An EU climate target for 2040 -

elaboration on the European Commission's public consultation

Carbon Gap, June 2023

Importance of the 2040 climate target(s)

The development of further climate targets for 2040 is an essential step in defining the EU's path to reaching climate neutrality in 2050, and a temperature check for the Union's overall climate ambition. Carbon Gap welcomes the European Commission's Public Consultation and the opportunity to input to the 2040 targets and would like to hereby elaborate on recommendations for the development of the targets as well as overall climate and carbon removal policy.

For the development of the next climate framework, we call on the European Commission to:

- **Aim to achieve 95% net GHG emission reductions by 2040 compared to 1990 levels,** recognizing that *carbon* neutrality (net zero CO_2 emissions) must be achieved before *climate* neutrality (net zero GHG emissions)
- **Separately quantify the role of gross emission reductions** and total carbon removals the EU (and its member states) should achieve by 2040
- **Divide emission reduction and removal targets into biogenic and geological components to** enable the EU to realistically quantify CDR's contribution to the 2040 and 2050 climate targets, while avoiding overreliance on the biosphere
- **Mainstream carbon removals specifically, and climate action generally, across all relevant EU policies** to highlight potential synergies between climate and other objectives and allow for a more holistic approach to tackling climate change
- **Support a wide range of CDR options** to ensure sustainable and durable deployment of CDR
- **Establish a transparent portal summarising targets and resources**
- **Ensure sufficient political and financial support for the 2040 climate target**
- **Ensure that the attainment of the 2040 targets will be just and inclusive,** considering issues including but also beyond gender

The role of removals in climate change mitigation efforts

For Europe to achieve *climate* neutrality by 2050 (which includes the role of non-CO_2 GHGs), it is crucial to recognise that *carbon* neutrality (net zero emissions of CO_2) will need to be reached much sooner, ideally by 2040. It is therefore essential that the EU set a climate-compatible 2040 target that responds to the urgency of the climate crisis and prioritises faster emission cuts as well as the responsible scale up of carbon removal (CDR).

Next to rapid and large-scale GHG reductions, CDR will play a key role in climate change mitigation, complementing emission reduction efforts. The evidence assembled in the IPCC's latest WG3 report is unambiguous: without substantial volumes of cumulative carbon removals both before mid-

century, and increasing post mid-century, achieving Paris climate goals is not possible. The IPCC described three crucial roles for removals: 1) accelerating progress toward net zero, 2) counterbalancing difficult-to-decarbonise emissions at the point of net zero, and 3) delivering net negative emissions. This was further reinforced by the latest recommendations from the European Scientific Advisory Board on Climate Change, which showed a clear need for removals to achieve Europe's climate goals. [1,2]

When planning the next climate framework, it is important to recognise the need to both support novel CDR methods, and responsibly scale up more mature CDR methods, as urgently as possible. Europe cannot afford to wait to deploy CDR until all emission reduction efforts have been achieved. CDR needs to be scaled up alongside these critical emission cuts to enable it to work in parallel with emission reductions.

The history of solar and wind energy illustrates that multi-decadal timescales are needed to reach meaningful scale, and that dramatic cost reductions come with scale. Increasing levels of carbon removals in the 2020s, 2030s, and 2040s will be needed to reach climate neutrality by or before 2050, to balance residual, hard-to-abate emissions, and subsequently to reach net negative emission, which can only be achieved via removals.[3]

