Restoring sustainable carbon cycles

As the European chemical industry, we have the ambition to become climate-neutral by 2050. We are currently looking into the "HOW" and the elements needed for achieving this objective. Cefic welcomes the European Commission's initiative on restoring sustainable carbon cycles, which we see as an important step towards an effective carbon management policy and which will guide our thinking towards 2050. We aim to go as far as possible in reducing our own carbon footprint by maintaining high levels of resource efficiency and circularity, by introducing alternative processes enabling the use of circular and alternative feedstock and low-carbon energy including low-carbon heat and steam supply as well as by capturing and storing CO_2. However, when it comes to the role that carbon plays within industry, the chemical sector has its own specificity: carbon is and will remain at the very heart of many of our processes and it is an essential element of many chemicals, like it is for most products society is using. Having access to alternative sources of carbon, notably from waste, CO_2/CO captured from industrial processes and bio-based resources is therefore an absolute necessity. In the longer-term, as residual emissions become hard or even impossible to abate, balancing options will also be needed to reach our climate-neutrality objective.

A new approach to carbon management

Cefic supports the objective to establish sustainable and climate-resilient carbon cycles, thereby minimising additional emissions and fossil fuel extraction. The Commission's Communication recognizes the essential role that carbon plays in our life, societies and economies, while aiming to ensure that this resource is managed in a sustainable manner, without leakage to the environment in the form of waste or CO_2. Establishing sustainable and climate-resilient carbon cycles is, in our view, a more efficient approach to climate mitigation than an approach that is essentially geared towards "decarbonisation", which may result in the wrong diagnosis and thus will lead to suboptimal solutions. In fact, carbon is an essential element in organic compounds: it is not possible to reduce the carbon density of our products and we will remain strongly reliant on carbonas a source of feedstock.

The objectives of the Communication are in line with the vision put forward by Cefic in its Mid-Century Vision report titled 'Molecule Managers'. The European Chemical Industry is already contributing for yearsto the objectives identified in the Communication.

The EU27 chemical industry has already significantly reduced its carbon intensity through increased energyefficiency, with specific energy consumption[1] going down by 47% since 1990. Next, the industry is aiming for higher resource efficiency in general, limiting waste during production and using waste and side streams as circular feedstock, by intelligently connecting production plants and technologies. The fraction of waste generated in the industry which is recovered increased from 39% in 2007 to 48% in

[1] Specific energy consumption index, which is calculated as (energy consumption index/consumption index) (1990=100). See Cefic's 2022 Facts & Figures.

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2018.[2] Product design and product reuse can also decrease the use of resources to the necessary minimum supporting SDG #12 on responsible production and consumption. At the same time, carbon is and remains an indispensable element for organic chemistry, which is about three quarters of the production volume of the European Chemical Industry.

Conscious of consumers' desire for sustainable products, the chemical industry is increasingly looking at ways to reduce its own carbon footprint, particularly by sourcing its carbon feedstock from alternative sources and by increasing circularity in order to keep the carbon in the loop. The product value of the bio-based share of chemicals has increased to 13.8% over the last decade[3] and the EU chemical industry is set to scale-up its sustainable production and use. Chemical recycling is another way to intensify carbon circularity. This emerging route is starting to make contributions.[4] Our member companies are working towards investments in scale-up and full integration of chemical recycling in the production of chemicals including plastics. European chemical companies are also developing a broad portfolio of advanced technologies for efficient utilization on CO_2 from various sources (and CO from industrial waste gases) for the production of chemicals and polymers with a lower carbon footprint. Ensuring greater circularity of resources (including those that are originally fossil-based) to reduce emissions at the products' end of use and switching to biogenic carbon and CO_2, all have the potentials to significantly reduce our impact on climate.

Certain sources of GHG emissions emitted by our plants will remain extremely costly or even impossible to abate – at least by 2050, and therefore need to be removed/compensated elsewhere in the chemical industry or the economy, necessitating exploiting cross-sectoral synergies, industrial symbiosis and long-term carbon storage solutions. For instance, some installations' emission abatement potentials will be strongly limited by their geographical location (e.g. lacking infrastructure). Deploying carbon utilisation solutions inside the chemical sector can also help other sectors of the economy, in particular industrial installations, to deal with their own emissions. Chemical products are a major reservoir of carbon. They can help keeping carbon in the loop through a variety of circular solutions.

