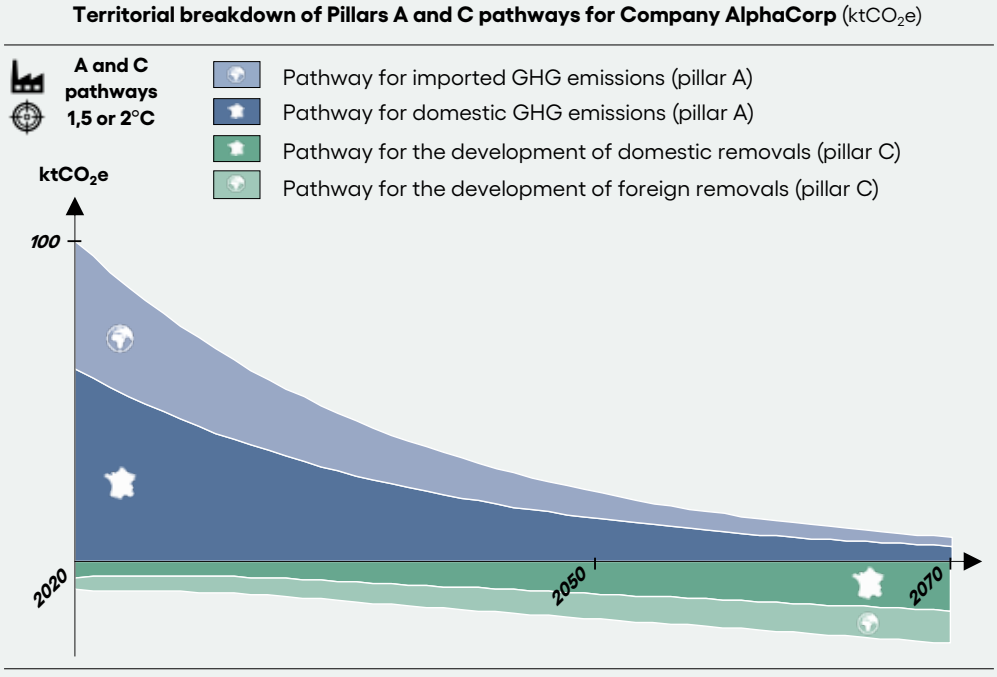


Figure 7 - ...and then applied to the company's Pillar A trajectories (blue), so as to derive geography-specific Pillar C trajectories (green)

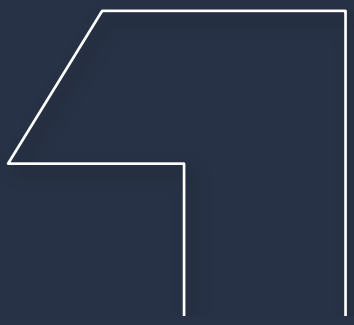
In order to develop removals in practice, the company is invited to collaborate with the actors in its value chain to co-lead this development effort, in order to limit double counting.

Specific objective on sinks in the value chain (C1, C2)

Companies with carbon sinks in their value chain have an important role to play in achieving global carbon neutrality, as direct or indirect managers and operators of these sinks. For this reason, they should set targets for the development of these sinks, without making these targets dependent on their Pillar A emissions.
The rules for setting such targets on C1 and C2 will be the subject of further work, although several avenues can already be sketched out.

Next steps

The 2021-2022 edition of NZI will focus on further developing the rules for calculating avoided emissions for three sectors of the economy: transport, buildings and energy industries. At the time of writing, the 2021-2022 season of NZI is supported financially and/or methodologically by ADEME, the French Ministry of Ecological Transition (MET) and fifteen companies.



Introduction and framing

Introduction and framing

1. The Net Zero Initiative, a specific way to address companies' "net zero" ambition

A. The difficulty of defining net zero at the company scale

There is no doubt that in 2020 we witnessed a burst of activity over the concept of "net zero". By the end of the year, no less than 1,565 companies (as well as 826 cities and 103 regions) on all the continents had set the goal (or already claimed the status) of being carbon neutral, or net zero, by 2050[5].

This profusion of commitments may seem positive news at first glance, as it seems to testify a certain awareness among private actors. However, this hope does not stand up to analysis: it is indeed possible[6] to note considerable heterogeneity in the specific modalities of these objectives, which lead to very disparate levels of ambition.

Among the criteria that play a major role in the credibility of these targets are, for example:

- the greater or lesser place given to genuine **decarbonation** in the objective (size of the scope of emissions covered, compatibility of the reduction trajectory with 1.5°C budgets, the use of "accounting tricks" such as the purchase of guarantees of origin for green electricity to "cancel out" scope 2, etc.)

- the extent to which **so-called carbon offset mechanisms** are used (whether or not credits are used, and if so, the nature and price of these credits)

- the place of **carbon removal solutions** in the company's net zero objective (nature and permanence of carbon sinks, whether or not to use these removals *against* the net zero target, etc.)

Most conveniently for the less attentive companies, all these differences disappear behind the standardized façade of "net zero", thus making it difficult to compare and check the seriousness of these commitments. As things stand, the way in which "net zero" is defined and implemented at the level of sub-planetary actors is so heterogeneous that it leaves little hope that it will spontaneously lead to the collective achievement of the Paris Agreement.

[5] NewClimate Institute (2020), *Navigating the Nuances of Net Zero Targets* https://newclimate.org/2020/10/22/navigating-the-nuances-of-net-zero-targets/. In the following, we will use the terms "neutrality" and "net zero" without distinction, as recommended by the IPCC.
[6] *Ibid.*

Some initiatives[7] are currently working on defining criteria to help corporates strengthen their net zero commitments. The question then becomes: even if we manage to "clean up" these net zero objectives by giving them the necessary robustness criteria, do they still constitute the right framework to guide corporate climate action? Will these neutrality objectives be the optimal solution for reaching collective net zero, which is defined on a global scale[8] and which underlies radical paradigm changes? Does the achievement of a global emissions/removals balance necessarily require a sum of individual neutralities? Does the current number of essential blind spots in corporate climate action exceed what can be captured by a net zero ambition, however well framed it may be?
These issues, as well as moving beyond individual net zero to a contribution to *collective net zero*, have been at the heart of the Net Zero Initiative since its creation.

B. Contributing to collective net zero

What is this "net zero" so sought after by companies? And what should it consist of?

In the context of absolute climate emergency, it seems reasonable to assert that the ambition of private actors to achieve "net zero emissions" should ultimately serve to place them on a trajectory compatible with the Paris Agreement, and to trigger actions contributing to the substantial decarbonation of the global socio-technical system. In other words, a net zero ambition for a company should both **prepare it for a changing world**, so that it can **resiliently** project itself into a net zero emission world in 2050, and at the same time **make it an active contributor to the emergence of this world of net zero emissions**, by participating at the right level in the relevant currents of action.

It should be recalled that the only scientifically valid definition of net zero today is applicable at the global scale[9], and possibly to national territories[10]. The net zero planetary objective embodies (with certain flaws[11]) the need for a **radical change in the system**: it is this deep change that should constitute the basis of all reflection. It is therefore necessary to ensure that companies contribute at the right level **to global net zero**, without necessarily seeking to define an individual net zero state at their level that would have no scientific basis.

This is why the Net Zero Initiative has been trying since its creation to propose a paradigm shift, and to **think of the company as an object that must above all transform itself in the service of, and with a view to, the emergence of planetary carbon neutrality.**

[7] Especially the initiative *Race to Zero* (UNFCCC) or SBTI (2021), *Foundations for net-zero target-setting in the corporate sector*.
[8] The IPCC defines global net zero emissions as the point anthropogenic CO_2 emissions balance with anthropogenic removals. In order to meet the 1.5°C target, this must occur by mid-century (and switch to a situation where global emissions are *net negative*.
[9] IPCC (2018), Global Warming of 1,5°C (SR15).
[10] ADEME (2021), Les avis de l'ADEME: la neutralité carbone.
[11] In particular, the concept of a global net zero could be criticized for implying that it is possible to use the emissions lever and removals lever indiscriminately in order to achieve zero. However, it is possible to use the reduction of emissions that should be pursued as a priority. See J. Dyke, R. Watson, W. Knorr, *Climate scientists: concept of net zero is a dangerous trap*, The Conversation, April 22, 2021.

The notion of a “net zero” or “neutral” company is therefore abandoned in favor of independent indicators that measure a company's climate performance against the global net zero requirement at any given time.

C. The Net Zero Initiative dashboard

For the Net Zero Initiative, the ambition of carbon neutrality means that a company must take climate action at the right level on several fronts, using an analysis tool: the NZI matrix (or dashboard).

This matrix can also be seen as a generalization of the carbon footprint tool, by enriching it with new "metrics" capable of covering the blind spots of classic reporting methodologies, in particular the notion of the climate (in)utility of a product/service, the action of safeguarding and developing carbon sinks, and the monitoring of financial contributions to the low-carbon transition (avoiding as much as possible the use of the word "offsetting", which wrongly implies the possibility of "cancelling" one's footprint through the purchase of carbon credits).

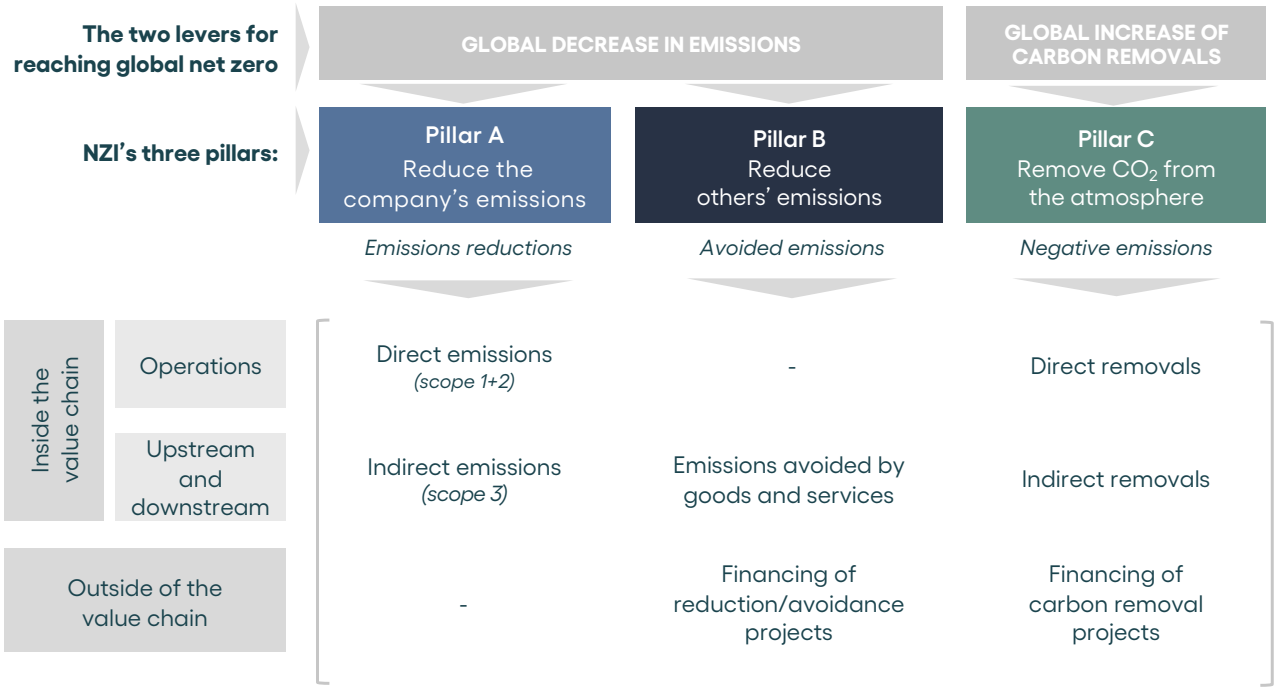


Figure 8 - The Net Zero Initiative Dashboard

For the sake of simplicity, we will name each category according to its "coordinate" in the table, i.e. a letter (A, B or C depending on the Pillar) together with a number (1, 2 or 3 depending on the place in the value chain):

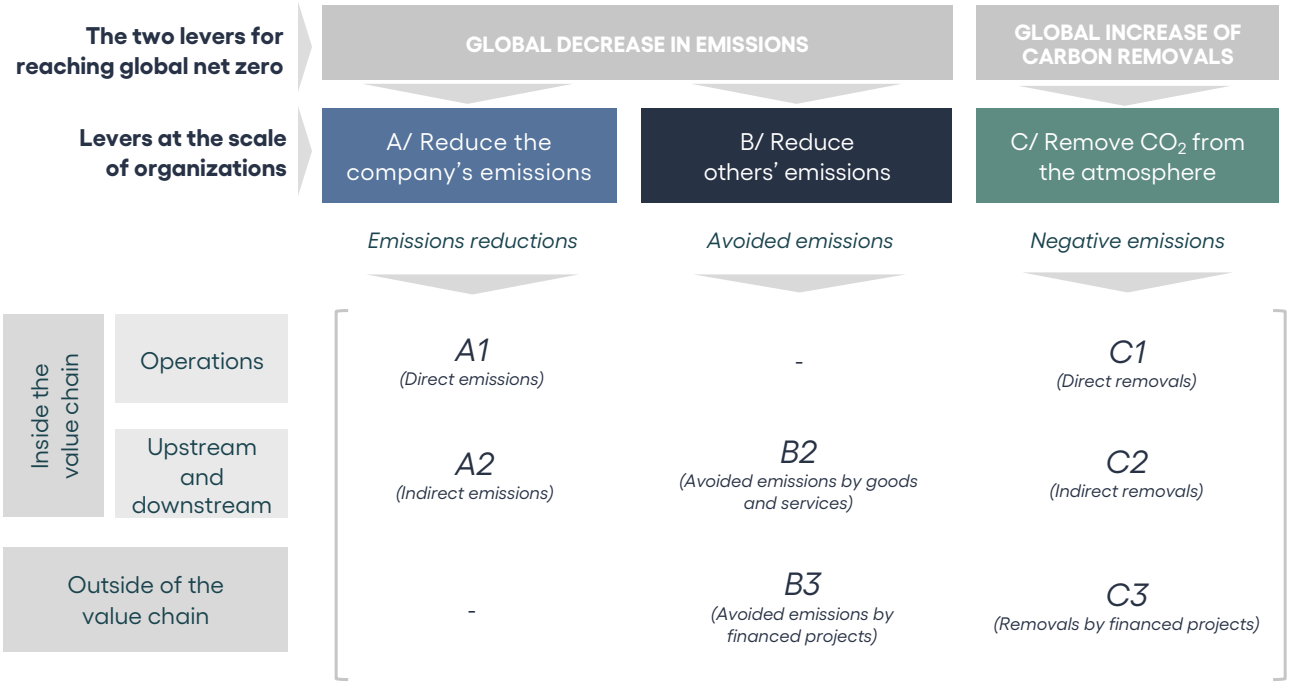


Figure 9 - Shortcut names given to each category

Correct "Pillar C. Company's contribution to carbon sink development
For more details on the matrix, readers can refer to the NZI benchmark released in May 2020[12].

The Net Zero Initiative believes that the appropriation of this dashboard by companies, the setting of ambitious objectives for each category, and their monitoring over time, are particularly efficient ways of steering their actions towards global and national net zero.

Pillar A is already well mapped, with well-established methodologies for measurement (GHG Protocol, ISO 14064, Bilan GES, etc.) target setting (SBT) and performance monitoring over time (ACT).

Now, a number of things remain to be clarified, particularly with regard to Pillars B and C.

2. Pillar B: how to quantify the contribution to decarbonation?

Pillar B of the NZI dashboard seeks to quantify all the emission reductions caused by a company to third parties, i.e. outside its operational boundaries:

[12] Carbone 4 (2020), *Net Zero Initiative. A framework for collective carbon neutrality* http://www.carbone4.com/publication-referentiel-nzi/

- Either as a result of its **goods and services** being sold as a substitute of more carbon-intensive practices by end customers;

- Or through the **financing of emission reduction/avoidance projects outside its value chain** (purchases of certified emission reductions, direct equity investments in projects, low-carbon energy contracts under certain conditions, etc.).

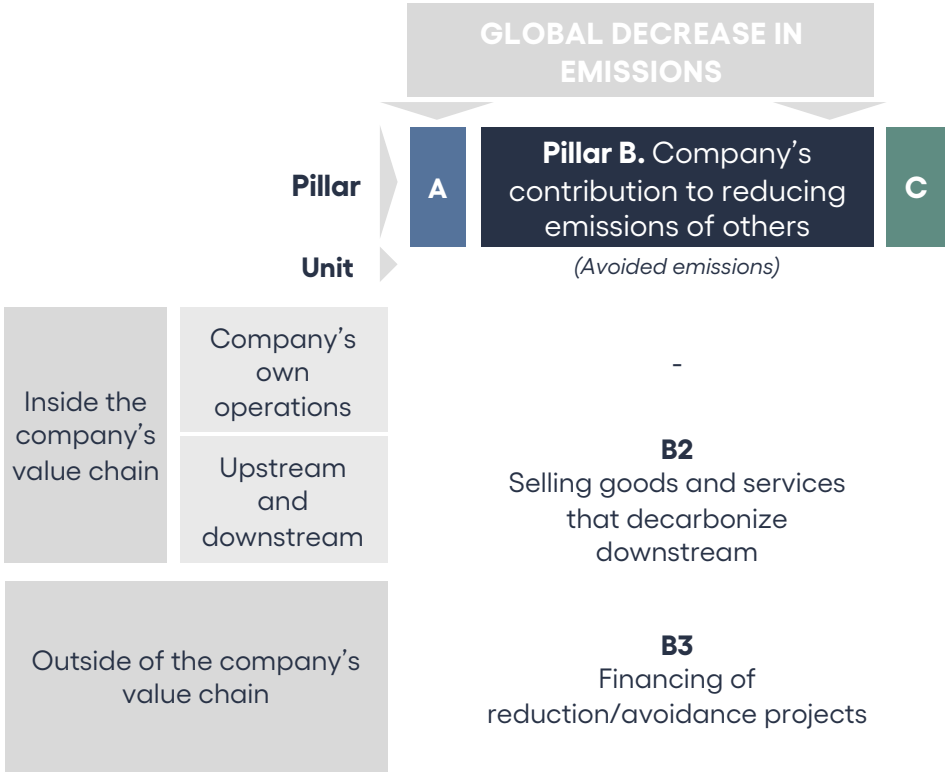


Figure 10 - Content of Pillar B "Company's contribution to reducing emissions of third parties"

Pillar B is one of two ways to participate in the effort to reduce global emissions, the other being to reduce one's own footprint (Pillar A).

The concept of "avoided emissions" is the indicator historically used to account for a positive impact outside the company's perimeter, but today it suffers from methodological vagueness far too great to be satisfactory. **The aim of the work carried out in 2020 was to make the quantification indicator for Pillar B more robust.**

What is an avoided emission?

A project avoids emissions if there is a positive gain between the emissions of the project and the emissions of the reference scenario that would have occurred in the absence of the project. An avoided emission is therefore the difference between a GHG emission that actually occurs (that

of the project) and a GHG emission that, by definition, did not occur (that of the counterfactual[13] or "baseline" scenario)[14].

It is clear that the choice of the reference scenario is the cornerstone of the concept. Avoided emissions, although expressed in tons of CO_2 equivalent, are therefore not immediately comparable to absolute GHG reductions, since they are theoretically only "virtual" differences in emission levels (and not necessarily an absolute decrease in emission levels between two points in time).