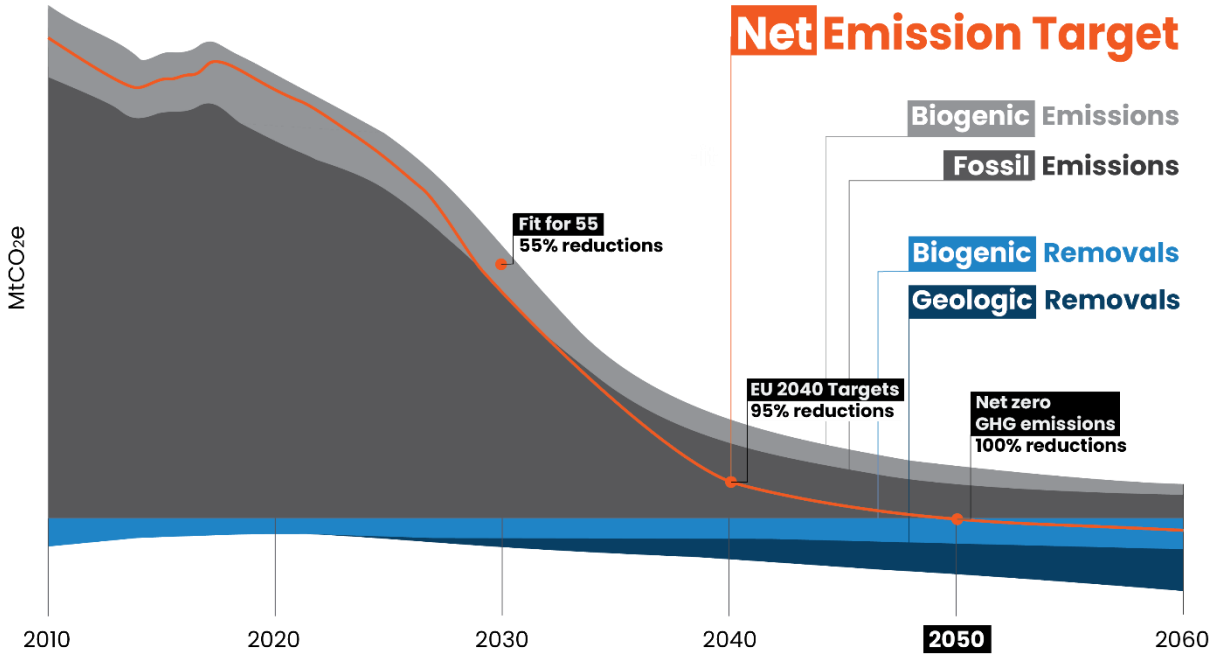

Figure 1: Illustrative pathway towards significantly reducing net emissions and reaching net zero in 2050, highlighting the roles of biogenic as well as geologic GHG sources and sinks (adapted from original source) [4]

1. Set an explicit 2040 net emissions target

[1] IPCC WG III, 2022. Climate Change 2022: Mitigation of Climate Change. (link)
[2] European Scientific Advisory Board on Climate Change, 2023. Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030-2050. (link)
[3] IPCC WG III, 2022. Climate Change 2022: Mitigation of Climate Change. (link)
[4] European Scientific Advisory Board on Climate Change, 2023. Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030-2050. (link)

Given the need to drastically reduce GHG emissions and sufficiently scale up CDR, **Carbon Gap considers it crucial for the EU to set an explicit 2040 net emission target.** This target should be the key milestone that the Union commits to reach on the path to climate neutrality by or before 2050. As suggested by the latest report of the European Scientific Advisory Board, **this should be a 95% net emissions reduction by 2040 compared to 1990 levels.** This ambitious goal is commensurate with a just and fair European contribution to climate action in the global context.

This net emissions target must be split into distinct twin targets for reductions and removals (see Recommendation #2 below). However, the overarching net emissions target must be paramount, in recognition of the fact that warming is a function of cumulative emissions to the atmosphere.

2. **Quantify the distinct roles of gross emission reductions and total carbon removals**

As shown in Figure 1, underpinning the 2040 net emission target, two twin targets should be set:

I) A **gross emission reductions target**, to ensure that emissions are reduced across all sectors as much as possible, and that if any emissions remain in 2050, they are only those especially difficult-to-abate.
II) A **carbon removal target**, to ensure that CDR can fulfil its crucial roles in both complementing emission reduction efforts on the way to climate neutrality and delivering net negative emissions thereafter.