The industrial sustainable carbon challenge

An aspirational target of 20% to increase the share of "sustainable non-fossil"[5] carbon sources in chemical and plastic products by 2030 can be an important signal for our sector but it can only materialise if the accessibility and availability of raw material is improved and is competitive for the industry, and if waste collection and sorting for all sources is improved to enable innovative recycling solutions.

For each source of alternative carbon, the EU should consider the cost-competitivity, accessibility and sustainability of feedstock to be considered for the attainment of the objective.

[2] Recovered waste intensity index is calculated by dividing the total (hazardous and non-hazardous waste) recovered waste index by the production index, source: E-PRTR and Cefic analysis.

[3] According to BIC/Nova Institut latest statistics, the share of the product value coming from bio-based chemicals has increased from 11.8% to 13.8% over 10 years.

[4] Cefic Chemical Recycling Virtual Exhibition: https://cefic.org/policy-matters/innovation/chemical-recycling/

[5] Cefic's definition of sustainable non-fossil carbon sources includes all sources of sustainable circular carbon even if originally coming from fossil sources.

The EU should also adopt a methodology for the calculation of the share of sustainable non-fossil carbon in chemical and plastic products, including:

- a clear scope (which industry perimeter);
- a point of calculation, avoiding double counting;
- a definition of sustainable non-fossil carbon. In Cefic's view, this target should cover all sustainable circular feedstock including bio-based, mechanically and chemically recycled and CO_2-capture based materials.

In the Annex II to this position, Cefic proposes a series of principles to underpin the methodology to calculate the share of sustainable non-fossil carbon in chemical and plastic products.

Cefic recommendations:

- Develop a comprehensive and supportive policy framework to help overcome existing challenges and incentivise increased market recognition, while safeguarding industry's international competitiveness: industry requires a clear set of measures that would make alternative/circular feedstock and products competitive;
- Clarify the concept of "non-fossil carbon sources" and include all sources of sustainable circular carbon even if coming from fossil sources originally;
- Establish a clear and harmonised system for claiming circular sustainable raw material content in all material end-use segments, including a chain of custody (such as mass balance) certification system;
- The 20% aspirational target by 2030 on sustainable non-fossil carbon sources should be backed with a detailed strategy outlining the measures taken to secure access of the chemical industry to sustainable biomass and waste at fair economic and technical conditions for all market players while fully respecting the planet's boundaries. The availability of sustainable non-fossil carbon sources should be clearly assessed versus future needs.

Transforming industrial value chains

The EU's and Member States policy and regulatory framework should further evolve to enable the chemical sector's contribution to new carbon management options. Concretely:

- **CO_2 emission avoidance and fossil fuel extraction resulting from the utilisation of captured CO_2 as alternative carbon feedstock for the production of chemicals should be recognized in the EU ETS**

Cefic regrets that the Inter-institutional agreement on the revision of the EU ETS Directive does not fully recognise the role of emission capture and utilization in products. The strong conditionality, compared to the initial Commission proposal, will unfortunately maintain the current uncertainty for investments. A consistent treatment of CCU materials is crucial.

- **The EU's strategy should take into account the role of (chemical) products as a carbon storage and sequestration option.**

The chemical sector is uniquely positioned as an important contributor to restoring sustainable carbon cycles. Chemical products are a massive reservoir of carbon that can fix the carbon for 10-40 years[6] in a single pass and will be fixed for a multiple of this time when the recycling will become fully material. Based on our estimations, the volume of carbon embedded in chemical products is comparable to total emissions of the industry for the production of those. Today, most of this carbon ends up in the atmosphere when products are incinerated at the end of their use.[7]

An ambitious circular economy strategy including efficient waste management and recycling policies, securing access to biobased feedstock and supportive measures for the utilization of captured CO_2 as feedstock are therefore a pre-requisite for achieving sustainable and climate-resilient carbon cycles by keeping carbon "in the loop". Today the chemical sector can contribute to emission abatement in other sectors by "absorbing" carbon and storing it in products.[8]

In the longer-term (towards 2050), the chemical industry could contribute to removing CO_2 from the atmosphere with storage of biogenic carbon and Direct Air Capture either underground or in products.