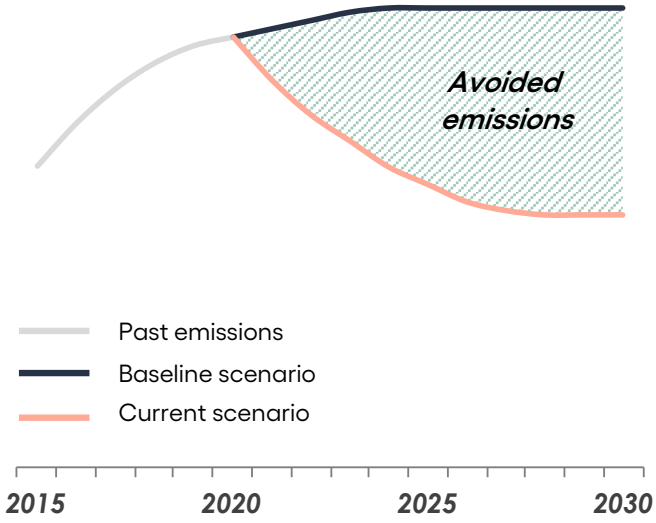


Figure 11 - Illustration of the concept of avoided emissions

This concept can be found in various applications (generation of carbon credits, due-diligences, green bonds, etc.). Two of them are of particular interest to us:

- **The notion of emissions avoided by goods and services sold** (2nd line of Pillar B, or "B2");
- The notion of emissions avoided through the financing of emissions avoiding projects outside the value chain, which includes a certain type of carbon credit (3rd line of Pillar B, or "B3"). These projects can be financed through the purchase of carbon credits from these reduction/avoidance projects, but not only: they can also be direct investments in projects, including long-term projects that do not necessarily deliver immediate reductions (R&D projects, etc.).

What are the problems to be solved?

As mentioned above, the "avoided emissions" indicator suffers from a certain number of weaknesses, or at least is not sufficiently defined at the present time to make it a satisfactory tool

[13] Counterfactual: what could have happened.
[14] Another way of referring to an avoided emission is a "non-emission of GHGs compared to a baseline scenario" or "the persistence over time of a lower level of emissions compared to a baseline scenario".

for steering corporate climate action. Only once these weaknesses have been corrected will it be possible to consider the development of a method for setting a performance objective for Pillar B.

One example of conceptual weakness is that an avoided emission **does not necessarily reflect an absolute decrease in emissions**. This is an important nuance, as the global net zero target calls for an absolute decrease in emissions at the global level. At the company level, we need to distinguish between two different concepts, emission reductions and avoided emissions:

- An **emission reduction** is an actual decrease in GHG emissions between two dates within a given scope;

- An **avoided emission** is the difference in the level of emissions induced by a solution compared to a baseline scenario.

We can see that the concept of reduced emissions *always* corresponds to an absolute decrease in emissions. For the concept of avoided emissions, however, this is not always the case, since the reference is not always the previous state of the system, but a state "that would have occurred in the absence of the project". Avoided emissions are therefore not always synonymous with absolute emission reductions. A methodological refinement, which we present below, will account for this subtlety.

This ambiguity is present not only for products and services, but also for avoided emission carbon credits (which are monetized!). This means that within the family of avoided emissions carbon credits, there is a disparity between, on the one hand, credits that finance real reductions and, on the other hand, credits that only finance a "lower increase" in the level of emissions.

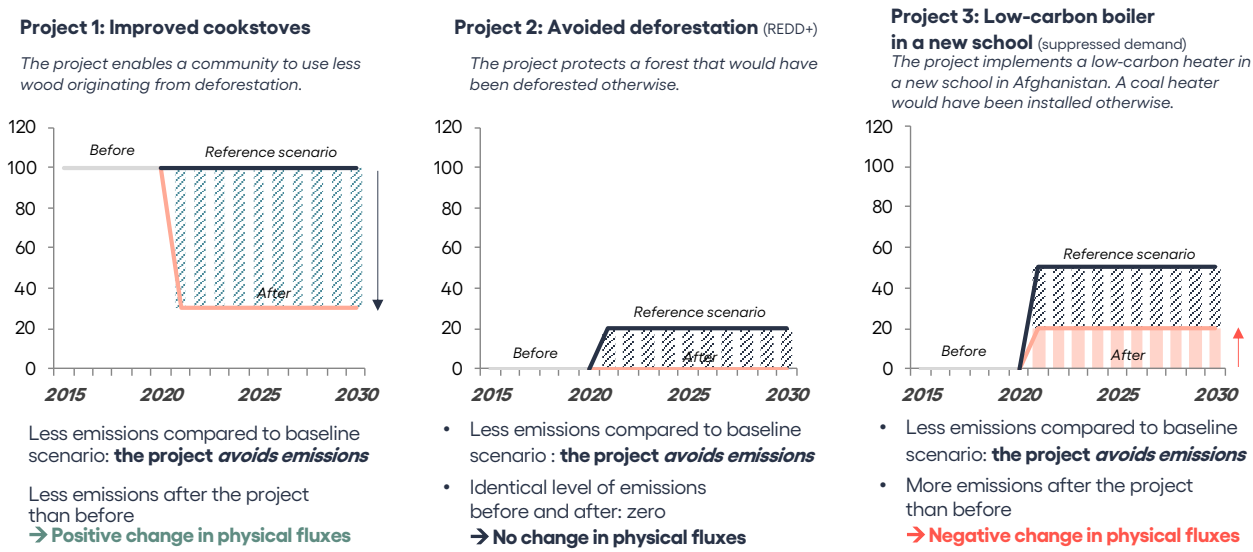


Figure 12 – Avoidance carbon credits can have very different physical natures, without this difference necessarily being recognized

In total, the Net Zero Initiative has identified six issues to be addressed by 2020:

- **Issue N°1:** Can emissions avoided by goods or services (B2° be added together with those triggered by financing emission reduction projects outside the value chain (B3)?
- **Issue N°2:** What is the right metric to quantify a contribution to decarbonation?
- **Issue N°3:** How can a good baseline scenario be defined to calculate avoided emissions?
- **Issue N°4:** How can "real reductions" be distinguished from "lower increases"?
- **Issue N°5:** How should avoided emissions be allocated among the different companies that contribute to the same good or service?
- **Issue N°6:** How can we ensure that organizations set an ambitious, achievable and fair target for avoided emissions, whether B2 or B3?

The thought processes that led to their treatment are described in the "Methodological Discussions" section in the appendix, and the final response to each of these issues is explained in the "Recommendations" section.

3. Pillar C: How to set the right level of removal development?

Pillar C of the NZI dashboard seeks to quantify all CO_2 removals that occur within the company's value chain (C1,C2), or that are caused by financing outside its value chain, whether through direct financial investments in sinks or the purchase of credits generated by carbon sequestration projects (C3).

The concept of removal accounting is currently being developed by the World Resources Institute (WRI) as part of the GHG Protocol's "Carbon Removal" framework[15]. It is scheduled for release in late 2021. The Net Zero Initiative has therefore not specifically looked at how to count removals in the value chain.

Instead, the work focused on the issue of the right level of contribution to the development of removals, in order to answer the question: **"what target should each company set for Pillar C to contribute to the right level of developing the removals required by the IPCC scenarios?".**

The literature review shows that a number of initiatives have already answered, or begun to answer, this question. These include:

[15] https://ghgprotocol.org/blog/update-greenhouse-gas-protocol-carbon-removals-and-land-sector-initiative

- the *Foundations for net-zero target-setting in the corporate sector*[16] **(SBTi)**, which estimates that the "right level of sinks" to be achieved in 2050 should be the equivalent of the company's residual emissions in 2050, after reducing along a trajectory compatible with an increase of 1.5°C;

- the *Climate Responsibility Approach*[17] of the **NewClimate Institute** think tank, which considers that companies should commit to a total amount of financing outside their value chains (without distinguishing a priori between financing towards sinks and financing towards emission reduction projects);

- the **PAS 2060**[18] and **Carbon Neutral Protocol**[19] approaches, which consider that companies must immediately "offset" their emissions, without however making a distinction between the different types of carbon credits;

- the work of **Climate Analytics**[20] on the distribution of the burden of developing sinks between actors, based on a logic of "historical responsibility" or "capacity to pay";

- corporate practices:
    - **Microsoft**[21] and **Velux**[22], to name but two, and their commitment to absorb all that has been historically emitted by the company, and until 2050;
    - A number of companies aiming to balance their emissions and removals by 2050 or earlier.

Although most of these approaches are rich sources of inspiration, they do not quite address the need to link the company's particular goal with the collective need to develop sinks in an effort-sharing manner.

NZI's work in 2020 has focused on finding rules for companies to set the right level of contribution to carbon sinks in Pillar C.

4. Summary of work to be carried out in 2020

A synthesis of what has already been covered and what will be developed during the 2020 Net Zero Initiative season is summarized below.

[16] Science-based Targets Initiative (2020), *Foundations for net-zero target-setting in the corporate sector*
[17] https://newclimate.org/climateresponsibility
[18] https://www.bsigroup.com/fr-FR/PAS-2060-Neutralite-carbone/
[19] https://www.carbonneutral.com/the-carbonneutral-protocol
[20] Fyson et al. (2020), *Fair-share carbon dioxide removal increases major emitter responsibility*
[21] https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/
[22] https://www.velux.com/what-we-do/sustainability/lifetime-carbon-neutral/science-based-targets

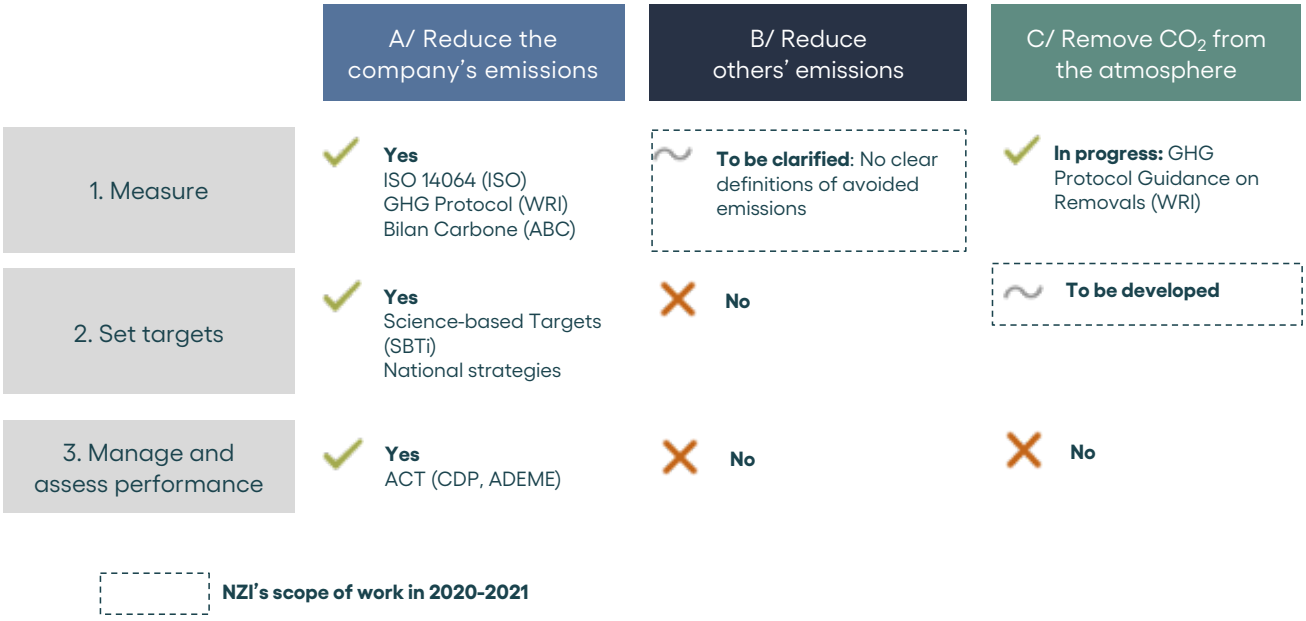


Figure 13 - State of the art of what is currently covered by existing methodologies. NZI 2020's work on Pillar B has focused on the notion of measuring Pillar B, and to a lesser extent on the notion of setting targets consistent with science. The work on Pillar C has focused primarily on the notion of target setting for removal development

5. Working groups

The results presented here were the subject of a study conducted over several months, involving:

- Carbone 4's operational teams: Maxime Aboukrat, Luc Bachelet, Rodrigo Baranna, César Dugast, Zénon Vasselin
- NZI 2020 sponsor companies: EDF, ENGIE, Orange, Poste Immo, RATP, LVMH, Décathlon, Unima, Woodeum/WO2, Tikamoon, GRTgaz, Generali;

- Members of two Technical Working Groups (TWGs), one for Pillar B and the other for Pillar C. Each TWG consisted of:
    - experts from French and international organizations,
    - members of NZI 2020 sponsor companies who volunteered to participate in the technical discussions.

The composition of the two working groups is shown below.

NB: The conclusions shown in this report do not necessarily reflect the views of each working group member.

Name	Organization	Country	TWG B	TWG C
Richard Baron	2050 Pathways / ECF	France		✓
Fanny Fleuriot	ADEME	France	✓	✓

Daniele Pernigotti	Aequilibria	Italie	✓	
Alexandre Rambaud	AgroParisTech	France		✓
Jonathan Guyot	All4Trees	France		✓
Cécile Goube	Alliance Foret Bois	France		✓
Juliette Griton	Association BBCA	France	✓	
Damien Huet	Association Bilan Carbone	France	✓	
Gilles Dufrasne	Carbon Market Watch	Belgique	✓	✓
Manon Castagné	CCFD-Terre Solidaire	France	✓	
Claire Fyson	ClimateAnalytics	Allemagne		✓
M.J. Mace	ClimateAnalytics	Allemagne	✓	
Olivier Gleizes	CNPF	France		✓
Émilie Aubry	Décathlon	France	✓	✓
Anne Grau	EDF	France	✓	
Thibaut Brac de la Perriere	EDF	France	✓	✓
Christine Fedigan	ENGIE	France	✓	✓
David Laurent	EpE	France	✓	
Matthieu Jousset	Fondation GoodPlanet	France	✓	
Adeline Favrel	France Nature Environnement (FNE)	France		✓
François Garreau	Generali	France	✓	✓
Tani Colbert-Sangree	GHG Management Institute	États-Unis	✓	
Alban Thomas	GRTgaz	France	✓	
Alice Saurin	GRTgaz	France	✓	
Pascale Guillo-Lohan	GRTgaz	France		✓
Johannes Svensson	IDDRI	France	✓	✓
Yann Briand	IDDRI	France	✓	✓
Claudine Foucherot	Institute for Climate Economics (I4CE)	France	✓	✓
Julia Grimault	Institute for Climate Economics (I4CE)	France		✓
Hélène Valade	LVMH	France	✓	✓
Arthur Laurent	Microsol	France	✓	

Clément Bultheel	Ministère de la Transition Ecologique (MTE)	France	✓	✓
Emmanuelle Huet	Ministère de la Transition Ecologique (MTE)	France	✓	✓
Carsten Warnecke	NewClimate Institute	Allemagne	✓	
Thomas Day	NewClimate Institute	Allemagne	✓	
Annette Cowie	NSW Department of Primary Industries	Australie		✓
Philippe Tuzzolino	Orange	France	✓	✓
Eli Mitchell-Larson	Oxford University	Royaume-Uni	✓	✓
Thomas Hale	Oxford University	Royaume-Uni	✓	✓
Marie-Thérèse Durand	Poste Immo	France	✓	✓
Aurélien Cartal	PUR Projet	France	✓	✓
Aurélia Menacer	RATP	France	✓	✓
Stéphane Hallaire	Reforest'action	France		✓
Minh Cuong Le Quan	Staterre	France		✓
Derik Broekhoff	Stockholm Environment Institute (SEI)	États-Unis	✓	✓
Yoann Lechat	Tikamoon	France		✓
Gajanana Hegde	UNFCCC	Suisse	✓	
Miguel Naranjo Gonzalez	UNFCCC	Suisse	✓	✓
Panna Siyag	UNFCCC	Suisse		✓
Philippe Blais	Unima	France, Madagascar	✓	✓
Augustin Fragnière	Université de Lausanne	Suisse	✓	✓
Tiina Pajula	VTT	Finlande	✓	
Bastien Bouteloup	Woodeum/WO2	France	✓	✓
David Rich	World Resources Institute (WRI)	États-Unis	✓	
Matt Ramlow	World Resources Institute (WRI)	États-Unis		✓
Brad Schallert	WWF US	États-Unis	✓	

Recommendations

Recommendations for Pillar B

1. Recommendations for Pillar B

A significant amount of groundwork has been done to identify the problems with the current definition of avoided emissions and the methodological solutions that can be used to make this metric an effective measure of the contribution to global neutrality made by companies, and one that makes sense in the fight against climate change. This section summarizes the responses to the six issues identified by the Net Zero Initiative in 2020:

- **Issue N°1:** Should avoided emissions by goods or services be accounted for jointly or separately from those triggered by financing emission reduction projects outside the value chain?
- **Issue N°2:** What is the right metric to quantify a contribution to decarbonation?
- **Issue N°3:** How can a good baseline scenario be defined?
- **Issue N°4:** How can "real reductions" be distinguished from "lower increases"?
- **Issue N°5:** How should avoided emissions be allocated among the different companies that contribute to the same good or service? (B2)
- **Issue N°6:** How can we set an ambitious, achievable and fair target for avoided emissions?

A. Recommendations

Issue 1: how to report Pillar B categories

Should avoided emissions by goods or services be accounted together with or separately from those triggered by financing emission reduction projects outside the value chain?

An organization can contribute to the decarbonation of third parties in two ways:

- **B2:** through the effect of its goods and services sold that replace more carbon-intensive goods and services for end customers;

- **B3:** through the financing of emission reduction projects outside its value chain (purchases of certified emission reductions, direct equity investments in projects, low-carbon energy contracts under certain conditions[23], etc.).

Recommendation

The Net Zero Initiative believes it is important to rigorously distinguish between these two types of avoided emissions (B2 and B3), and to report and monitor them separately.

The reasoning behind this decision is explained in Annex 1.

Issue 2: Metric to quantify Pillar B

What is the right metric to quantify a contribution to decarbonation?

In 2020, the Net Zero Initiative considered how best to quantify the contribution to emission reductions by third parties (Pillar B). To do this:

1. the notion of avoided emissions was questioned, and in particular the relevance of the classic indicator in **tons of CO_2e avoided**, which presents risks of greenwashing;
2. **Alternative metrics** were considered.

The reader can find all the options discussed in the **annex to this report.**

Recommendation for B2 - Contribution to decarbonation through goods and services

The metric chosen by the Net Zero Initiative to quantify B2 remains tCO_2e avoided, provided that it is clearly specified whether these are "actually reduced" emissions or those that are " increased less" (see Issue 4).

Despite the pitfalls that it can lead to (see the full report for more details), this metric remains the most suitable for quantifying a contribution to decarbonation, as it corresponds to a physical flow. It also makes it possible to take into account the importance of the **context** in which the sale of a given product takes place, through the reference situation.

[23] For example, a green electricity contract does not necessarily contribute to the decarbonation of the national electricity mix, since the guarantees of origin purchased could very well come from existing low-carbon installations. For such a contract to count as avoided emissions under Pillar B, it must be shown that it triggers, at least in part, the construction of new low-carbon electricity generation capacity.

In addition, the Net Zero Initiative recommends that the share of sales that corresponds to the calculated avoided emissions should also be disclosed. For example, if the organization has focused on a particular product range in calculating its avoided emissions, the share of that product line in total sales should be made explicit.

In this way, the organization's communication will take the following form: **"We are helping to avoid the emission of XX tCO_2e from our customers thanks to our low-carbon offers, which represents YY% of our sales"[24].**

Recommendation for B3 - Contribution to decarbonation by financing projects outside the value chain

The Net Zero Initiative recommends disclosing two metrics together and inviting **companies to report both the amount of avoided emissions** they are helping to generate **and the amount of associated funding.**

It is possible to communicate only an approximate amount of avoided emissions generated, for example in the case where the projects supported are long-term projects (R&D) whose impact is difficult to quantify, or in the case of the purchase of "practice-based credits". This approximation does not pose a major problem as the B3 category is not used to "offset" the company's emissions in Pillar A.