Setting separate twin targets is crucial to ensure that efforts to reduce GHG emissions and scale up carbon removals are carried out in parallel. The target for gross emission reductions will specify the total emission cuts that the Union needs to achieve in 2040 as a key milestone towards 2050. In the same fashion, setting a specific target for carbon removals will allow CDR to be scaled up alongside critical emission cuts, avoiding risks of under- or overreliance on carbon removals.

3. **Divide emission reduction and removal targets into biogenic and geological components**

The gross emission reduction target must distinguish between **fossil based** and **biogenic emissions**, essentially creating two sub-targets corresponding with the slow carbon cycle and the fast carbon cycle.[5]

Likewise, the carbon removal target must be divided into two sub-targets, one for **higher-durability carbon removal** and another for **lower-durability carbon removal** in the land sector and wider biosphere. These two buckets should be defined according to the character of the CO_2 storage, hence one sub-target for carbon removals that store CO_2 in the geosphere (higher durability), and one sub-target for removals that store CO_2 in the biosphere (lower durability).

These sub-targets are essential, given the fundamentally different nature of carbon storage in the biosphere and geosphere, and their distinct advantages and limitations.

Biosphere storage can offer advantages such as providing a wide array of non-carbon benefits (biodiversity, rural livelihoods), but also has limitations given limited land availability, carbon sink saturation, and vulnerability to physical reversal of stored carbon through fire, diseases, drought, and human intervention. Moreover, there is also the risk that the biosphere may flip from a net carbon sink to a net carbon source because of climate change itself.

[5] NASA, 2011. The Carbon Cycle. (link)

Geosphere storage advantages include high durability resulting in very long expected storage duration, and relative ease of monitoring. Current limitations include storage sites ready for injection, lack of existing CO_2 transport infrastructure, and obstructing legal conditions.

Setting specific sub-targets based on CO_2 storage characteristics will enable the EU to realistically quantify CDR's contribution to the 2040 and 2050 climate targets, while avoiding overreliance on the biosphere, and to reach "durable net zero".