- **All forms of biogenic carbon removals should be considered in the EU's carbon accounting framework.**

Increasing the share of biobased products can play an important role in meeting the EU's climate-neutrality objective. The future carbon removal certification framework should clarify the rules applying to capture and storage of biogenic carbon. Under the current EU Emission Trading Scheme, there is no crediting foreseen to industrial installations if biogenic carbon is captured and stored underground or used in materials, which creates uncertainty for investments into Carbon Capture and Storage and Usage projects.

- **The EU's policy framework should acknowledge emission abatements along the entire value chain**

Certain processes remain energy intensive and therefore do not lead to absolute GHG reductions if only considering the perimeter of chemical production facilities. These technologies will however reduce GHG emissions at the product's end-of-life, generating benefits across the value chain. The ETS MRR alone will not provide a direct incentive for circular technologies, although they are crucial to avoid GHG emissions. A holistic framework needs to be developed to support these circular technologies and overcome differences between ETS and ESR treatment of waste.

- **The inclusion of municipal waste incineration in the scope of the EU ETS could give a coherent signal on circularity**

Including municipal waste incineration in the scope of the EU ETS, while ensuring the necessary exemptions for hazardous waste and sewage sludge, would provide a coherent signal on circularity creating an equal treatment of waste incineration inside and outside ETS installations, regardless the permitting and facilitate the tracking of carbon until the end of the value chain. This could help to direct material away from incineration towards recycling. At the same time, appropriate measures should be

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[6] Geyer, Jambeck, Law Sci. Adv. 2017;3: e1700782.

[7] According to Material Economics, in 2017 out of 35 to 45 Mtons of EU plastic waste, 20 to 30 Mtons were incinerated and not collected separately (Industrial Transformation 2050 - Pathways to Net-Zero Emissions from EU Heavy Industry p. 102).

[8] According to the initial findings of the iC2050 model, the amount of captured CO_2 used as feedstock would vary between 9 and 13 Mtons by 2050.

put in place to prevent unintended consequences, whereby operators could have the incentive to redirect materials to landfill rather than to recycling. We therefore regret that the inclusion of municipal waste incineration has been delayed to 2028, maintaining the current uncertainty for investments.

- **The inclusion of biogenic carbon uptake in cradle-to-gate assessments could drive procurement decision making in the right direction**

The current PEF methodology does not allow the inclusion of credits for the biogenic carbon uptake in cradle-to-gate, regardless if in a cradle-to-grave approach this credit would most likely be taken into account in the form of the end of life emissions.

This accounting issue could potentially lead to wrong purchasing decisions, and in addition makes communication of PEF much more difficult to understand. It prevents companies from generating emission reduction savings from the use of the biogenic carbon uptake and at the same time savings from a potential circular solution, as the emissions at the end of use are assumed to be zero for bio-based materials. Therefore, it can be a disadvantage for bio-based circular solutions, as they would have to show-case a negative emission, which is again difficult to explain.

The consideration of biogenic carbon uptake at cradle-to-gate approaches provides a fair basis of comparison, and supports decisions that ultimately drive emission reduction. It is also easier to explain to internal stakeholders (e.g. Procurement Department), and allows credits from circular solutions to be considered.

The rationale for not allowing biogenic carbon uptake as a credit for bio-based materials is the fact that when you cut a tree the carbon absorbed during photosynthesis would be ultimately released into the atmosphere. But when one extracts fossil materials out of the ground, the rationale should be the same. Now circular solutions are allowing longer term carbon storage, therefore this accounting rule should be revisited.

Cefic recommendations:

- Use of captured carbon as feedstock needs to be fully recognized within ETS MRR;
- Ecodesign and waste related legislation should address the reuse and recycling of carbon stored in materials of (end of use) products;
- Adjust PEF methodology to reflect the carbon removal in biomass at the cradle stage instead of at the final disposal stage, hence differentiating bio-based products from their fossil equivalents.

Carbon removal certification should build on existing mechanisms

Cefic welcomes the Commission's initiative to develop a regulatory framework for the certification of carbon removals. Cefic hopes this initiative will pave the way for recognizing the contribution of technological solutions to carbon removals: the Commission's long-term strategy, which underpins the European Climate Law, clearly emphasizes the role of industrial removals solutions for the achievement of the climate-neutrality objective.