The company is asked to **calculate the ratios between the amount of tons avoided and the funding,** in order to make the cost per ton avoided of the projects funded transparent.
In this way, the organization's communication could take the following form: ***"We are avoiding the emission of XX tCO_2e thanks to our funding of YY k€ for low-carbon projects. The average cost per ton avoided is YY/XX k€/tCO_2 avoided".***

In both cases (B2 and B3), the Net Zero Initiative recommends **always distinguishing** between avoided emissions corresponding to a real reduction, and avoided emissions that only reflect a lower increase compared to the previous situation (see Issue 4).

NZI also points out that it is obviously **not possible to subtract this amount of tCO_2e avoided from the company's Pillar A of NZI reporting, as the three Pillars are strictly independent.**

[24] Note: there is no need to define what a "low-carbon product" is in order to provide this information. A sale is counted as "low-carbon" when it is proven that the product/context pair (i.e. the sale of such and such a product in such and such a context) triggers a reduction in emissions for the customer.

Issue 3: Calculation of avoided emissions and choice of baseline scenario

How to calculate avoided emissions?

This question applies to both the company's products and services (B2) and to the financing of decarbonation projects outside the value chain (B3). For the latter category, however, in the specific case of purchases of credits from certified projects (Low Carbon Label, Gold Standard, Verra, UNFCCC, etc.), methodologies already exist to calculate avoided emissions. However, the recommendations below are intended to apply to all cases.

The calculation of avoided emissions is based on the difference between the situation with the project and a counterfactual situation, which would have occurred in the absence of the project. It is therefore necessary to:

- **Reason with a "life cycle" rationale**: it is not desirable to focus on a specific part of the life of a solution or project, but to evaluate the emissions of the project and the baseline scenario over the entire perimeter.
  For example, in the case of emissions avoided by an electric vehicle, the manufacturing phase of the vehicle should be taken into account, not just the use phase.

- In the case of products and services (B2), **assess the cumulative avoided emissions over the life of the project, and link them to the year of sale**.

- **Take into account the evolution of the baseline scenario over time,** in order to take into account the market trend or regulation. Thus, the emission reduction achieved by a project compared to the previous situation may well have taken place regardless, thus not resulting in any avoided emissions.
  For example, if the regulation requires mandatory retrofitting of the building stock in a given geographical location, it is not clear that an energy retrofitting company can claim to have avoided emissions if its work complies only with the expectation of the regulations.

How to define a good baseline scenario?

The reference scenario must describe **the most likely situation that would have occurred in the absence of the solution studied.**

Note: the Net Zero Initiative has chosen not to contravene this classical definition of avoided emissions, but to define them as a difference between an actual and a fictitious

(or 'counterfactual') situation. It nevertheless insists very strongly on the fact that, in this definition, an "avoided emission" is not necessarily synonymous with a real and absolute reduction compared to a previous level. The distinction between avoided emissions "actually being reduced compared to the previous situation" and avoided emissions "showing a lower increase compared to the previous situation" is addressed in Issue 4.

To define a good reference scenario, it is necessary to identify homogeneous situations in terms of performance and the use of solutions, depending on a number of parameters. For example, current or future regulations (e.g. future ban on sales of oil-fired boilers or thermal vehicles) constitute a minimum requirement for establishing the reference scenario. The parameters presented below are aimed at developing the most relevant baseline scenarios. This is a list of parameters applicable to most avoided emission analyses (although it is not intended to be exhaustive).

These calculation principles are applicable to both emissions avoided by goods and services sold (B2) and emissions avoided by financing projects (B3). When calculating emissions avoided by projects generating carbon credits, Net Zero Initiative recommends that results from certification methods (Gold Standard, Low Carbon Label, etc.) should be used directly (although the incorporation of the recommendations below into these methods is strongly encouraged).

Parameter 1: sales context

A solution that replaces an existing solution at the customer's site will not avoid the same amount of emissions as one that does not replace anything at the customer's site.

Depending on the sales context of the solutions studied, it is possible to identify three main distinct situations:

- **Replacement:** the solution analyzed replaces an existing solution, which will be decommissioned, leaving the market definitively.
- **Direct market growth:** the solution analyzed is sold within the framework of the growth of its market to a new consumer of this type of solution. In this case, the solution does not replace any other solution.
- **Indirect market growth:** the solution analyzed replaces an existing solution, which will not be decommissioned but replaced elsewhere for a different use within the framework of additional market growth. In this case, the solution replaces only part of the existing solution's usage.

Example:

A car can be sold in different sales contexts:

- Replacement: the new car will replace an old car that will be retired.
- Direct market growth: the new car will be purchased by a customer who did not have a car before. It will not replace any existing car and will be used to increase the fleet.
- Indirect market growth: The new car replaces an existing car, but the old car is sold second-hand to a third-party who did not previously own a car. In this case, the new car partially replaces the existing car. This growth is therefore not in the primary car market but in the secondary car market.

Parameter 2: geographical distribution

A solution will not have the same avoided emissions depending on its country of use. Indeed, the country of marketing/use of the solution studied will play a role in the performance of the reference scenario, and in the performance of the solution analyzed, especially regarding the emissions induced during the use phase.

Thus, it is important to take into account the geographical distribution of sales when identifying the sub-scenarios to be defined.

In the case of multinational companies, a simplification can be considered so that it is not necessary to study in detail all the countries of sale. For example, countries can be aggregated by region or by similarity of usage. Alternatively, the top countries, which together represent 80% of sales, can be analyzed first and the results extrapolated to the remaining 20% of sales.

Example: Sale and use of an electric sedan (segment D) in France or Germany.

For this example, the reference situation is identical in both cases: the sale of the electric car replaces the sale of a diesel car, whose emissions do not depend on geography.

On average, the electric car used in France will avoid 50% more emissions per kilometers than the same car used in Germany. This is because the carbon intensity of electricity is higher in Germany than in France. The emissions avoided by an electric car therefore depend on the country in which it is used[25].

Parameter 3: market segments

A solution will not avoid the same amount of emissions depending on the product segment it replaces. Therefore, when defining performance and use in the reference scenario, we should not be satisfied with an overall market average, but rather look for figures that are as specific as possible to the market segments concerned.

Example:

A new residential building can accommodate inhabitants previously housed in different types of construction, such as single-family houses, semi-detached houses, collective housing, etc. Depending on the previous housing, the reference scenario will not have the same performances and uses.

[25] Carbone 4, *Road transportation: what alternative motorizations are suitable for the climate?* http://www.carbone4.com/publication-transport-routier-motorisation-alternatives/

Parameter 4: age of goods

As with the market segments, the age of the products replaced also has an influence on their performance and potentially their usage. Thus, the age of the goods replaced must also be taken into account when defining the reference sub-scenarios.

Example:
As seen above, a new car can generate avoided emissions by replacing an existing car or by avoiding the purchase of a new, more carbon-intensive car.
In the first case, the baseline performance will not be the average performance of the existing fleet, but the performance of the car being retired. As an approximation, it is possible to use the average performance of the cars leaving the fleet, which are older than the fleet average.
In the second case as well, the reference scenario is not the average performance of the existing fleet, but the performance of the new car that was not purchased. As an approximation, the average performance of new cars can be used.

Parameter 5: customer profile

The same solution will not have the same performance and uses depending on the profile of the customers to whom it is sold. Thus, the different types of customers must be considered in the definition of the reference sub-scenarios.

Examples:
The renovation of a tertiary building allows for a reduction in the need for heating. The energy consumption before and after the renovation depends directly on the profile of the organization occupying the building: offices, shops, hospitals, hotels, etc.
In the same way, a given car will not have the same performance and use if it is acquired by a private individual as if it were part of a company fleet.

In summary, the Net Zero Initiative encourages **the development of good baseline scenarios using the criteria listed below,** with an attempt **to transform these scenarios over time in phase with the evolution of what is considered to be the 'baseline'.** As mentioned above, particular attention should be paid to **the market trend for a given use** and to **the current regulations.**

Issue 4: "real reductions" vs. "lower increases"

How to distinguish "real reductions" from "lesser increases"?

Whether for B2 (goods and services) or B3 (carbon finance), avoided emissions are by definition a difference between a "real" situation and a "virtual" (counterfactual) situation that would have occurred in the absence of the project. This definition therefore says nothing about the variation in the situation between two given moments, since the reference is not a previous point in the system, "which existed in the past", but a situation concomitant with the project, a virtual situation "which could have been now".

The shortcoming of this definition is that it gives no information on the actual impact of a given project on **the variation of an absolute level of emissions over time**. The amount of avoided emissions calculated can therefore, depending on the case, reflect:

- A real reduction in emissions compared to a previous more carbon-intensive situation;
- A lesser increase in emissions compared to a counterfactual scenario that never happened but would have induced more emissions than the current situation.
-

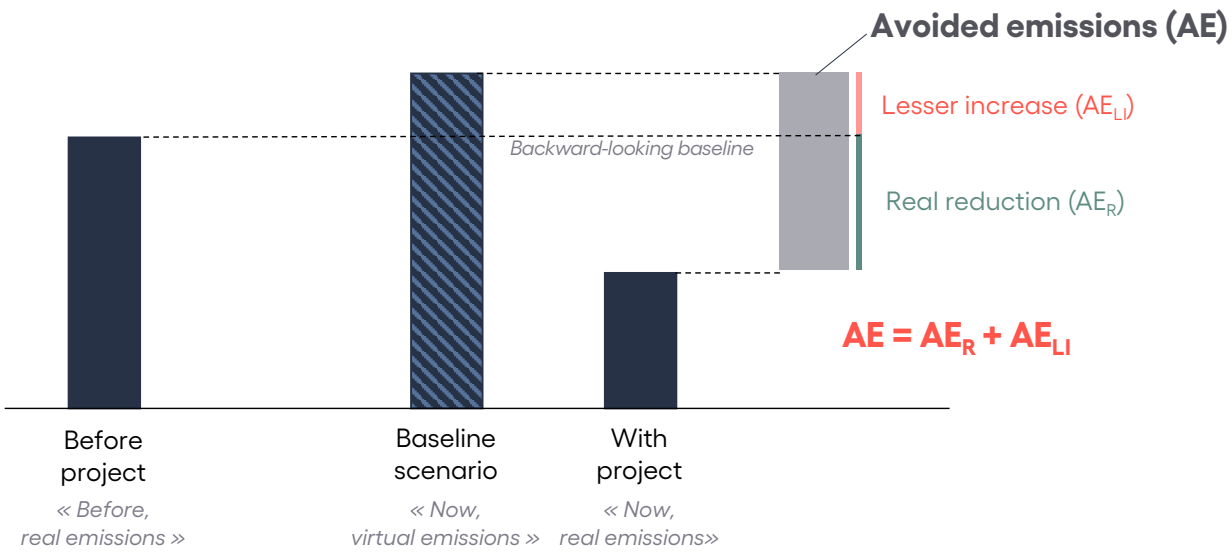


Figure 14 - Illustration of the difference between the two types of avoided emissions

These two types of avoided emissions are currently not distinguished, even though they cover two very different physical realities.

The Net Zero Initiative proposes to refine the current definition of avoided emissions to take into account the difference between real reductions and lesser increases in emissions. To do so, we propose the following definitions:

- **Avoided emissions (AE):** Avoided emissions are the difference in emission levels between the current situation and a counterfactual baseline situation.

- **Avoided emissions - Reduction (AE_R):** the share of avoided emissions corresponding to an actual reduction in emissions compared to the previous situation.

- **Avoided emissions - lower increase (AE_{LI}):** the share of avoided emissions corresponding to a lower increase in emissions compared to the previous situation.

AE, AE_R and AE_{LI} conform to the following equation:

$AE = AE_R + AE_{MA}$

Thus, this distinction makes it possible to isolate, within the total avoided emissions, the proportion that corresponds to the real decarbonation of the system before and after the project (AE_R).

Of course, not all avoided emission situations are "hybrid" situations comprising both types. If, for example, the level of emissions in the baseline scenario remains stable compared to the initial situation, there will only be avoided emissions of the "reduction" type (AE_R).

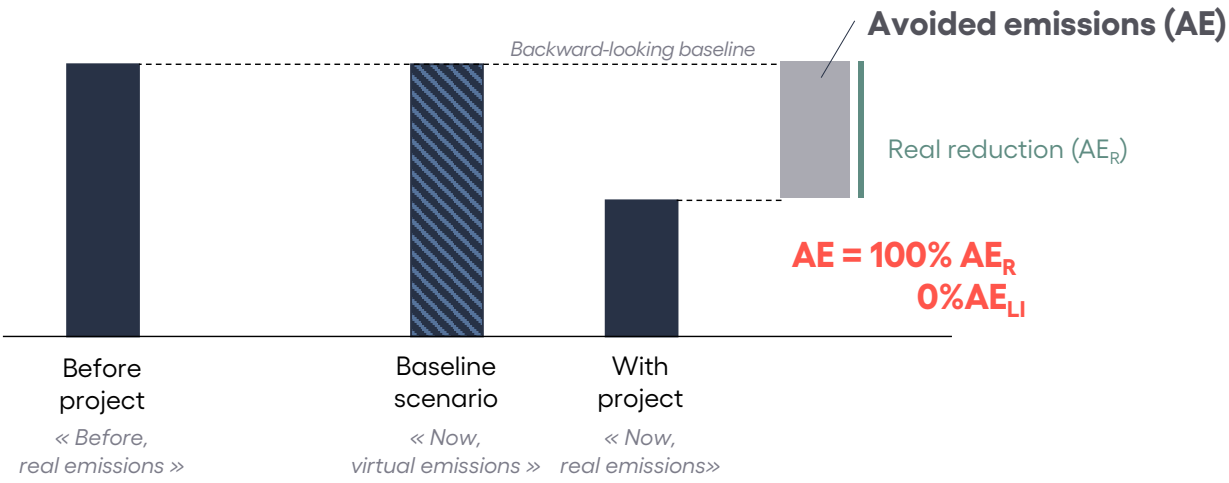


Figure 15 - Pure reduction situation, with a reference scenario stable with respect to the previous state of the system. Example: energy retrofitting of a building that would have remained the same without retrofitting

Note that the amount of EE_R can never be greater than the total amount of EE. If, for example, the project significantly decarbonizes the system compared to the previous state, but the system would have decarbonized a little anyway in the absence of the project (lower baseline, e.g. due to market trend or regulation), EER will not be equal to the difference between the pre-project/post-project levels, but to the difference between the project and the baseline scenario. In other words, EE_R is always a **share** of total EAs, which can never exceed 100%.

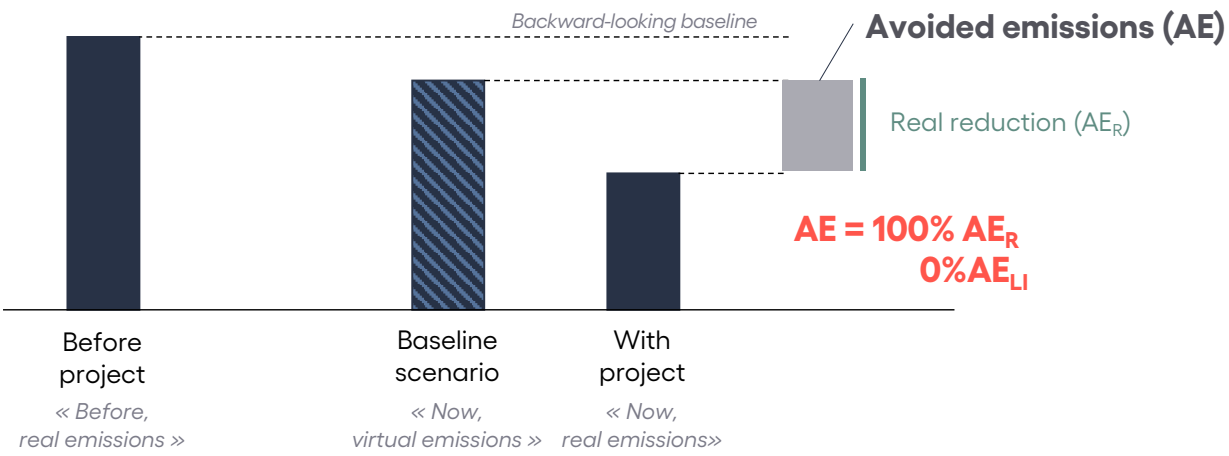


Figure 16 - Pure reduction situation, where the baseline scenario is reduced compared to the previous state. AE_R is not equal to the difference between the pre-project situation and the project situation, but rather to the difference between the baseline scenario and the project situation.
Example: energy renovation of a building that would have been renovated anyway, but with less ambition

Finally, in the case where the situation with the project is improving compared to the previous situation of the system, but not as much as would have happened in the absence of the project, the emissions avoided are 100% "lower increase" emissions (AE_{LI}).

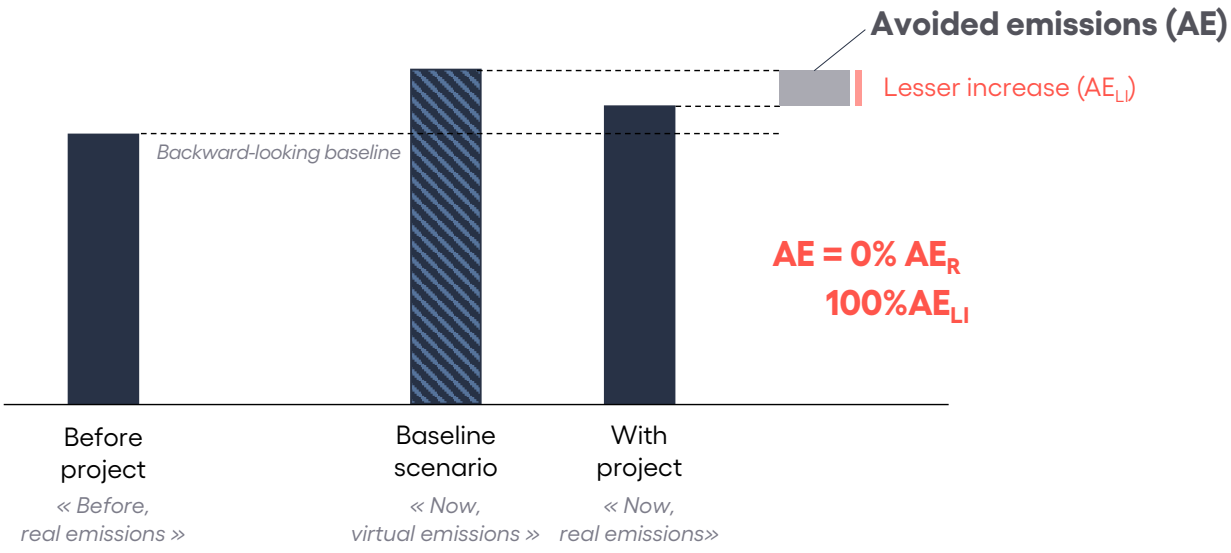


Figure 17 - The “lower increase' situation. Example: Construction of a new low-carbon building which, even if it does better than the new building trend, still means an absolute increase in emissions compared to the previous state of the building stock

Example for a company in the automotive sector

Let us imagine a company, ModernCars, that produces low-carbon cars. ModernCars sells a fleet of its low-carbon vehicles in 2020 to a corporate customer, and seeks to calculate the emissions avoided by that fleet[26].

Let us apply this concept to the following three examples:

Example 1: Avoided emissions corresponding to an absolute reduction in the level of emissions
ModernCars' corporate client wishes to renew its fleet of commercial vehicles. A study shows that without ModernCars, the client company would have purchased a fleet of commercial vehicles with the average carbon performance in the market, which would have lower emissions but higher carbon emissions than the ModernCars fleet. The new fleet of commercial vehicles replaces the company's old fleet, which is being taken out of circulation, thus emissions are reduced.