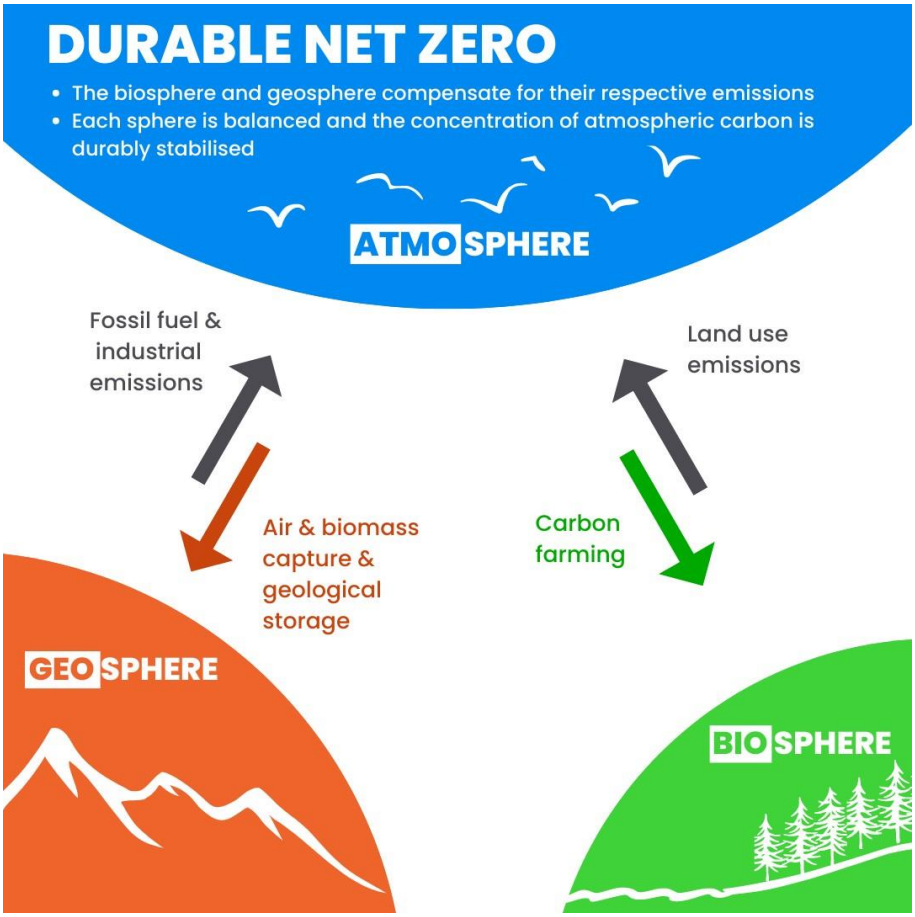

Figure 2: Simplified depiction of durable net zero (adapted from source)[6,7]

As shown in Figure 2, durable net zero is a state in which emissions have been reduced as much as possible (minimising the need for removals), and where the amount of carbon leaving the geosphere and biosphere is balanced by removals that return carbon to the geosphere and biosphere, respectively.

The attainment of this balanced state is crucial and can only be achieved if clear and separate sub-targets for biosphere and geosphere storage are set.

4. Support a wide range of CDR options

While carbon removals will need to play a crucial role in limiting global warming, it is also essential to understand the limitations of the deployment of carbon removals, and therefore the reasons why they cannot replace drastic emission reductions. Unlike some sectors and activities which may be easier to decarbonise, large-scale deployment of carbon removals will require a significant quantity and variety

[6] Fankhauser, S. et al., 2021. The meaning of net zero and how to get it right. (link)
[7] WEF, 2021. Net-Zero to Net-Negative: A Guide for Leaders on Carbon Removal. (link)

of resources (such as electricity, heat, land, biomass) per ton CO_2 removed[8], which may adversely impact the sectors producing them and sectors relying on these resources. It is therefore important to consider and address competition over resources, as well as synergies and trade-offs of carbon removals with other sectors, activities and sustainability goals, when adjusting and improving climate policies and legal frameworks.

The 2040 targets should therefore be inclusive in their definition and not create path dependency in which removal methods we pursue, as well as consider emerging CDR methods which could help us reach our climate goals. It is furthermore important to note that high-durability CDR methods significantly expand beyond the ones often primarily considered (i.e. BECCS and DACCS), ranging from mineralisation and incorporation into cementitious building materials to direct separation and storage of CO2 from seawater.

In developing a portfolio approach to carbon removal, which would span a variety of CDR methods to ensure sustainable and durable deployment of CDR, these other high-durability CDR methods should also receive increased attention.

5. **Mainstream carbon removals specifically, and climate action generally, across all relevant EU policies**

For the 2040 targets and wider EU climate policies, it is essential to consider climate policy and carbon removals not only in dedicated files, but to also ensure their sufficient consideration in other relevant policy files. These include policies such as those focused on other aspects of land use, agriculture, forestry, industrial infrastructure, financing of research and innovation projects.

To this aim Carbon Gap has started mapping EU, national and international legislation and policy proposals related to CDR and tracking their development (see https://tracker.carbongap.org/).

In the context of the 2040 climate framework, we call on the European Commission to systematically include climate generally and carbon removals specifically where relevant. In turn this will help reduce conflicts among policy files and over resources, highlight potential synergies between climate and other objectives, and allow for a more holistic, instead of a fragmented, approach to EU climate action.

6. **Establish a transparent portal summarising targets and resources**

The achievement of the 2040 targets and subsequently 2050 climate neutrality target requires an array of actions and a variety of policies that span multiple sectors. To clarify EU's climate objectives and ensure that these are met in a coherent manner, Carbon Gap strongly recommends the creation of a **publicly available portal summarising all the EU climate targets and all the pieces of legislation in which they reside in a clear and transparent way**. This would enable all stakeholders and policymakers to gain a holistic overview of the EU's objectives, check officially measured progress toward meeting them, and apply proper scrutiny to their quality and additionality, and interactions or overlap among the targets.