Annex III features Cefic's position on the Commission proposal for a Union certification framework for carbon removals, building on key principles:

- **Avoiding emissions in the first place should remain the EU's priority** while removals will need to focus on hard-to-abate emissions. Meanwhile, in order for the EU to reduce its dependence on fossil carbon, circularity of the carbon that is already circulating in the economy should also be prioritized.
- **Quantification, additionality, long-term storage and sustainability criteria** should be developed to ensure a robust EU certification system.
- **Carbon removals also need recognition under relevant enabling policy frameworks including the EU ETS**. While the Commission's proposal on carbon removal certification is addressing voluntary markets, the regulatory framework should keep an eye on the ETS MRV Regulation, in order to ensure regulatory consistency.

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Cefic, the European Chemical Industry Council, founded in 1972, is the voice of large, medium and small chemical companies across Europe, which provide 1.2 million jobs and account for approximately about 15% of world chemicals production.

Annex I: Sustainable Carbon Cycles Driven by Low-Carbon Energy

Sketching a pathway for the European chemical industry to neutralize the impact on the climate.

This opinion paper presents a vision for the chemical industry how to contribute to meeting the UN climate goals and remain within the planet's boundaries. This vision is proposed to provide a narrative about available carbon stocks and the carbon flows within the creation of a carbon stock across the economy. As the chemical industry is placed at that point of the economy in which carbon is introduced into the structure of our day-to-day products, it plays with its carbon processing capacities a pivotal role for the overall change from fossil to non-fossil based materials. The paper is intended to be a basis to build upon when discussing decarbonisation strategies at EU, Member States or company level. It is not to be confused with a carbon accounting system but it intends to focus on the strategic cross-industry's role to use alternatives to fossil and hereby contributing to the goal of a climate-neutral society.

A feedstock vision for the chemical industry

Considering our planet's boundaries, neutralising our impact on the climate is imperative. Implementing sustainable carbon cycles driven by low-carbon energy is the path the European chemical industry is taking, and for which it has many solutions to offer.

The concept of Sustainable carbon cycles entails the reduction of fossil carbon utilization as structural carbon in our products. It describes the available means to utilize alternative feedstock from non-fossil sources and ways to keep as much carbon as possible inside the economic system, minimise losses and minimise the impact from losses. In this respect, this vision discusses both replacing fossil carbon with non-fossil feedstock sources as well as circular economy measures to keep existing carbon as long as possible in use with acceptable efforts and sustainability advantages. It also includes carbon capture measures as e.g. storage (end-of-pipe) or utilization. With this, it covers the entire lifecycle of the carbon, from the extraction or production of raw materials to end of life carbon management.