➔ **ModernCars can claim avoided emissions because it is doing better than the market average.**

➔ **Because the level of emissions is lower than before, these avoided emissions are 100% reduction emissions (AE_R).**

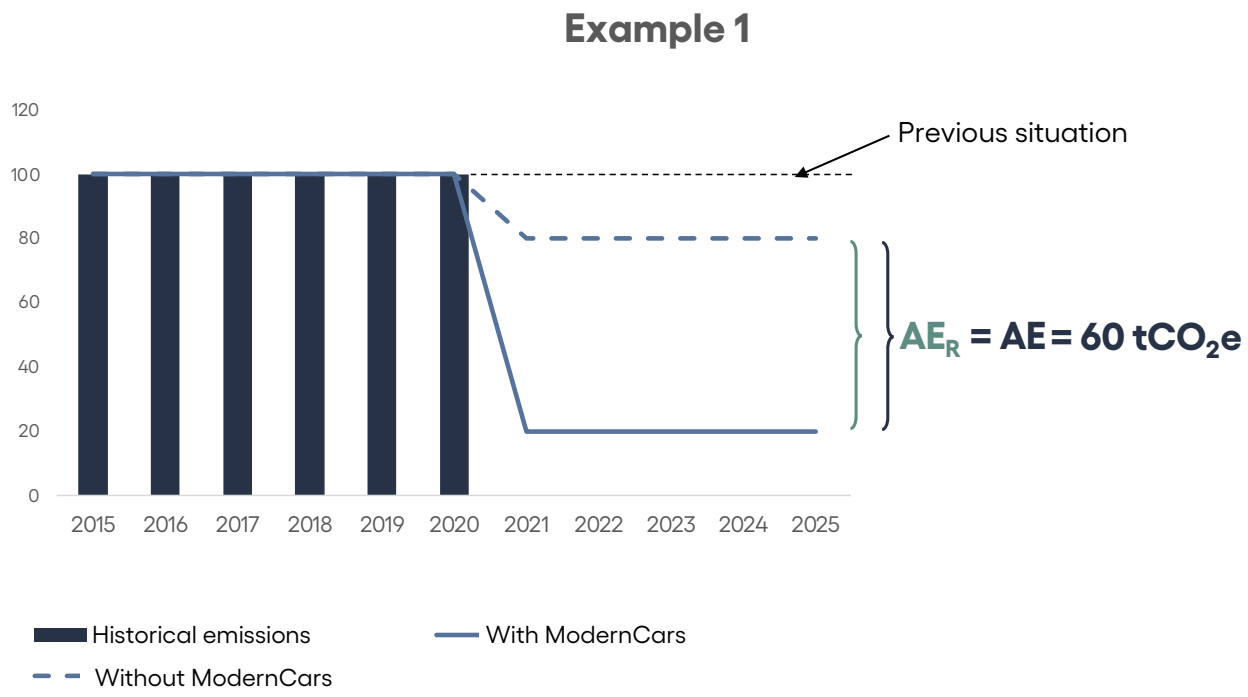


Figure 18 – Example 1

[26] Values used in the example: the old fleet of vehicles emits 100 tCO_2e per year. The new fleet of ModernCars emits 20 tCO2e per year. The new fleet of mid-market carbon performance vehicles emits 80 tCO_2e per year. The new fleet of premium vehicles emits 120 tCO_2e per year. Note: these emissions include all sources over the life of the vehicles, including manufacturing and end-of-life emissions.

Example 2: Avoided emissions corresponding to an absolute increase in the level of emissions
ModernCars' corporate client wishes to expand its fleet of vehicles.
A study determines that without ModernCars, the client company would have purchased a fleet of vehicles with the average carbon performance of the market, more emissive than ModernCars and manufactured by a company competing with ModernCars.
The new fleet of vehicles meets the client's need for additional vehicles and is therefore added to the existing fleet while the old vehicles are still in use: emissions increase compared to the previous situation.

→ **The avoided emissions are 100% lowest increase emissions (EA_{LI}),** which reflect the fact that the absolute level of emissions has actually increased with the project (but less quickly than the baseline).

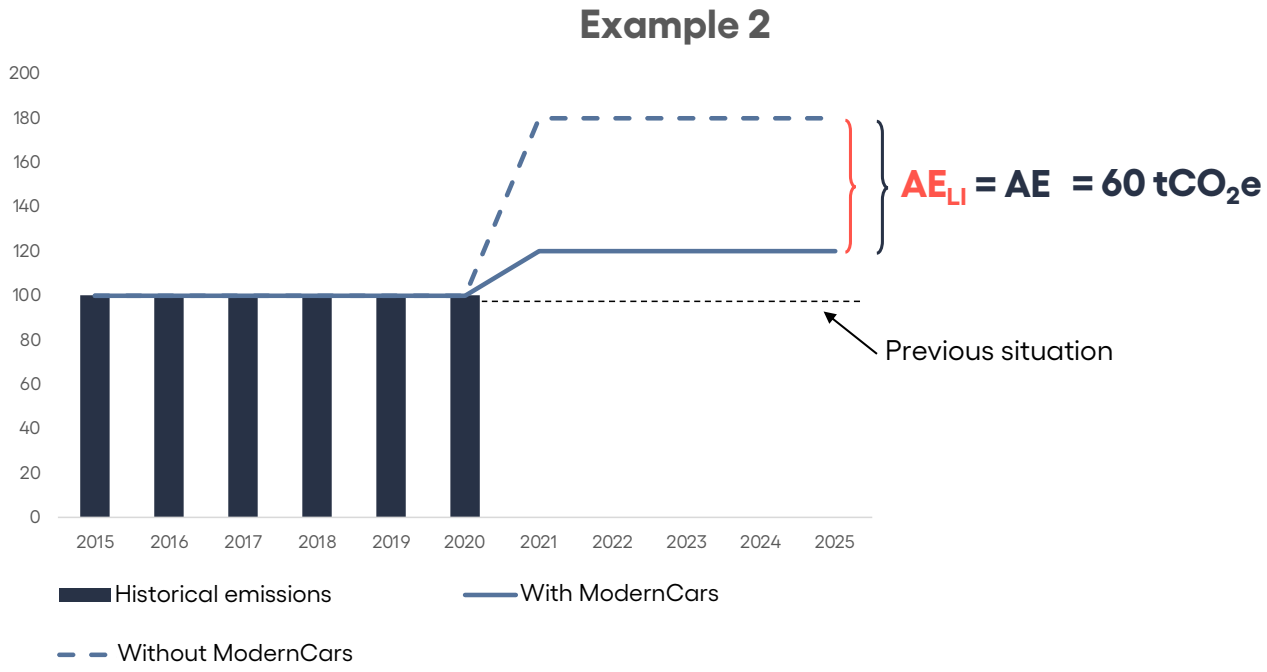


Figure 19 – Example 2

Example 3: avoided emissions corresponding partly to an absolute decrease and partly to an absolute increase in the level of emissions
ModernCars' client company wants to renew and upgrade its fleet of vehicles.
A study determines that without ModernCars, the client company would have purchased a fleet of luxury, more carbon-intensive vehicles produced by another car manufacturer
The new vehicle fleet replaces the company's old fleet, which is being retired from the fleet of vehicles in use, which implies an absolute decrease in emissions compared to the previous state.

→ **In this example, 80% of the EA are ER_R and 20% are EA_{LI}.**

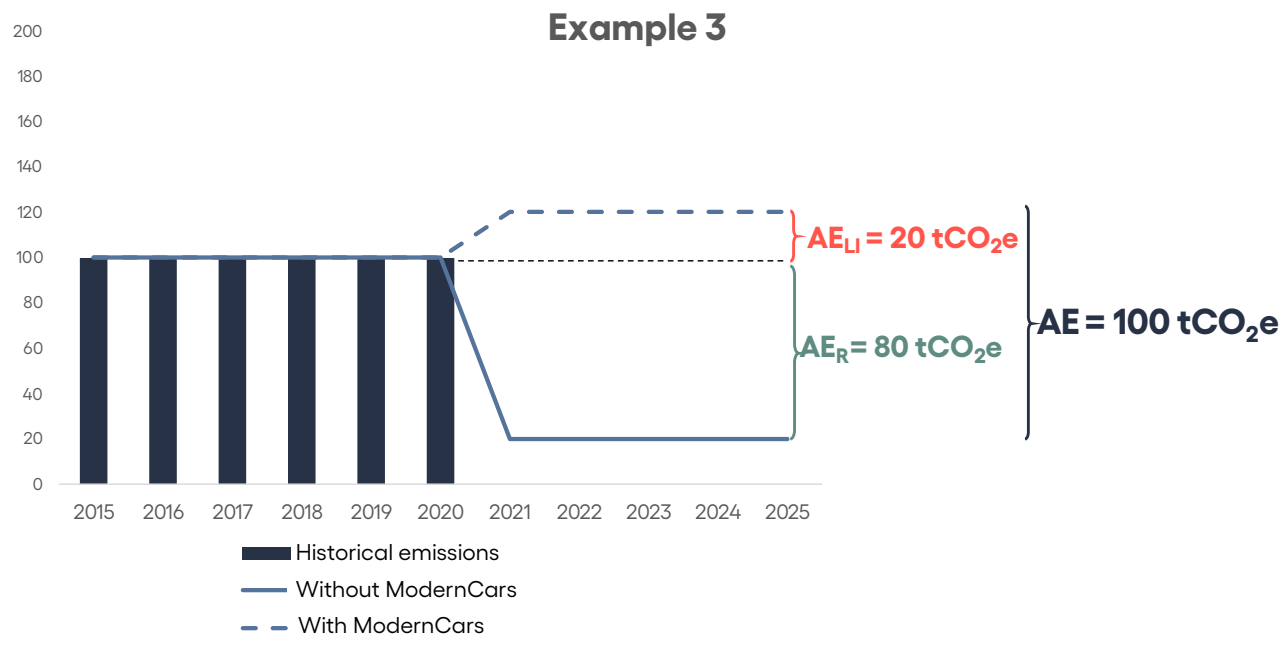


Figure 20 – Example 3

Recommendation

The Net Zero Initiative recommends that organizations:

1. **Calculate their avoided emissions (AE)** (see Issue 3),
2. **Calculate their avoided emissions - Reduction (AE_R),**
3. **Calculate their avoided emissions - lesser increase (AE_{LI}),**
4. **Disclose and monitor the AE and the corresponding share of AE_R and AE_{LI}.**

Issue 5: Allocation of avoided emissions (B2)

How should avoided emissions be allocated among the different companies that contribute to the same product or service?

The analysis of avoided emissions requires taking into account all the emissions of the value chain of the solution studied and that of the reference scenario. In order to keep the vision of interdependence between the different actors, it could have been envisaged that **no allocation rule be applied** in the estimation of avoided emissions, which means that each actor in the value chain reports all the emissions avoided by the solution proposed.

However, to ensure consistency with Pillar A - induced emissions, the Net Zero Initiative recommends that the scope of analysis and reporting should be identical to that of the carbon

footprint. In this way, an organization can only claim avoided emissions from a solution if all the emissions induced from the value chain of that solution are included in its carbon footprint. Thus, if an allocation rule is applied to induced emissions in Pillar A, t**he same allocation rule must be applied** to avoided emissions in Pillar B.

Example:
A supplier of electric vehicle charging stations is dependent on all the emissions induced by the generation of electricity used to charge the vehicles' batteries, as well as the manufacturing of the electric vehicles using the stations (Pillar A). Furthermore, as a member of the electric vehicle value chain, it would like to claim the avoided emissions (Pillar B) not generated by the vehicles that its charging stations charge.

In practice, such a player does not account for all the emissions generated by these vehicles in its carbon footprint (Pillar A), but only the part for which it considers itself directly responsible. For example, it allocates to itself the emissions linked to the manufacture of its bollards and those of electrical losses at the bollard. The terminal supplier would then only allocate 1% of the total emissions of the electric car value chain in its pillar A. In this case, in order to maintain consistency between Pillar A and Pillar B, **this actor can only claim 1% of the emissions avoided by the electric car kilometers travelled thanks to the energy supplied by its terminals**.

Issue 6: Target setting on Pillar B

How can an ambitious, achievable and fair target be established for avoided emissions?

To make avoided emissions a relevant indicator of companies' contribution to global neutrality, they must set a target that is ambitious, achievable and fair. The ambition of the target must reflect the scale of the effort required to achieve global neutrality. It must also be achievable so that it does not inhibit action. And finally, the target must be fair, i.e., appropriate to the sector and size of the company.

Since emissions avoided by products and services (B2) and by financing projects outside the value chain (B3) must be accounted for separately (see Issue 1), separate targets must be set for these two contributions.

Recommendation for B2 - emissions avoided by products and services

For the target setting methodology to be science-based, a total volume of emissions to be avoided must be calculated against a counterfactual prospective emissions scenario. This means that the avoided emissions target setting methodology is highly dependent on the avoided emissions measurement methodology. Both methods must therefore be developed together.

The Net Zero Initiative is not yet in a position to provide recommendations for setting targets for avoided emissions from products and services at this stage. This will be the focus of the work planned for 2021, when **measurement and target setting methodologies will be developed by industry**.

Recommendation for B3 - emissions avoided by financing projects outside the value chain

This will also be considered as part of the work to be done in 2021.

B. Case study

The reader can find two case studies, one for transport (electric vehicles), the other for electricity production (emissions avoided by low-carbon electricity) in Annex 2 of this report.

Recommendations for Pillar C

Recommendations for Pillar C

To truly contribute to global carbon neutrality and do their fair share in the fight against climate change, companies must implement a climate strategy aligned with the Paris Agreement for each of the three Pillars of carbon neutrality: A - Induced Emissions, B - Avoided Emissions, C - Negative Emissions.

The third and last Pillar of the NZI framework, Pillar C, is an indicator that measures the contribution of companies to the development of global carbon dioxide removal. This document is a methodological guide to help organizations understand their role in the global (or national) effort to develop carbon dioxide removal, and to help them define a negative emissions trajectory consistent with the Paris Agreement.

The target-setting method is separated into two parts:

- Firstly, a method for all types of companies, addressing all of Pillar C;

- Secondly, additional guidance only for companies with a significant amount of carbon dioxide sinks within their value chain, allowing for an additional target to be set that is essential to the consistency of the climate ambitions of these companies. This second part of the method is outlined here and will be the subject of the Net Zero Initiative work done by Carbone 4 in 2021.

The scientific basis, feedback from experts and reasoning behind these methods are detailed in the full report.

A. Reminder of vocabulary and concepts

i. Categories under consideration

What is carbon dioxide removal seen from the perspective of a company? Let us take several examples to demonstrate that this is not a homogeneous category:

- A **forestry company** or an **agricultural cooperative** manages assets that will remove and sequester (or destock) carbon every year. The removal source is owned directly by these companies.

- A **food-processing company** does not own any carbon sink as such but relies on suppliers upstream in their value chain who potentially have direct control over these sinks. From its

perspective, these removals could be described as indirect, as they are upstream in the value chain but not owned.

- A company **selling carbon capture and storage devices** (e.g. an energy or industrial company), **or nature-based solutions** (e.g. a tree nursery) does not remove any carbon by itself but enables its customers to do so. This is also an indirect removal, downstream of the value chain.

- A company **buying carbon credits from reforestation projects**, or **directly financing such projects**, contributes to the increase of the overall amount of sinks without this sink appearing in its value chain. These carbon dioxide removals are "triggered" by its financing and represent an increase in the level of removal compared to a baseline situation.

Three categories for Pillar C then emerge, depending on their localization in the value chain:

- **C1:** direct carbon removals, owned by the company. To caricature, this is the equivalent of direct emissions (Pillar A1), but in "negative" terms.

- **C2:** indirect carbon removals occurring upstream or downstream of the value chain. This is equivalent to "scope 2+3 emissions", but for removals.

- **C3:** Carbon removals triggered outside the value chain via the financing of carbon dioxide removal projects. This can be done through the purchase of certified credits on the voluntary carbon market, or through the financing of projects that meet a number of criteria[27].

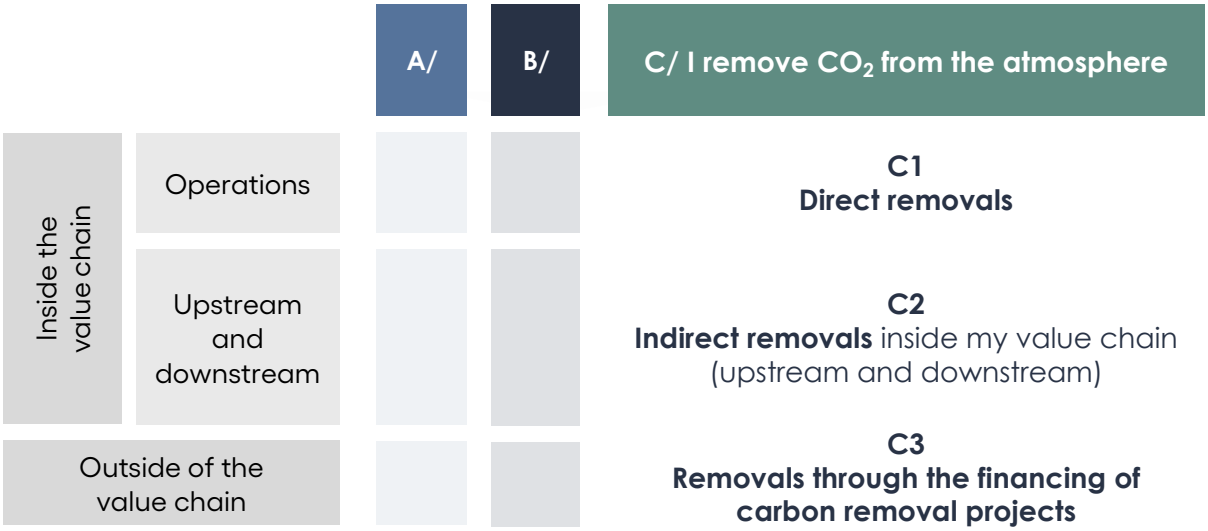


Figure 21 - Net Zero Initiative matrix categories for Pillar C - Negative Emissions

[27] Ideally, a purchased carbon credit should be exactly equivalent to one additional ton of carbon sequestered compared to a situation where there would be no financing through the sale of credits. However, it is now known that a number of sequestration projects are only partially financed via the generation of credits, but nevertheless grant 100% of the sequestration to these credits. This has the effect of overestimating the effect triggered by the purchase of a credit, and therefore being very favorable to the buyer. See the appendix of the NZI standard published in April 2020, as well as the final report of the I4CE working group on the Low Carbon Label applied to agri-food industries.

Each of these categories can, of course, coexist with the others: for example, a food-processing company can both own indirect sinks upstream (C2) and finance removals outside its value chain (C3).

For C1 (direct removal) and C2 (indirect removal), the accounting logic is **inventory accounting:** all the removals that have taken place in a year are counted, exactly as one would count in Pillar A all the direct (Scope 1) and indirect (Scopes 2+3) emissions that take place in a company's value chain in a given year.

For C3 (financing of removals), the logic is different since it is **intervention accounting**: it is not an absolute quantity of absorption that is counted (as with C1 and C2) but the difference between an actual absorption and a counterfactual reference scenario which would have occurred in the absence of the financing in question. This is the logic of carbon credits or avoided emissions: the unit used is always a difference between the actual situation with the carbon sink project and a fictitious scenario without the sink.

Another difference is that for some sequestration carbon credits (C3), removals are counted before they take place (ex-ante), and brought back in full to the year of sale of the credit, which is very different from C1C2 accounting, which is strictly annual. Ex-post credits do not present the same problem, as they are generated after verification; however, the fact that they are not generated annually, but every three or five years (or even more), may also raise other timing issues. Ideally, NZI could propose a credit selection rule to maximize the coincidence between the date of credit purchase and the actual date of absorption.

How can Pillar C be counted?

The major difficulty with Pillar C is that most carbon sinks are not permanent. This means that once absorbed by a sink, the carbon is likely to be re-emitted in the future due to the instability of the storage pool. For example, planting a tree may result in carbon being absorbed as it grows, stored in the ground for a few decades, and then released into the atmosphere at some point. From the point of view of the atmosphere, if the re-emission takes place too quickly, it is as if "nothing had happened", or almost nothing[28]. This raises the conceptual difficulty of how the notion of sink permanence in the calculation of absorptions should be taken into account.

This conceptual difficulty does not exist for Pillar A, since emitting a ton of fossil CO_2 means storing it in an extremely stable reservoir: the atmosphere. One ton of CO_2 has a very high residence time due to the high chemical stability of the carbon dioxide molecule in the atmosphere.