7. Ensure sufficient political and financial support for the 2040 climate target

[8] Smith et al., 2016. Biophysical and economic limits to negative CO_2-emissions. (link)

Climate targets require sufficient political and financial support to be meaningful and achievable. Therefore, the European Union and its Member States should not only discuss and establish targets for 2040, i.e. the final outcomes of implemented climate policies and financial instruments over the next years, but also evaluate, determine and introduce the necessary political actions and associated funding to ensure these targets are reached through unprecedented scale up of climate solution deployment.

To this end, the European Commision should work on modelling the projected overall cost of achieving the 2040 targets and provide an estimate of the financial resources needed to reach them.

8. Ensure that the attainment of the 2040 targets will be just and inclusive, also considering issues beyond gender

All 2040 targets and the pathways to reaching them should furthermore **ensure a just and inclusive transition to climate neutrality, not only regarding gender aspects (as specifically asked about in the consultation questionnaire), but considering aspects of inclusivity, justice and intersectionality more broadly as well.**

Achieving the 2040 targets will involve an unprecedented scale-up of climate solutions, from renewables to improved land sink measurement to novel carbon dioxide removal technologies. Collectively, this net zero revolution will generate both costs and financial benefits, growth, and job creation, and it will reshape everything from food systems and diets to air quality and energy costs. Essential to a just transition is ensuring that these costs and benefits are shared fairly through a New Green Social Contract that ensures EU citizens thrive and are better off in 2040 than in today's fossil fuel-dominated economy. Distributive justice must be a core tenet of the green transition to ensure ongoing popular and political support for climate action. Meeting any ambitious 2040 EU climate target depends on it.

Recommendations for the upcoming impact assessment

In view of the upcoming development of the European Commission's impact assessment on the 2040 targets, Carbon Gap wishes to highlight some elements of the consultation that could be strengthened and provide some recommendations for the upcoming consultation.

While Carbon Gap agrees that carbon removals will play an important role in 2050, as the EU will require a significantly scaled-up quantity of carbon removals to reach both its net zero GHG emissions and negative emissions thereafter, the impact assessment would benefit from a more nuanced approach to the topic. Given that the scaling of carbon removals will be subject to resource availability, as well as several adverse side-effects associated with a range of carbon removal methods, **it will be crucial not to neglect the sustainability concerns surrounding CDR** and that CDR cannot be infinitely scaled to address all unabated GHG emissions in 2050.

Moreover, **Carbon Gap would strongly suggest introducing a more nuanced and differentiated categorisation of carbon removals in the upcoming impact assessment.**

CDR methods expand significantly beyond nature-based and industrial removals, and there are other issues to consider beyond the important question of balancing "nature-based" and "industrial" removals (discussed above). It is essential to restore natural land-based carbon sinks, not just in terms of their climate change mitigation potential, but also in view of the co-benefits they deliver (e.g.,

increased nutrient retention, water quality, biodiversity, rural livelihoods from managed ecosystems, etc.). Natural land sinks will however also be limited by potential carbon sequestration saturation, the pursuit of improving other ecosystem services or achieving sustainable development goals, and adverse impacts caused by environmental change.[9] Industrial carbon removals have the advantage of generally storing carbon more safely and over longer periods of time yet are also associated with higher costs and development or substantial expansion of CO_2 transport and storage infrastructure. **It is therefore important to build a portfolio of a variety of CDR methods both within and outside of the two categories and ensure that said CDR portfolio removes enough CO_2 from the atmosphere while ensuring to cause no significant harm to environment and people and while maximizing potential co-benefits.**

Looking ahead

Carbon Gap welcomes further discussion of carbon removals as necessary and complementary to rapid and large-scale emission reductions for the EU's 2040 and 2050 climate targets, and its wider contribution to reaching the Paris Agreement's goals. When further defining the role of carbon removals within EU climate action over the coming decades, it will be crucial to enshrine political, legal, economic, social, and environmental factors in CDR sustainability guidelines, to ensure the responsible deployment of carbon removals in Europe.

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[9] IPCC WG III, 2022. Climate Change 2022: Mitigation of Climate Change. (link)