In the following, we will assume, for want of a better term, that the risk of impermanence is already taken into account in the estimation of the absorption fluxes. That is, any uptake considered is an 'equivalent permanent' uptake that reflects the expectation that the carbon will be stored for at least 100 years given the hazards to which the reservoir is exposed. A discount may be applied if necessary. For example, if a forester plants a tree that does not have a 100% chance of remaining

[28] In fact, storing carbon outside the atmosphere for a period of time has the merit of avoiding the radiative forcing of that carbon during that time interval. See "dynamic" counting methodologies for more information.

standing after 100 years, they will apply a discount to reduce the amount of 'permanent' uptake that this planting represents.

Other possibilities are also on the table, such as not counting **uptake and re-emission fluxes,** but monitoring **changes in carbon stock.**

The details of how to calculate biogenic carbon accounting are being developed by WRI as part of their "Removals" protocol, which will be published in late 2021. These issues will also be the subject of a specific study by Net Zero Initiative during 2021. In the meantime, NZI is suspending judgment on these accounting issues.

B. Target setting

1. Overall spirit

The purpose of this section is to specifically describe the methodology that any company can apply to set a Paris Agreement-compliant removal development ambition consistent with the net-zero global goal.

Throughout discussions with the Technical Working Group (see full report), it became clear that a company's responsibility for removal development is twofold:

- On the one hand, a company is expected to participate in the development of removals because **it is part of the climate issue**: it is a responsibility **as a GHG emitting entity.** This responsibility is therefore incumbent on every company. Intuitively, the level of carbon dioxide sinks to be developed by the company should be consistent with the amount of sinks to be developed at the macroscopic level, and proportional to the company's own impact (past, present and/or future) on the climate[29].

- On the other hand, in some cases, a company is expected to participate in the development of removals not because it emits GHGs (and therefore bears responsibility as an emitter), but because it **manages and operates these carbon sinks**. Thus, it has an **operational responsibility to safeguard and develop carbon sinks** which have little or no connection to its GHG emissions. This responsibility falls **specifically on companies with sinks in their value chain** (categories C1 and C2), referred to in this report as "removals operators". Intuitively, the level of removals to be developed should be consistent with the absorption "carbon budgets" projected by the 1.5°C scenarios for each type of sinks.

[29] Or to the company's capacity to pay.

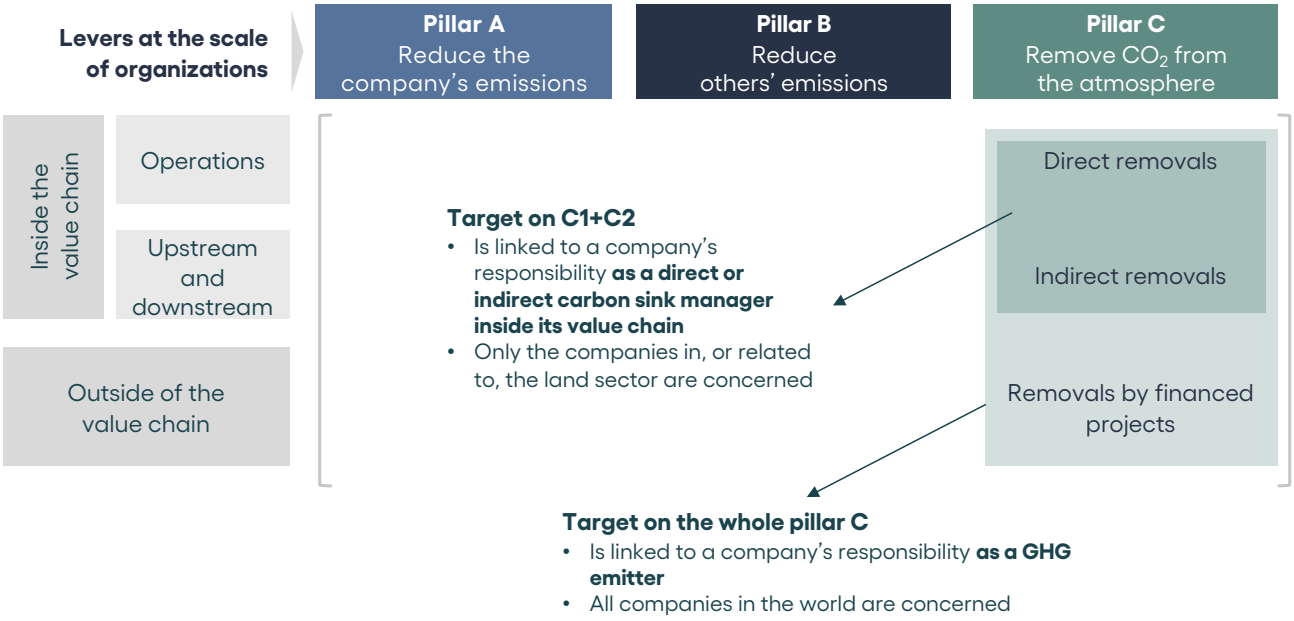


Figure 22 - Coverage of Pillar C categories by the target-setting methods presented in this report

For example, an intellectual services company or a car manufacturer will have only one objective: that of its overall Pillar C, relating to its responsibility as an emitter. But a food-processing or forestry company will also have a specific objective in the C1 and C2 categories as an actor in the agricultural or forestry value chain, so that it can help the community to comply with the carbon budgets provided by the IPCC scenarios.

The following two parts specify the modalities for setting each of these two types of objectives.

2. Overall target on Pillar C

i. General principles of the methodology

Net Zero Initiative is proposing a "top-down" approach, which aims to refer to both:

- **macro scenarios for the development of carbon removal**, to match as closely as possible the need for carbon sequestration in a given area, as recommended by climate science or public policies;

- **and to the company's own climate performance**, so that the effort expected from the company is proportional to its responsibility for climate change.

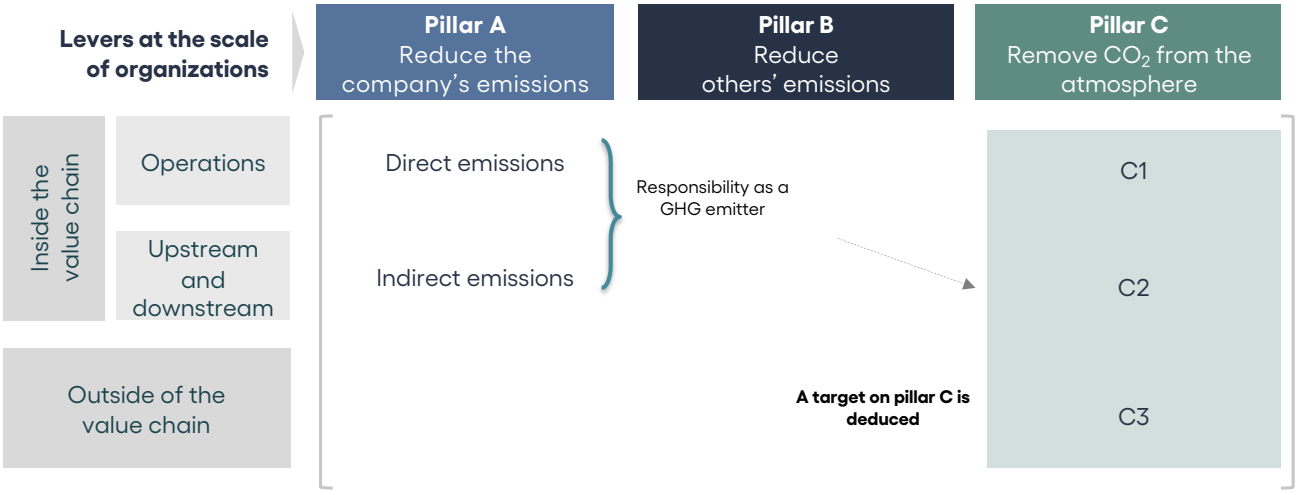


Figure 23 - The methodology detailed in this section of the report allows for a carbon removal target that encompasses all of Pillar C

The key idea of the methodology proposed for the Pillar C target is that the company's removals/emissions ratio (i.e. its C/A ratio) **should at all times be equal to the removals/emissions ratio of the 1.5°C/2°C scenario for the territory under consideration.**

The company can then mobilize any type of removal (C1, C2 if it has a carbon sink in its value chain, or C3 if it does not) to meet its commitment.

For example, let us imagine a French SME, whose value chain is only in France. The "macro" scenario considered is that of the French "SNBC" (National Low Carbon Strategy), which calls for both a reduction in France's emissions by a factor of 6 between 1990 and 2050, and the doubling of national carbon sinks over the same period. Each year, it is then possible to calculate a removals/emissions ratio for France. This ratio is currently about 8% (-40 $MtCO_2$ of removals versus 480 $MtCO_2e$ of emissions), and should be 100% in 2050 (territorial carbon neutrality, where emissions = removals = 80 $MtCO_2e$). The company then undertakes to ensure that its own C/A ratio follows the same trend and will mobilize carbon finance (C3) to achieve this.

ii. Simple approach: on one single territory

The main idea of Net Zero Initiative is to consider the company as a contributor to the achievement of territorial carbon neutrality, and in particular the largest territory of all: the planet. Pillar C is therefore a pretext for inviting the company **to make its climate action consistent with the territories in which it is established** (i.e., emitter)**, and to place it at the service of the development needs of removals identified in one or more given territories in order to comply with the Paris Agreement** (compliance with national contributions, or NDC, in particular).

First, let us look at what this idea means in a simple case in which the company is concerned with only one territory: the planet.

Determining its target path for carbon removal requires three steps: 1. Selecting a scenario, 2. Deducing the ratio of removals to territorial emissions, 3. Applying the ratio to its carbon footprint.

1. Selection of the 1.5°C/2°C scenario relevant to the activity

First of all, a 1.5°C/2°C scenario must be identified that gives the trajectories of carbon emissions and removals by 2050 for the territory relevant to the company (global or national scale). This scenario must meet the following criteria:

- **Rigor:** The scenario must be consistent with the principles of climate science and the Paris Agreement, and must propose realistic removal increase trajectories that do not rely on uncertain technologies, and ensure "Do no significant harm"[30].

- **Ambition:** The emission reduction and carbon removal trajectories of the scenario are consistent with limiting climate change to below 1.5°C or 2°C by 2100.

- **Territorial relevance:** The scenario concerns one or more territories (world, country, region) at a scale relevant to the company's activities. A French company could thus rely on the trajectories of the SNBC (National Low Carbon Strategy). A multinational company could use the IPCC global scenarios.

Example: *AlphaCorp wants to set targets consistent with the Paris Agreement. It already has 2°C objectives for the "Induced emissions" of Pillar A. It wishes to set targets for the development of carbon sinks (Pillar C) by 2050.*

For its initial approach, it selects a global 2°C scenario that meets the criteria of rigor and ambition described above, and recovers the curve of global induced emissions and emissions sequestered by global carbon removals, annually, as a function of time (see Figure 24).

[30] It should be noted that the definition of the criteria and the setting of the thresholds associated with "do no significant harm" will potentially pose difficult methodological problems, and will most often be a matter of conventional choice.

Illustrative pathways of GHG emissions and CO_2 removal in a global 1.5°C or 2°C scenario, between 2020 and 2070 ($GtCO_2e$)

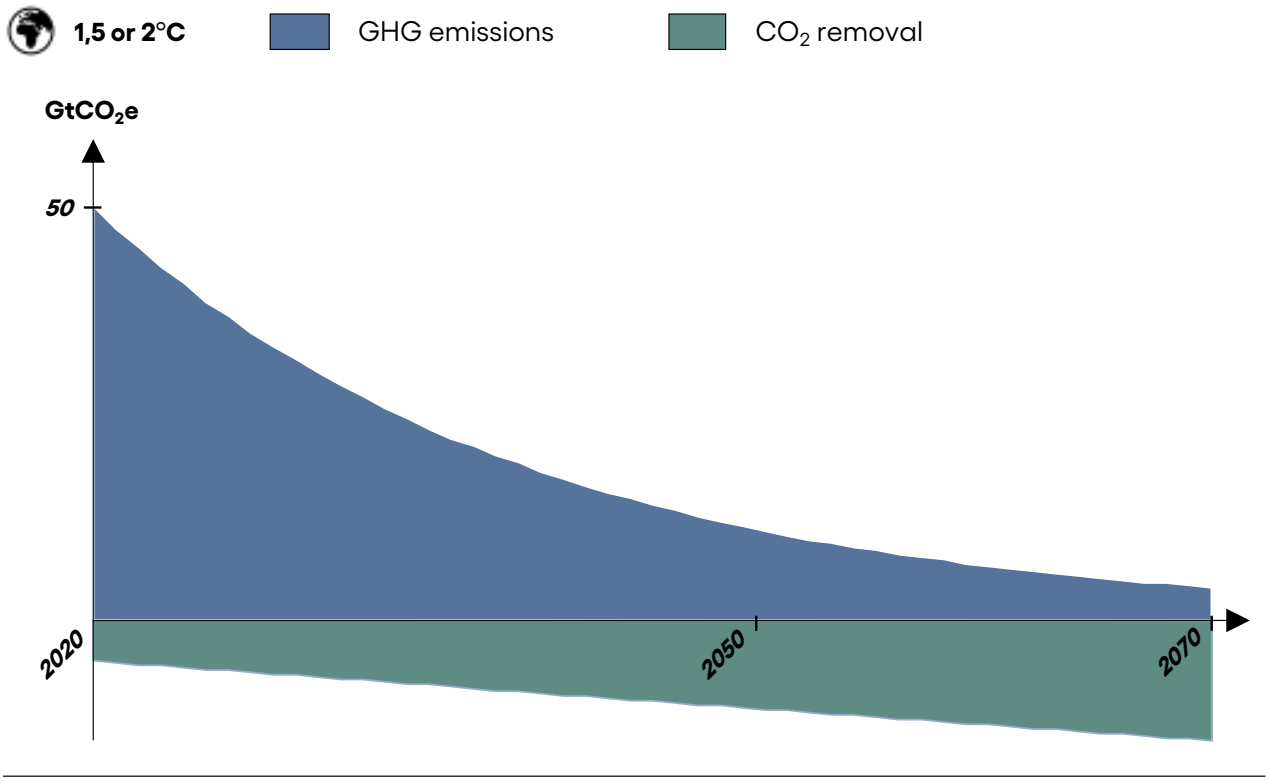


Figure 24 - Induced emissions and carbon removal trajectories in a 2°C scenario between 2020 and 2070

NB: Ideally, the scenario selected should be the same as the scenario that allowed the company to set induced emission targets (Pillar A) compatible with the Paris Agreement.

NB: Deforestation and net removal sequestration trajectories

The question arises as to whether the scenario trajectory characterizing the development of carbon sinks should be the 'gross' sink trajectory (removals alone), or the 'net' sink de-stocking trajectory (removals minus re-emissions).

For example, the IPCC AFOLU (Agriculture, Forestry and Other Land-Use) illustrative trajectories in Figure 5 are the net trajectories of the sink sector: they represent the sum of induced emissions related to the removal of carbon from sinks (e.g. due to deforestation) with negative emissions, i.e. carbon storage in sinks (e.g. due to growth in forest areas).

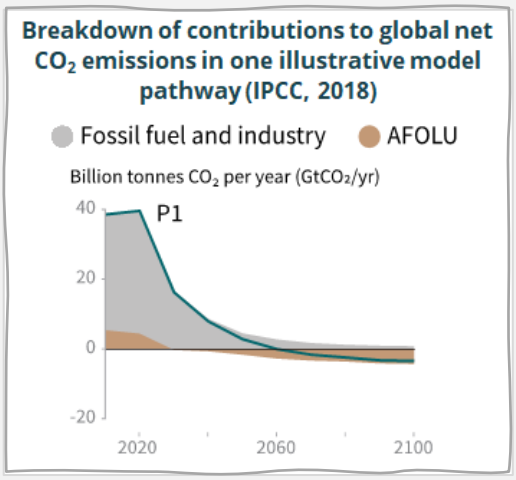


Figure 25 - Net anthropogenic emission trajectories in an illustrative IPCC 1.5°C scenario. The trajectory of the land sector is "net": it represents the sum of emissions related to carbon storage and removal by sinks. Currently, it is therefore net emitting (positive value) and should become negative from 2030

In this target-setting method, only the carbon storage by removals trajectory should be used, referred to here as the "gross" emissions trajectory sequestered by carbon sinks. Emission trajectories related to deforestation and change of land use, or more generally to emissions from the land sector, can be used to set reduction targets for Pillar A[31], or avoidance targets for Pillar B.

If the 'gross' trajectory is not available, the net trajectory can be used, taking into account only the point at which it becomes negative.

As a reminder, reducing emissions remains the top priority and it is crucial to stop deforestation and land artificialization immediately. Choosing to devote all of one's resources to replanting trees while primary forests continue to be ravaged at high speed can be seen as a serious prioritization error. This is why the strict distinction between a gross removals increase target (Pillar C), and a deforestation and land reclamation reduction and avoidance target (Pillars A and B), seems both sound and necessary.

2. Calculation of the ratio to be applied

For each year of the scenario selected, we must calculate the ratio between the quantities of carbon stored in the territory's sinks and the annual emissions occurring in the territory. In this way, we obtain the evolution over time of the ratio of removals to emissions for the territory under consideration[32], i.e. the quantity of carbon sinks to be developed on the scale of the territory scale for each ton of GHG emitted, year by year.*Example: To calculate its removal target in 2050,*

[31] See the WWF FLAG working group.
[32] It is a sort of C1/A1 ratio of the territory. Here, A1 and C1 represent the direct emissions and the direct absorptions, respectively, of the territory considered.

AlphaCorp will plot the following values on the emissions/removals curves of the IPCC 2°C scenario:

- *Global induced emissions until 2050*
- *Global sequestered emissions until 2050*

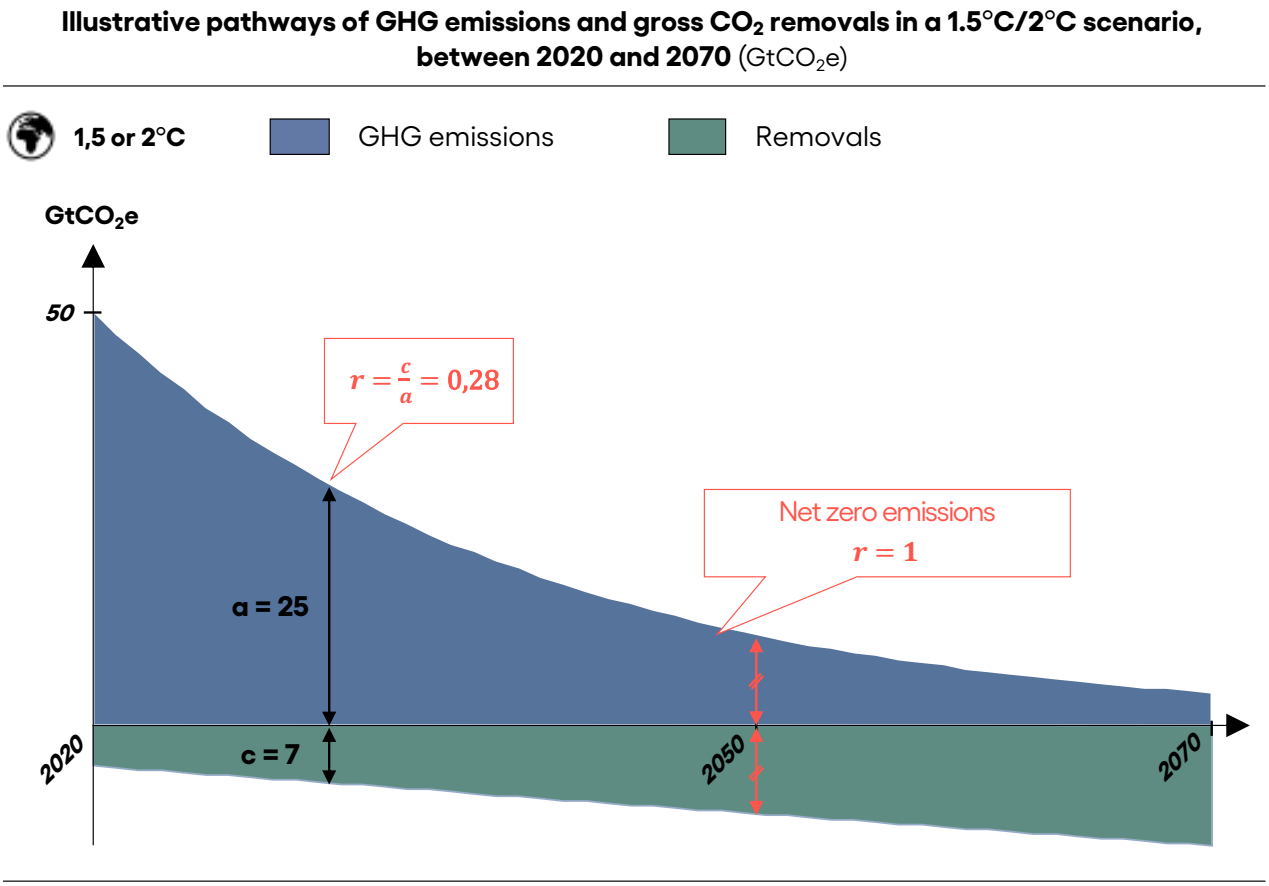


Figure 26 - GHG emissions trajectory and 'gross' removals trajectory in an illustrative global 2°C scenario, between 2020 and 2070

AlphaCorp then calculates the removals/emissions ratio of this scenario over the desired time period (noted as r in the following figures):

Value of the global (gross removals / GHG emissions) ratio between 2020 and 2070 (illustrative)

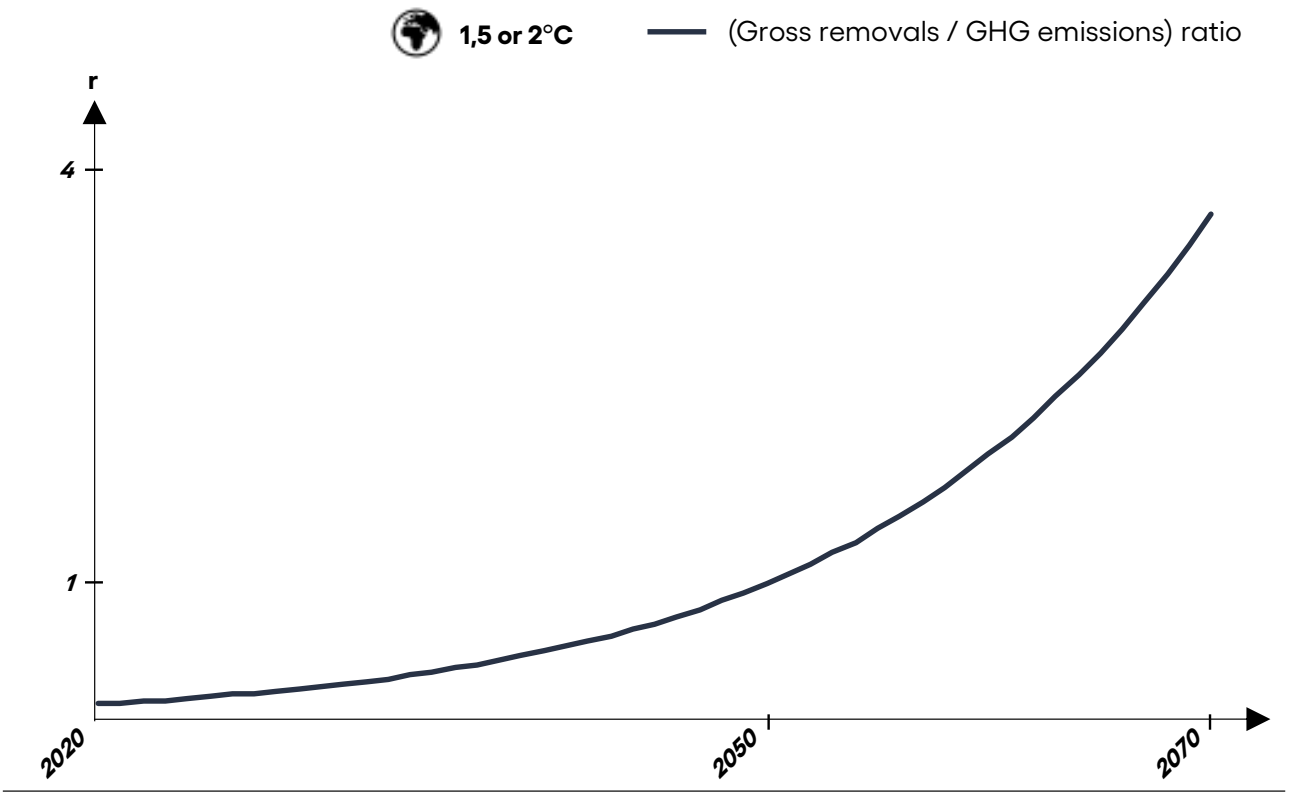


Figure 27 - Value of the global removals/emissions ratio in the illustrative scenario between 2020 and 2070

Finally, the company deducts its target sequestration trajectory (Pillar C) by multiplying its reduction trajectory (Pillar A, Scopes 1, 2 and 3) by the territorial removals/emissions ratio trajectory calculated previously.

Example: *AlphaCorp calculates its carbon removal trajectory to be developed until 2060 by multiplying its own induced emissions trajectory (Pillar A) by the removals/emissions ratio trajectory obtained previously for each year in the IPCC's scenario:*

AlphaCorp's GHG emissions reduction pathway (Pillar A) - 1.5°C- or 2°C-aligned ($ktCO_2e$)

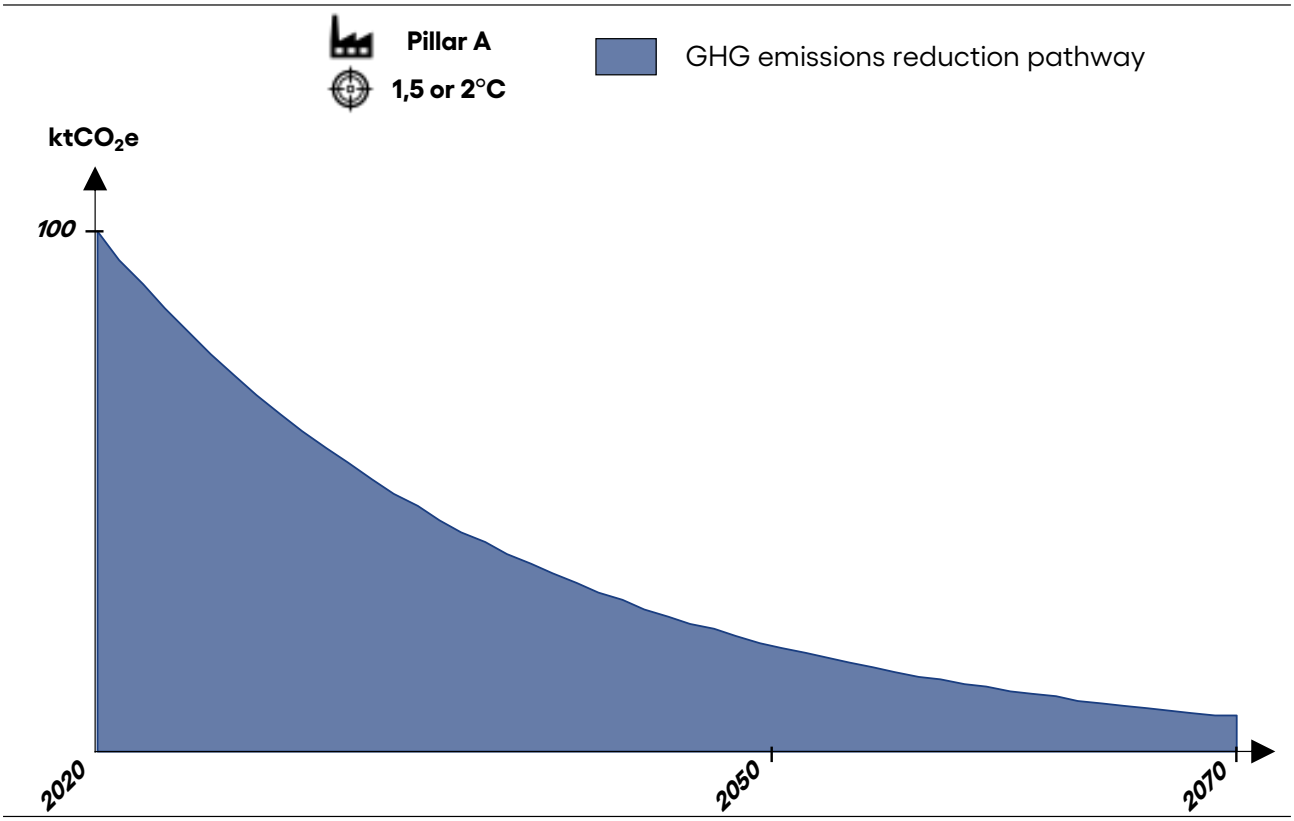


Figure 28 - AlphaCorp's Pillar A trajectory aligned with the Paris Agreement

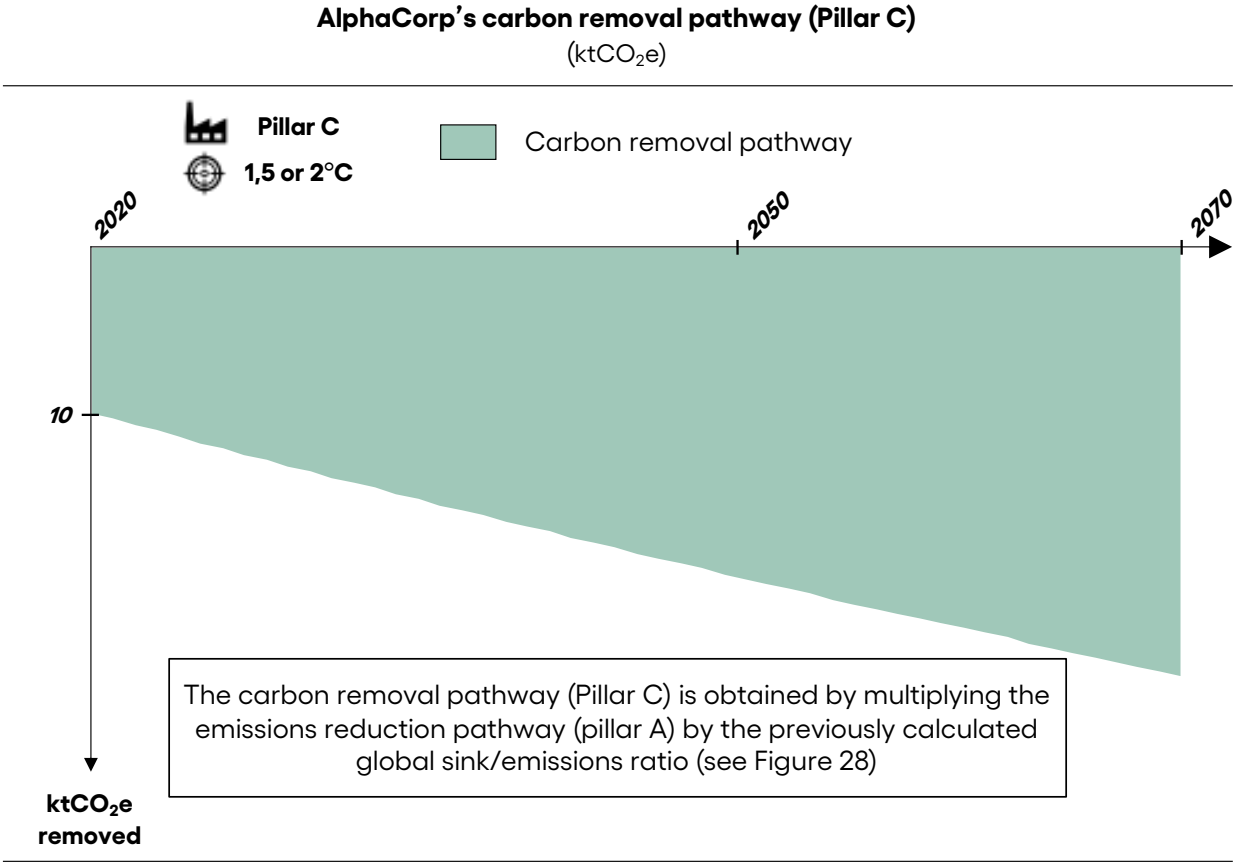


Figure 29 - AlphaCorp's Pillar C trajectory aligned with the Paris Agreement, obtained by "multiplying" the emissions trajectory by the global removals/emissions ratio calculated previously (refer to Figure 26)

iii. Fine-grained approach: territorialization of objectives

Once the "simple" solution has been described for a single territory, it is possible to go further in the territorialization of the company's climate action and its action with regard to the development of removals.

In most cases, companies' value chains extend over several geographies. Their direct and indirect emissions are therefore located in several territories, each of which has set different climate objectives, corresponding to specific needs, potential and capacities.

By breaking down its carbon footprint into its various emission areas, a company can set a Pillar C trajectory that is compatible with local climate strategies. For more information, please refer to the full report.

We could then envisage that a company wishing to go further in the "territorial" understanding of its GHG emissions, and wishing to stick as closely as possible to the realities and needs of each territory of interest, decides to highlight the geographical origin of its emissions and, therefore, establish its ambitions in terms of carbon sinks. Obviously, in the absence of an automated system for tracing the geographical origin of emissions in the value chain of companies (ideally,

something we would like to see one day), this task of emission genealogy can be laborious, requiring a great deal of work, but can be of great interest in the climate dialogue between companies and territories[33].

In this more refined approach, the company can therefore separate the emissions of its carbon footprint into at least two categories:

- on the one hand, the emissions that take place on the national territory with which it specifically wishes to make its objectives consistent;

- on the other hand, the remaining emissions (i.e. emissions that would not be included in the national carbon inventory according to the UNFCCC perimeter), which would then be treated within the "Global" approach.

It is therefore sufficient to apply the target setting method explained in the previous section ("Simple approach") to each of the two subsets of emissions:

- **the company's emissions taking place in the relevant country** (part of scopes 1, 2 and 3 taking place in the country's "Inventory" perimeter) are subject to a target calculated from the removals/emissions ratio derived from the territory's targets.

- **The company's emissions outside the given territory** are subject to a target calculated on the basis of the removals/emissions ratio resulting from a global scenario.

Example: A significant share of the emissions of the company AlphaCorp, studied above, take place in France. The company therefore decides to refine its climate strategy and set an objective for the development of carbon sinks compatible with France's territorial climate roadmap, the Stratégie Nationale Bas Carbone (SNBC).

It begins by identifying the proportion of its emissions that occur within the UNFCCC perimeter of French territory. Ideally, the company has a vision of its emissions over time according to its decarbonation trajectories, by emission item, by scope and by territory of origin of the emissions. Otherwise, it is possible to consider different simplified approaches or extrapolations. Once this has been done, the company has bases on which it can calculate the removals/emissions ratio.

[33] Carbone 4, ADEME, France Stratégie, Banque des Territoires, Transdev IdF (2021), *Neutralité et territoires. Un cadre d'action collectif pour la neutralité carbone en France.*
http://www.carbone4.com/neutralite-et-territoires-un-cadre-daction-collectif-pour-la-neutralite-carbone-en-france/

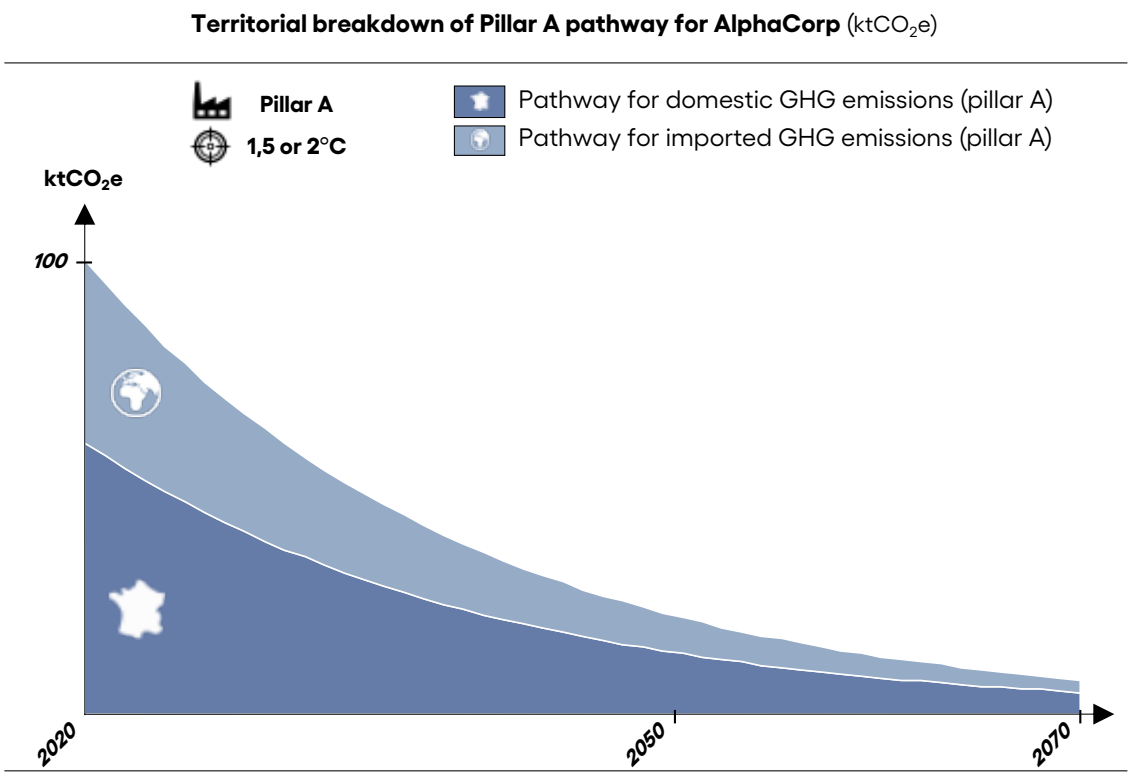


Figure 30 - Decomposition of the company's emission trajectories according to the territory of emission (France or Rest of the World) and time, between 2020 and 2070 in a 2°C scenario. These trajectories are used as the basis for calculating the development trajectory for sinks

For the sub-target concerning emissions taking place in France, the company applies the removals/emissions ratio calculated from the SNBC trajectories.

For the sub-target concerning emissions not taking place in France, the company can apply the removals/emissions ratio already calculated from the global trajectories.

Value of the global and national removals/emissions ratio in an illustrative scenario, between 2020 and 2070

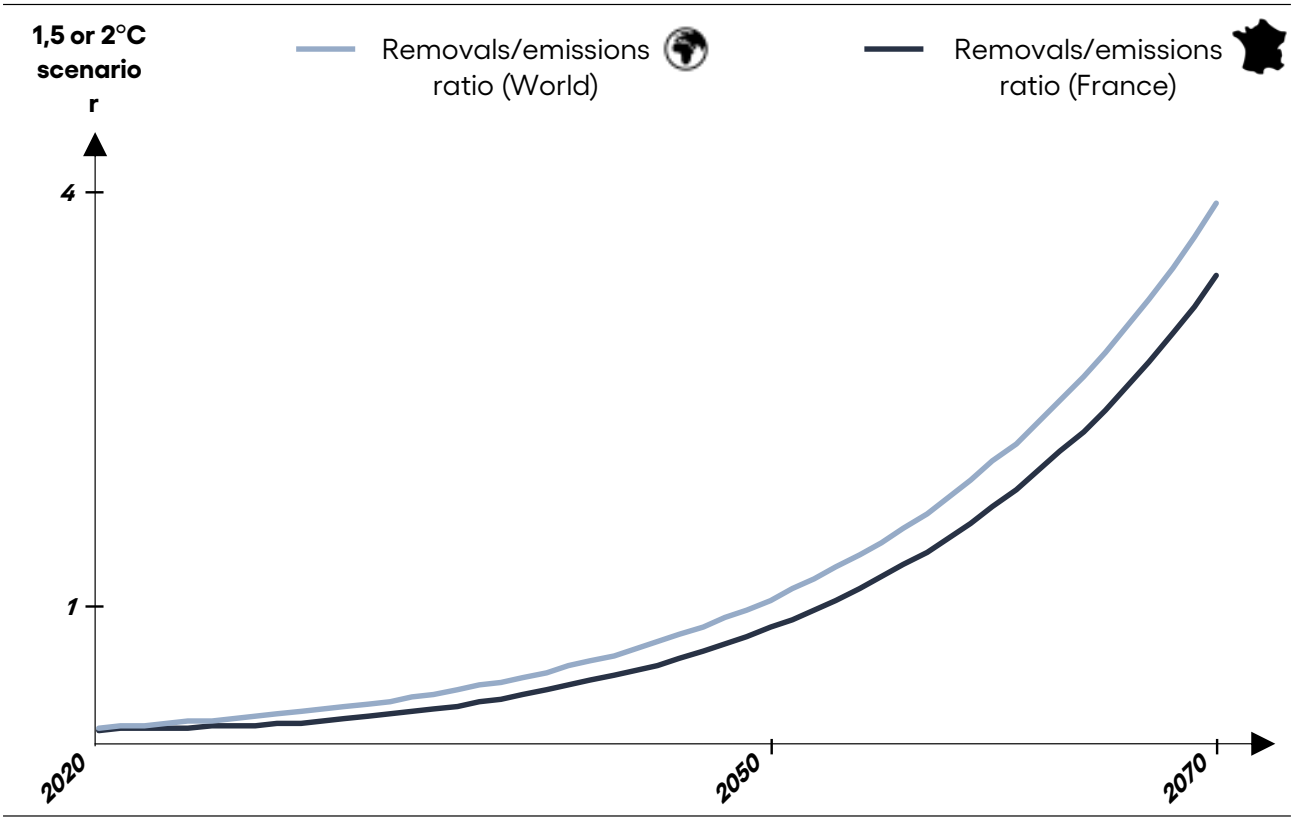


Figure 31 - Territorial removals/emissions ratios as a function of time, for the World and for France

The new Pillar C trajectory for the development of carbon sinks by the company is as follows:

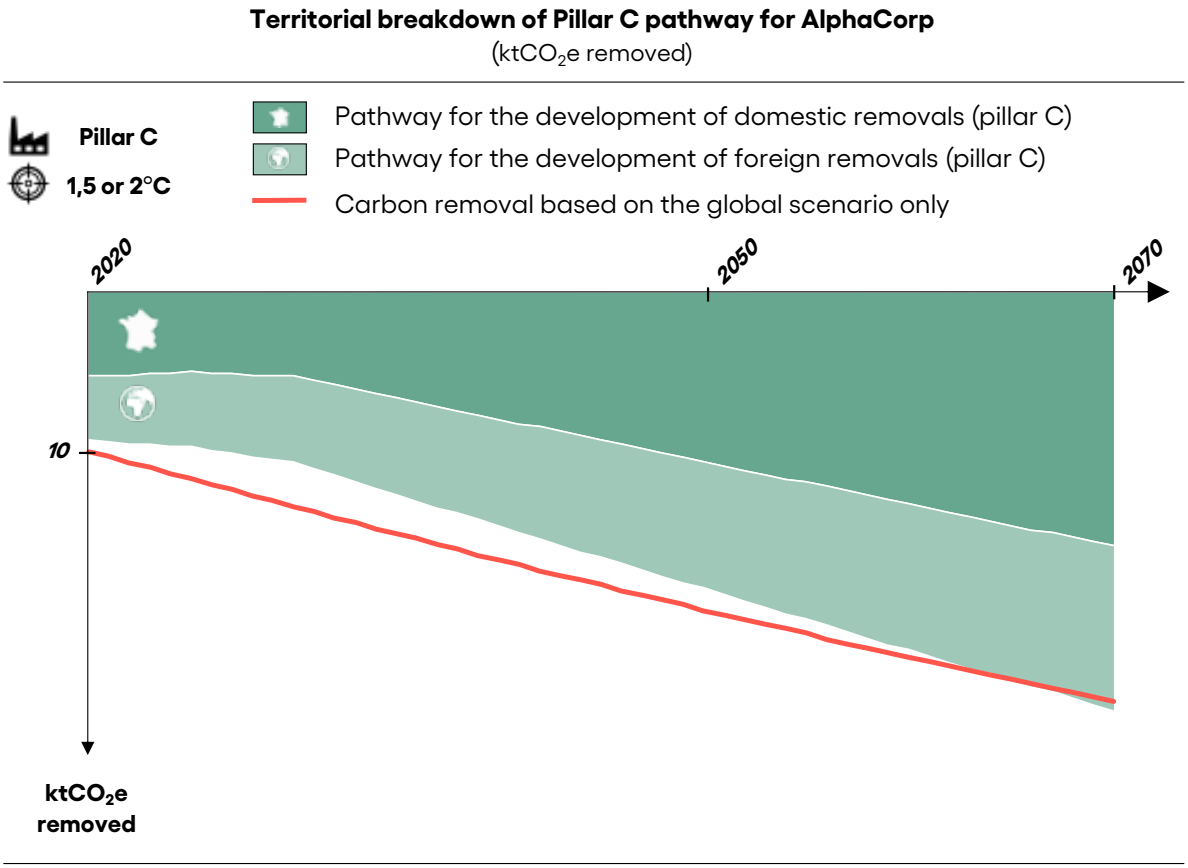


Figure 32 - AlphaCorp's Pillar C trajectory, refined by emissions territory (France and Rest of the World), compatible with the SNBC and the Paris Agreement

Thus, in 2050, the company will have to develop sinks in France to permanently sequester 12 $ktCO_2e$, and sinks elsewhere in the world for 8 $ktCO_2e$. It is up to the company to decide how to develop these sinks: either by developing those already existing in their value chain (C1, C2), or by using carbon finance (C3), i.e. financing absorption projects outside the value chain.

Finally, for a company that has highly detailed knowledge of the territorial distribution of its emissions and that has defined its reduction objectives at the corresponding level, it is possible to develop a detailed Pillar C trajectory for each territory with a specific carbon neutrality strategy (i.e. emission reduction and joint development of sinks), using the same method.

Specifically, companies should maximize the development of carbon sinks in their emission territories with targets based on national or territorial strategies. In the absence of territorial trajectories, it remains acceptable to set targets using global scenarios. In any case, care must be taken to ensure that sinks are developed in a fair and equitable manner (and thus avoid a situation where a given actor monopolizes the pool of sinks available in a given location).

Territorial breakdown of Pillars A and C pathways for Company AlphaCorp ($ktCO_2e$)

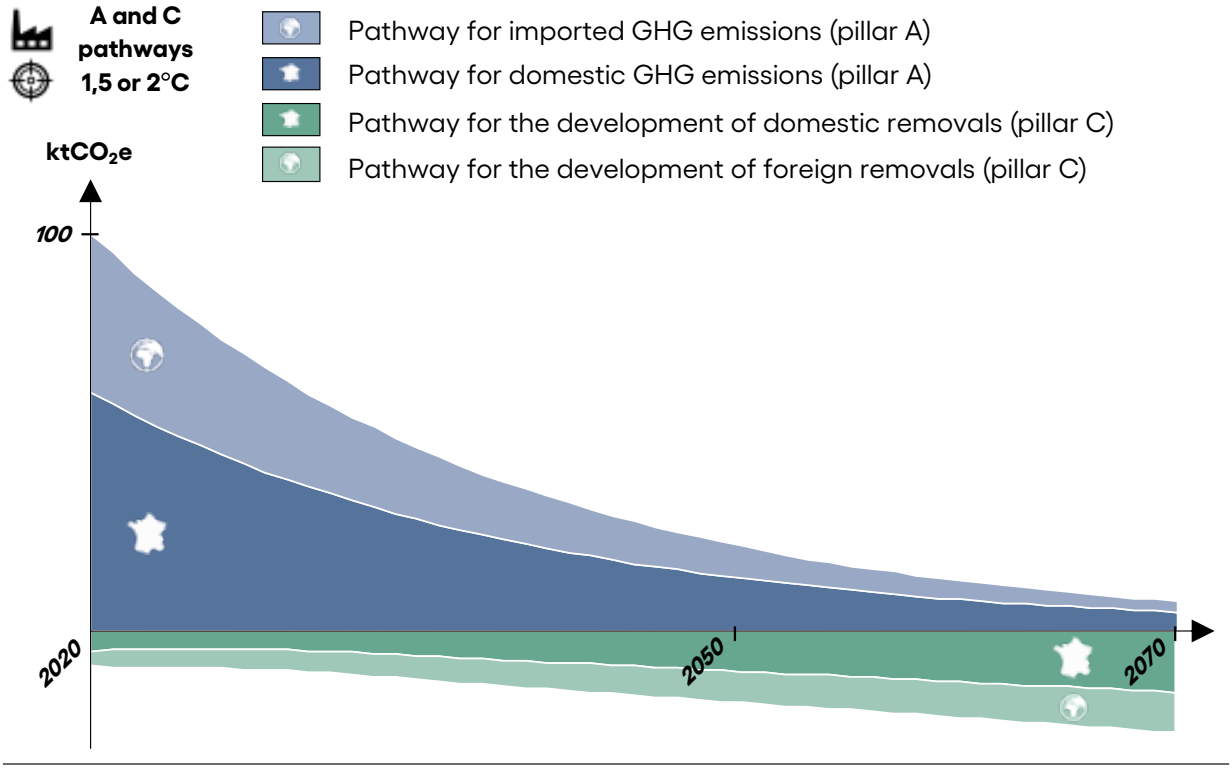


Figure 33 - Summary of AlphaCorp's trajectories A and C

iv. Common targets and reprocessing of double counting in the value chain

The method mentioned above (calculation of a territorial removals/emissions ratio, the application of this ratio to the company's footprint, and then the deduction of a quantity of removals to be developed) involves scopes 1, 2 and 3, and thus mixes direct (scope 1) and indirect (scopes 2, 3) emissions. However, indirect emissions are also someone else's direct emissions: the notion of a company's carbon footprint acknowledges the existence of "double counting"[34]. The double counting of the carbon footprint is reflected in the development goals of the removals. Therefore, if all companies set removal targets using this methodology, the removal targets will overestimate the actual need (since a single emission will be included in both the direct emitter's calculation base, and in those of all stakeholders observing that emission in their indirect scope)[35].

The solution proposed here is to **take advantage of the interdependence of actors in the same value chain to facilitate their cooperation** with a view to unifying efforts. This approach is in phase with the collective nature of the carbon neutrality ambition. Furthermore, it does not entail any major risk, in the sense that non-cooperation by the players would lead to an ambition that is not

[34] Double counting is never problematic, as corporate carbon footprints are not intended to be summed.
[35] A simple solution to avoid double counting would be to calculate Pillar C only on the basis of the company's scope 1, and not on all direct and indirect emissions. However, this would make the indirect responsibility of companies for the development of sinks invisible, and it would also be a missed opportunity to invite the players in the same value chain to engage in dialogue in view to making a joint effort.

too low, but too high (because one and the same ton emitted in the chain would be taken into account by several players to quantify their sink volume to be developed).

Thus, if two companies in the "vertical" part of the same value chain (one a supplier, the other a customer) commit to a trajectory for Pillar C, rather than setting independent targets, they can combine their climate strategies to identify the quantity of sinks they have in common and thus restate them in their target calculation.

Scope 1 of companies (direct emissions) can nevertheless be used to establish a minimum ambition regarding the sinks to be developed for a given actor.

The company would then have two sub-targets for Pillar C:

- **A minimum target, obtained by applying the territorial ratio to scope 1 only,**

- **A recommended target, obtained by applying the territorial ratio to all the scopes, the effort of which must be shared between all the players in the value chain.**

Example: ***A*** *company X produces steel for a company Y that processes it. Summing Scopes 1, 2 and 3 of the footprints of X and Y results in double counting, as the emissions associated with the production of steel by X are also accounted for in the upstream Scope 3 that covers the raw material purchases of company Y. Thus, if X and Y establish removal development targets independently, these emissions associated with steel production will be present in both calculation bases. The total quantity of sinks to be developed by these two companies will be mechanically greater than the quantity actually needed to achieve carbon neutrality in the territory where these emissions occur. The Net Zero Initiative methodology recommends that X and Y jointly set a target for the development of sinks, sharing the development effort. X and Y could then find a rule for allocating joint emissions (i.e. X's emissions serving Y's needs) in order to recalculate their individual removal development targets downwards. X and Y would also have a "minimum" target of removals to develop themselves, based on their scope 1.*

If a company in the value chain does not commit, the consistency of the targets remains, as the same work remains to be done by default by the other actors in the value chain. However, this lack of fair play ("free rider") should encourage companies to include as many actors as possible in their value chain.

It is in the interest of companies to involve their suppliers in this process, in order to have less restrictive individual targets. This need for a collective game should make it possible to propagate climate action within value chains and share the benefits in terms of reduced risk exposure.

Seen from another perspective, a player in the value chain that refuses to do its share would force all the others to increase their climate ambition to offset its lack of involvement.

v. Nature of removals to be developed

Net Zero Initiative does not make specific recommendations on the type of removals to be sought, particularly outside the value chain (C3), as long as they are genuinely removals and not emission reductions (B3). For now, Net Zero Initiative recommends that organizations develop the quantity of carbon sinks required for their Pillar C without prescribing the type of sinks, but that they should be transparent about the nature and performance of the removal source solicited, according to a taxonomy possibly inspired by the work of Oxford University on carbon offsetting[36]:

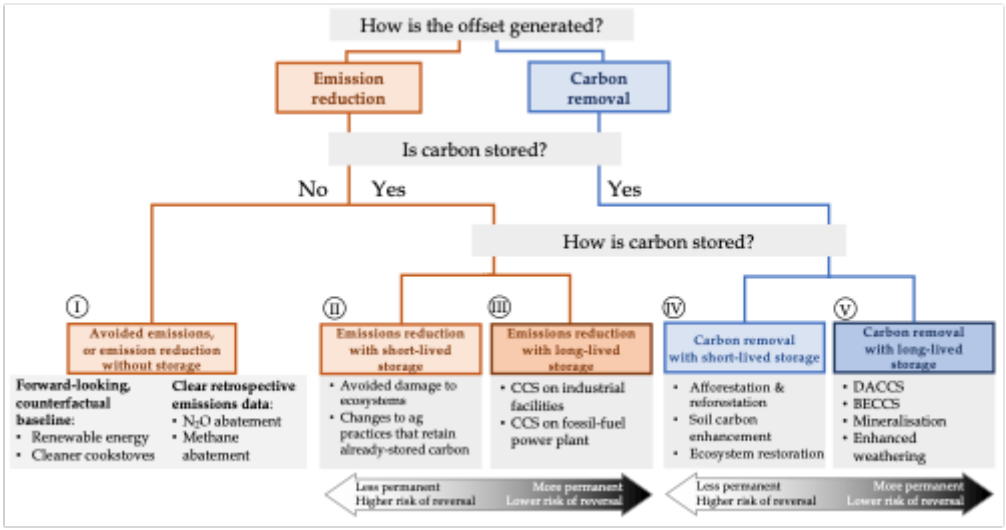


Figure 34 - Extract from the Oxford Offsetting Principles. NZI recommends that companies be transparent about the nature of the carbon sinks they are seeking, and that they clearly specify whether they are Category IV (carbon removal with short-lived storage) or V (carbon removal with long-lived storage)

3. Complementary target for C1 & C2

i. The Need for a Complementary Target for "Carbon Removal Companies"

The methodology described above allows any company to set carbon removal targets consistent with its responsibility for climate change as a GHG emitter. However, some companies also have an important role to play in achieving global carbon neutrality through their core business, an importance that is not necessarily proportional to the amount of GHGs they emit. **This is the case for companies that have carbon removals in their value chain (C1 and C2).**

As a carbon removals operator, the role of this company in achieving global carbon neutrality is precisely to develop carbon removals as much as possible. **The target for Pillar C described in the previous section is not sufficient to translate this necessary ambition.**

[36] Eli Mitchell-Larson and *al.*, *The Oxford Principles for Net Zero Aligned Carbon Offsetting*, 2020. https://www.smithschool.ox.ac.uk/publications/reports/Oxford-Offsetting-Principles-2020.pdf

To ensure that removal operators sufficiently develop carbon removals, an additional target called "Complementary Target C1C2" should be added to the previous targets (Pillar C).

> This objective only concerns actors that have significant carbon sinks in their value chain. It complements the goals that a company can set for itself through the overall Pillar C methodology.

More specifically, a company must adopt the more ambitious of these two targets, not the sum of the two.

In a given territory, it is these companies C1 and C2 that, through their own activities, will have to develop carbon removals in line with the territorial objectives. As these objectives are generally broken down by type of sink (forests, soils, negative emission technologies, etc.), they can be directly deducted from the absorption carbon budgets for the territory in question, using a method to be defined.

NB: Companies that do not have any carbon sinks in their value chain will have to use carbon finance (C3) to meet their responsibility objective described in the previous section. ***It is therefore the C1 (and possibly C2) companies that will receive financing from C3 companies.***

ii. General principle of the methodology

It is known that a certain amount of carbon removal must be developed by 2050 on a global scale. The nature of the removals considered (soils, forests, technologies, wood products, etc.) is often provided by the scenarios. The idea is then to break down this macroscopic objective into sequestration objectives (C1, C2) for each company. This is the same principle used by the SBTi for decarbonation trajectories, which deduces company targets from sectoral carbon budgets (provided by the IEA).

The question then remains as to what rule should be set collectively to move from a macro "removal" budget (e.g. doubling the French removal between 2020 and 2050) to a micro objective at the company level. Identifying such rules is one of the objectives of Net Zero Initiative's work in 2021.

A few initial approaches can already be proposed:

- **Reasoning in absolute terms:** "for a given type of sink, the macro scenario considered aims for an increase of x%/year in absorption flows by 2050, so any company in the sector must also increase its own absorption by x%/year on C1 and C2.

- **Intensity reasoning:** "for a given type of sink, the macro scenario considered targets an absorption intensity of x $kgCO_2$ per unit (of surface area/energy, added value, etc.), so any company in this sector must also target this intensity for its activity on C1 and C2.

In order to explore these two tracks, it is necessary to:

- identify the relevant macro scenario
- identify the development needs of each type of sink in this scenario;
- set an allocation rule that allows each company with sinks in its value chain to set C1 and C2 targets consistent with this scenario.

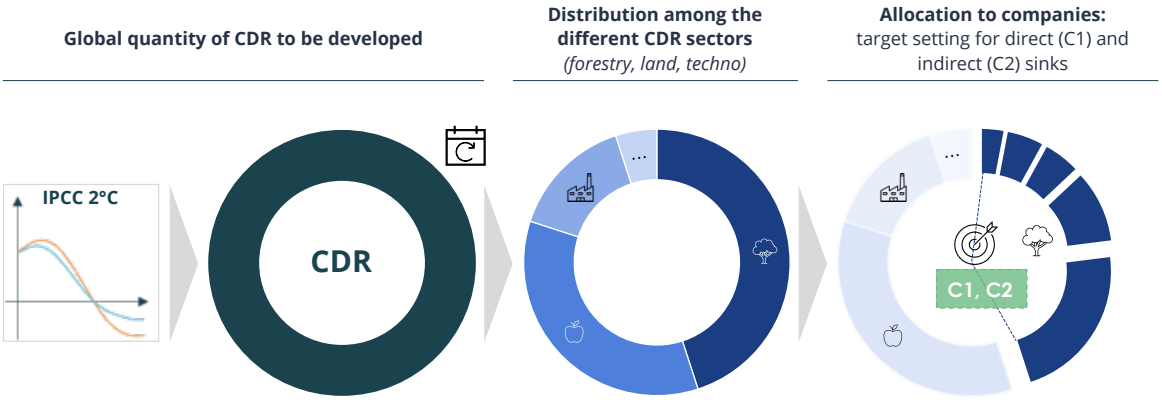


Figure 35 - Diagram summarizing the steps envisaged for the C1C2 complementary target setting method

Next steps

Next steps

Net Zero Initiative intends to continue the work presented here in 2021 in the following areas:

Pillar B

As avoided emissions are highly dependent on the context in which products and services are marketed, NZI wishes to **develop specific methodologies for each economic sector** in order to be able to **make more precise and operational recommendations** for actors in one sector who can contribute to lowering emissions in other sectors (e.g., a bicycle manufacturer - industrial sector - who can contribute to lowering emissions in the transport sector).

In 2021, NZI wants to set up three **sectoral working groups** dedicated to three sectors of activity that emit large amounts of greenhouse gases: transportation, construction and energy industries .
For each sector, the working group will take the following steps:

- Identify the **main goods and services** that will allow the sector to decarbonize in the coming decades;
- Define the **right baseline scenario** to apply to each of these solutions, and list the necessary criteria;
- Develop a **methodology for calculating avoided emissions** for the actors in the value chain of each solution, and define the **allocation rules** between these different actors;
- Develop a **methodology for setting avoided emission targets** consistent with climate science for each actor and/or solution selected.

The deliverable will consist of a white paper describing a robust definition of avoided emissions for each sector, the methods and reference scenarios for calculating them, and illustrations and examples.

Pillar C

In 2021, NZI wishes to form two thematic working groups that will allow the necessary methodological developments concerning carbon removals to be carried out in parallel:

- **Accounting for removals in the value chain.**
  This working group will develop a method for accounting for carbon removals in the value chain (forests, land, technological solutions), similar to the Bilan Carbone. The work will be inspired, if necessary and relevant, by the methodologies being developed by the WRI (GHG Protocol on Removals).

- **Sequestration objectives**
  The objectives of this working group will be to:

  - Refine the methodology for calculating the Pillar C targets proposed in the NZI 2020 deliverable;

  - Develop a method for setting targets for increasing carbon removals within the value chain (C1, C2). The work will draw, if necessary and relevant, on methodologies being developed by WWF (FLAG Initiative in particular).

The initiative already has the financial and methodological support of ADEME and some 15 companies.

At the time of writing, the 2021 season of NZI benefits from the financial and methodological support of ADEME, and the support of 15 companies: Alstom, Décathlon, EDF, ENGIE, GRTgaz, LVMH, Mobivia, Nature et Découvertes, Orange, RATP, Schneider Electric, SNCF, Somfy, Tikamoon, Unibail-Rodamco-Westfield.

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Annexes

Annex 1:
Consistency of the NZI framework with the SBTi Net Zero standard

The method explained above appears to be consistent with the "Net Zero" standard of the Science-based Targets initiative (SBTi) currently under consultation, while at the same time differing from it.

The SBTi and NZI initiatives are **consistent** with each other because:

- they both place the reduction of corporate emissions ("decarbonation" for the SBTi / "Pillar A" for NZI) as the top priority, to be distinguished from the rest;
- they distinguish between carbon sinks in the value chain (C1, C2) and sinks outside the value chain (C3);
- they distinguish between carbon credits generated by emission avoidance projects (offset / B3) and carbon credits generated by removal projects (neutralization / C3);
- they aim to achieve a long-term emissions/removals balance, ideally by 2050;
- They identify the problem of double counting on Pillar C, and invite dialogue between actors in the same value chain in order to act collectively to develop the right level of removals.

However, NZI **differs** from the SBTi vision because:

- NZI does not allow the claim of individual carbon neutrality, unlike SBTi, which accepts the net zero concept of a particular actor;
- NZI allows for a strict separation between corporate emissions and the rest by creating distinct, non-fungible categories (the A/B/C Pillars), and does not allow for "zeroing" by subtracting them;
- The objective of balance between carbon removals and emissions of a company in 2050 (Pillar C / Pillar A = 1) proposed by NZI is above all motivated by the search for consistency between the company and the territory on which it depends. The reasoning behind this objective is not to "do zero" at the company level (silo reasoning), rather it is the

consequence of considering it as a contributor at the right level of territorial neutrality[37]. Moreover, this "grounded" reasoning makes it possible to trace at each moment the trajectory of the increase in sinks expected of the company (via the ratio of removals to emissions from the territory), whereas SBTi provides only the point of arrival.

- NZI's reasoning in "contribution to the global or national territory objective" makes it possible to link companies as closely as possible to the territories, and to place the economic world truly at the service of achieving the NDCs of countries.

- In addition to the total Pillar C target, NZI proposes an additional specific sub-goal for carbon sinks within the value chain, which SBTi does not necessarily recommend at this stage.

- NZI expands the notion of financing removals outside the value chain to mechanisms distinct from carbon offset mechanisms, such as the direct financing of verified projects, some green bonds, or other hypothetical objects such as the "practice-based credits" [38].

- NZI includes the notion of avoided emissions by goods and services as one of the key levers of action for a company, whereas SBTi discards it.

[37] NZI is therefore fully consistent with the ADEME opinion on carbon neutrality: https://www.ademe.fr/avis-lademe-neutralite-carbone
[38] Please refer to Carbon Market Watch (2020), *Above and Beyond Carbon Offsetting – Alternatives to Compensation for Climate Action and Sustainable Development* https://carbonmarketwatch.org/publications/above-and-beyond-carbon-offsetting-alternatives-to-compensation-for-climate-action-and-sustainable-development/

Annex 2:
Additional case studies on avoided emissions

The aim of the following case studies is to illustrate in a very concrete way how a company should apply the Net Zero Initiative's recommendations on avoided emissions for three critical transition sectors.

Case 1: Transport - electric vehicle

A car manufacturer, Voltauto, takes a strategic shift and decides to market only three battery electric vehicle models from 2020, which it claims to be low-carbon. To ensure its real contribution to global carbon neutrality, Voltauto has launched a climate strategy based on the three Pillars of the Net Zero Initiative.

Voltauto is therefore starting with its Pillar A. It calculates its carbon footprint in scopes 1, 2 and 3, and then sets a trajectory for reducing its emissions that is compatible with a global carbon budget of 1.5°C. In the emissions item of scope 3 - use of products sold - 100% of the emissions from vehicle use are considered. This exercise has enabled the company to obtain the carbon footprint of its three new models through life cycle analysis:

- VoltCity, a passenger car in segment B (city cars):
  - 60gCO_2e/km in France in 2020
  - 90 gCO_2e/km in Europe in 2020 (average of the electricity mix in the EU)

- VoltBerline, a passenger car in segment D (family sedans):
  - 70gCO_2e/km in France in 2020
  - 100 gCO_2e/km in Europe in 2020 (average of the electricity mix in the EU)

- VoltDuty, a light commercial vehicle:
  - 80gCO_2e/km in France in 2020
  - 130 gCO_2e/km in Europe in 2020 (average of the electricity mix in the EU)

In 2020, Voltauto sold 30,000 VoltCity, 15,000 VoltBerline and 10,000 VoltDuty.

The remainder of this case study focuses on Pillar B2, i.e. the impact of Voltauto vehicle sales on customer decarbonation. We seek to illustrate how the company can evaluate its avoided emissions based on the data it has at its disposal. For the exercise to be complete, we need to:

1. Estimate the emissions avoided by the sale of the vehicles, with the most appropriate baseline scenario possible;
2. Estimate the share of EE-R and EE-MA: this is possible as long as the baseline situation is well defined;
3. Allocate the share of emissions avoided by Voltauto. For this point, the answer is immediate: Voltauto can claim 100% of the emissions avoided by its vehicles, because the company counts 100% of the emissions induced by the manufacture and use of these vehicles in its carbon footprint.

Definition of the baseline scenario:

Parameter 1: Sales context

- In the ideal case, Voltauto would have the specific breakdown of its sales between:
    1. **Substitution:** vehicles that are purchased to replace end-of-life vehicles that will be removed from the fleet.
    2. **Indirect market growth:** vehicles that are purchased to replace vehicles that will be resold and find a new use.
    3. **Direct market growth:** vehicles that are purchased to meet an increase in demand and will not replace any other vehicles.

- In reality, Voltauto does not have this breakdown for its sales. It therefore relies on the information available to it, and supplements it with conservative assumptions. To estimate the share of the different sales contexts, it uses data relating to the fleet in circulation in France and Europe:

    1. **Substitution:** estimated from the number of vehicles scrapped during the year and the number of new vehicles sold.
    2. **Indirect market growth**: estimated from the absolute growth of corporate fleets, households with a primary car and households with a secondary car.
    3. **Direct market growth:** estimated from the absolute growth of corporate fleets or households with a primary car in Voltauto's target market.

Parameter 2: geographic distribution

- In the ideal case, Voltauto would use the exact breakdown of sales by country.
- In reality, Voltauto uses a simplified sales breakdown: 80% of its vehicles are sold in France, 20% in the European Union.

Parameter 3: market segments

- In the ideal case, the other parameters would be defined individually for each segment: 1) VoltCity (segment B); 2) VoltBerline (segment D) and 3) VoltDuty (light commercial vehicle).
- In reality, Voltauto only has data on the other parameters in aggregate form for the major categories: 1) Passenger cars: VoltCity and VoltBerline; 2) Commercial vehicles: VoltDuty.

Parameter 4: age of substituted vehicles

- In the ideal case, Voltauto would know the age and performance of the vehicles that are fully or partially replaced by its vehicles.
- In reality, Voltauto relies on national statistical data to estimate the age and average performance of the replaced vehicles. Alternatively, if national data is not available, Voltauto could make assumptions about average age by situation: 1) vehicle leaving the fleet; 2) vehicle becoming a secondary car; 3) vehicle sold from a company to an individual.

Paramètre 5: Consumer profile

- In the ideal case, Voltauto would know the breakdown of its customers by usage profile: company vs. individual, frequent traveler vs. occasional driver, etc.
- In reality, Voltauto does not know the profile of its customers in detail, but has data on the breakdown between companies and individuals from a market analysis done by the marketing department. Based on this breakdown, Voltauto makes assumptions about average performance and usage for both categories (business and private).

Once all these parameters have been identified, Voltauto builds the reference sub-scenarios, defined by combining the different options for each parameter. For each sub-scenario, performance and usage are estimated for Voltauto's vehicles, as well as for the baseline situation. Avoided emissions are calculated for one vehicle in each sub-scenario. The overall avoided emissions analysis will be the multiplication of the sub-scenario results by the number of associated Voltauto sales.

Case 2: Energy - electricity

Olympower, a company specializing in the construction and operation of renewable electricity generation plants, wishes to calculate the emissions avoided by two of its new facilities.

Choice of the baseline scenario:

For the choice of the baseline scenario, the Net Zero Initiative recommends using the methodology developed by the United Nations Framework Convention on Climate Change (UNFCCC) in the framework of the Clean Development Mechanism (CDM)[39]: *Tool to calculate the emission factor for an electricity system*. This method calculates the emission factor (EF) of the electricity production that is affected by a new installation. This emission factor, known as the *Combined Margin*, has two components:

- *Operating Margin* (OM): represents the cohort of existing power plants whose operation will be most affected (reduced) by a new plant.
- *Build Margin* (BM): represents the cohort of potential/future power plants whose construction and operation will be affected by a new plant.

[39] "Tool to calculate the emission factor for an electricity system - Version 07". Available on: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

- The *Combined Margin* (CM) represents the emissions factor in the baseline situation. It is a weighted average of the OM and BM, with the weighting used to account for the difference between controllable and non-controllable generation capacity.

The *Combined Margin* emission factor is then calculated as follows:

$$FE_{CM} = W_{OM}\text{-}FE_{OM} + W_{BM}\text{-}FE_{BM}$$

with

$$W_{OM} + W_{BM} = 1$$

W_{OM} and W_{BM} are the respective weights between OM and BM.

This methodology, in addition to being recognized and robust, **is ideally suited to the Net Zero Initiative's proposal to refine the current definition of avoided emissions** to take account of the difference between actual reductions and lower increases in emissions.

Since the OM represents the emissions that would have been generated by the existing facilities without the new plant, **this emissions factor is used to calculate avoided-reduced emissions (AE_R).**

Since the OM represents the emissions that would have been generated by future facilities without the new plant**, this emission factor is used to calculate avoided emissions - lower increase (AE_{LI})**

Data required for the calculation of avoided emissions:

The data for the new Olympower facilities are as follows:

- **Site 1: Vulcan, a geothermal power plant connected to the electricity grid in Italy.**
    - Technology: geothermal
    - Estimated annual production: 100 GWh
    - Production capacity is controllable, i.e. production can be adjusted according to demand.

- **Site 2: Helios, a grid-connected photovoltaic plant in Greece.**
    - Technology: PV
    - Estimated annual production: 100 GWh
    - The production capacity is not scalable.

In the ideal case, Olympower should follow the CDM methodology[40] to calculate the FE_{OM} and FE_{BM} and use the recommended weightings (WOM and WBM) to calculate the FE_{CM}. For a simplified approach, Olympower decides to use the OM and WBM emission factors calculated by the International Financial Institutions (IFI TWG) [2]. These emission factors have the advantage of being harmonized, thus allowing consistency and comparability.

[40] Clean Development Mechanism.

The data for calculating emissions with and without Olympower are as follows:

- Data from the IFI Approach to GHG Accounting for Renewable Energy Projects[41]:
  - Weights for new **controllable** plants**:**
    § W_{OM} = 33%
    § W_{BM} = 67%

  - Weights for new **non-controllable** plants**:**
    § W_{BM} = 75%
    § W_{OM} = 25%

  - Emission factors **for Italy**
    § FE_{OM} = 423 tCO_2e/GWh
    § FE_{BM} = 167 tCO_2e/GWh

  - Emission factors **for Greece**
    § FE_{OM} = 708 tCO_2e/GWh
    § FE_{BM} = 319 tCO_2e/GWh

  - Emission factors **for Olympower technologies:**
    - PV: 48 tCO_2e/GWh (IPCC)
    - Geothermal: 45 tCO_2e/GWh (ADEME)

Emissions avoided by Olympower:

The emissions avoided by Olympower are then calculated as follows:

$AE = AE_R + AE_{LI}$

$AE_R = 100\ [GWh] \cdot W_{OM} \cdot (FE_{OM} - FE_{Technology})$
$AE_{LI} = 100\ [GWh] \cdot W_{BM} \cdot (FE_{BM} - FE_{Technology})$

The emissions avoided by the Vulcain and Helios plants are illustrated in the figures below. For Vulcain, the share of AE_{LI} in the total avoided emissions is higher than for Helios. This is due to the fact that the WBM weighting is greater for pilot plants than for non-pilot plants. In other words, with this weighting, the approach considers that a non-pilot plant primarily displaces fossil electricity generated by existing facilities, whereas a pilot plant will have the effect of primarily removing fossil electricity generation by future facilities.

[41] "IFI TWG - List of methodologies | UNFCCC". https://unfccc.int/climate-action/sectoral-engagement/ifis-harmonization-of-standards-for-ghg-accounting/ifi-twg-list-of-methodologies

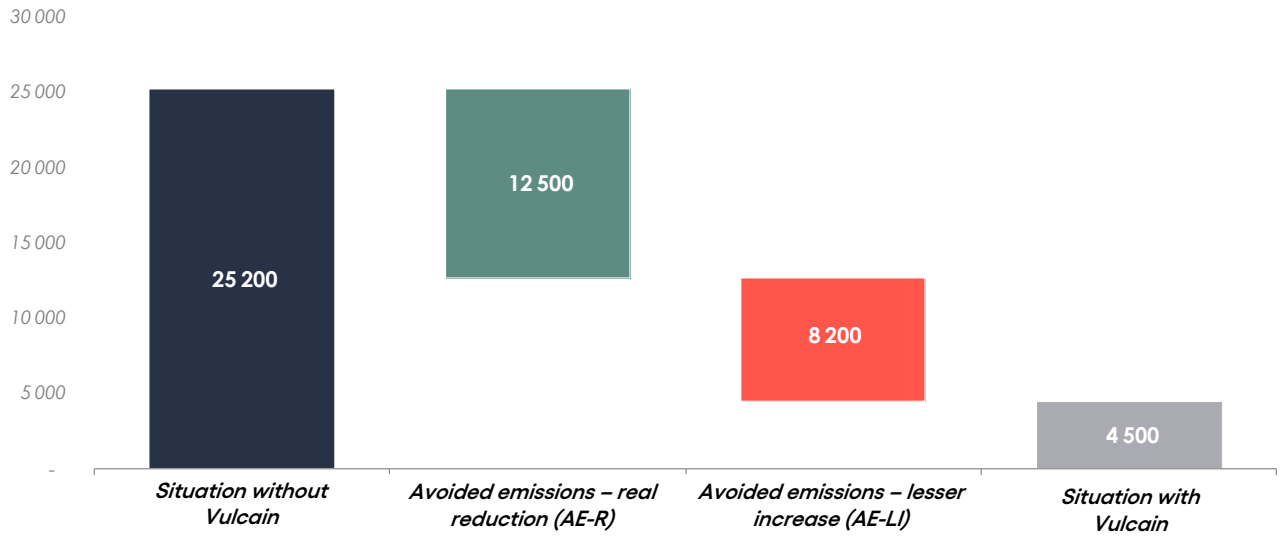

Figure 36 – Emissions avoided by the Vulcain plant

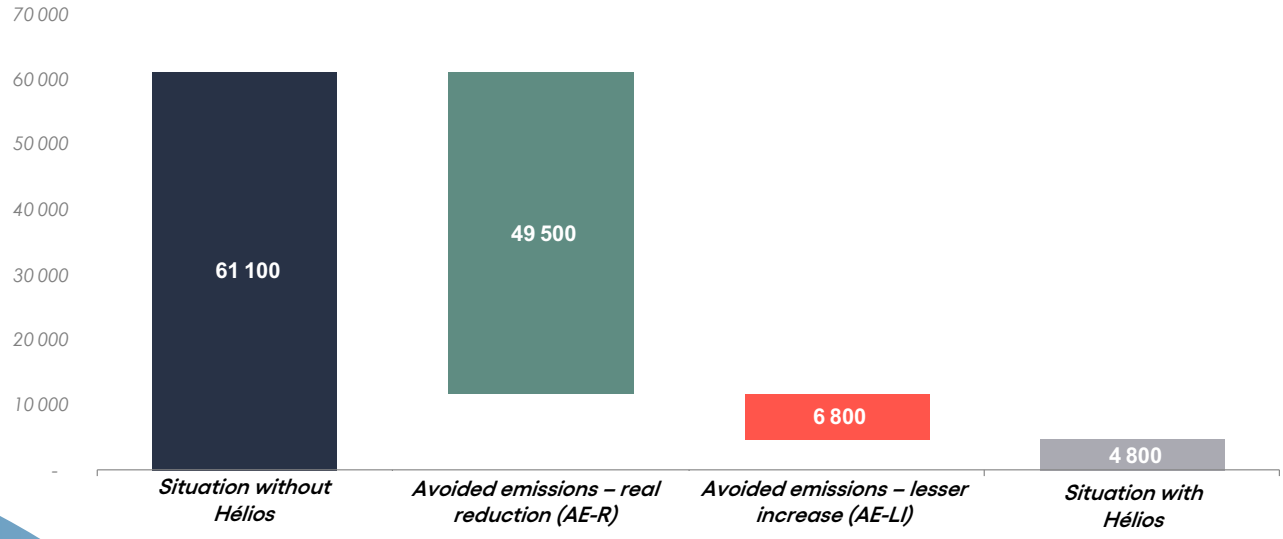

Figure 37 – Emissions avoided by the Helios plant

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We are constantly on the lookout for signs of weakness, we deploy a systemic vision of the energy-climate constraint and put all our rigour and creativity to work in transforming our clients into climate challenge leaders.

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