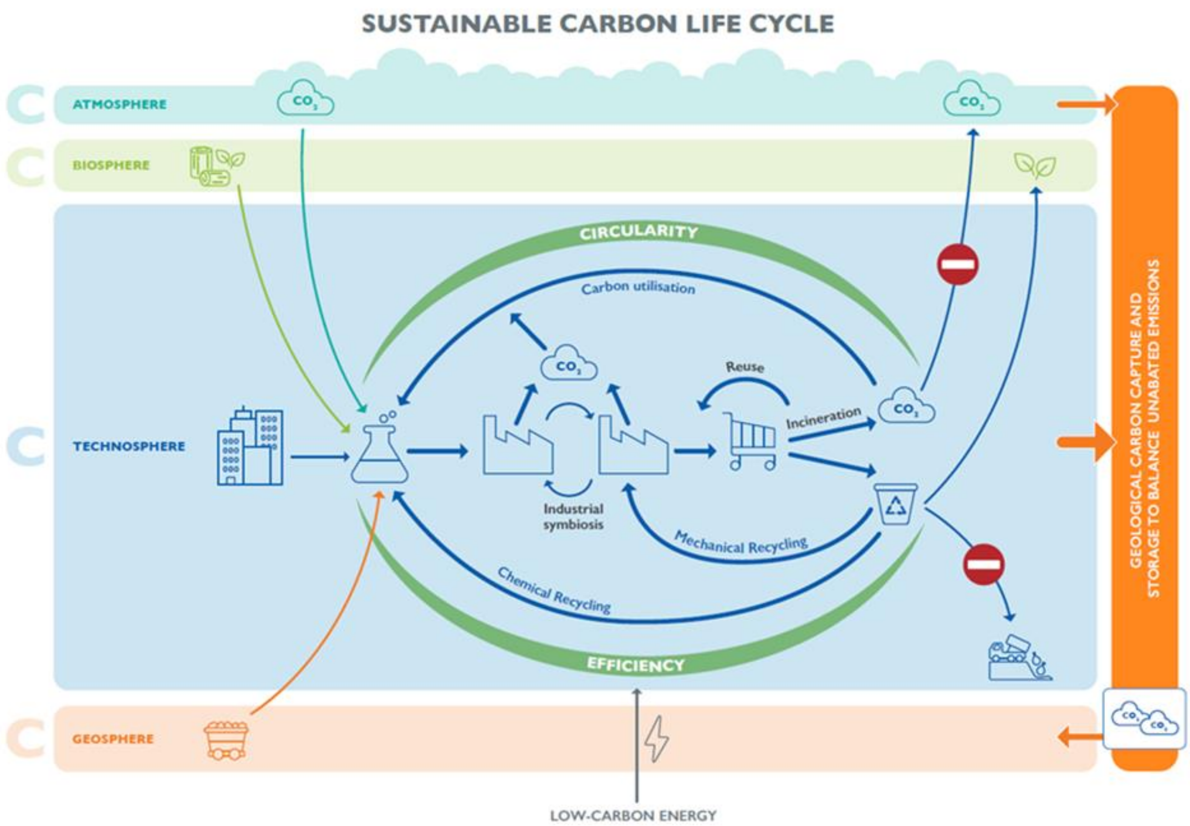
Maximising carbon circularity and minimising losses of carbon is key to create sustainable cycles. This can be achieved by reusing products, considering incremental approaches e.g., by increasing resource efficiency in production, recycling waste or reusing carbon which is already in the ecosystem (which we call technosphere carbon) through carbon capture technologies. The latter includes reusing carbon from industrial releases. The carbon losses and leakages should be restorative in nature. Idealised, maximizing carbon circularity and minimal losses can, in principle, contribute to keeping CO_2 out of the atmosphere by storing it in the "carbon chemical pool" (i.e., the stock of carbon-bearing manufactured products). The higher the degree of circularity reached within society, the more meaningful the contribution;

Because a 100% circularity is however not feasible, due to a.o. thermodynamics of the system, losses will be inevitable. A residual input of additional carbon containing feedstock remains needed to provide for increased need of carbon because of growth and to compensate for losses. In our vision, possibilities of "additional carbon" to replenish the carbon stock are in preference biosphere carbon and atmosphere carbon, although fossil carbon cannot be excluded.

Maintaining carbon in our economic system, and avoiding the losses of carbon, will however not be enough to achieve the imperative climate-neutral objective in 2050[9]. It will be necessary to take measures to actively remove carbon as CO_2 from the atmosphere, to address the hard-to-abate emissions of our own ecosystem, as well as others. That's where Carbon Capture and Storage (CCS) comes in.

CCS is yet another mitigation technology and part of the solution, next to choosing alternative carbon sources such as biomass and waste applying Carbon Capture and Use (CCU), increase circularity, electrification, CCS is to be considered as a mitigation measure to be deployed to address the remaining and hard-to-abate emissions. Avoidance of these additional emissions to the atmosphere, should be strived for first. A balance needs to be struck between utilization (CCU) and storage (CCS) of sources of CO_2. In any case, a safe and sustainable CCS needs to be preceded by a sound Environmental Impact Assessment and siting process, and a long-term monitoring and management scheme needs to be put in place.

Finally, the contribution of the above vision in meeting the Paris Goals is largely defined by **the efficiency** of processes and their **energy consumption**. Shifting to **low-carbon energy is imperative**. Some of the technologies discussed e.g. CCUS, or Direct Air Capture (DAC) consume a lot of (low-carbon) energy today; this will be an important element to consider when moving towards climate-neutrality.



[9] The Intergovernmental Panel on Climate Change (IPCC), International Energy Agency (IEA) and National Energy Technology Laboratory (NETL) argue that without carbon removals it is difficult to keep the temperature levels indicated in the Paris agreement.

Scope of the opinion paper

It is well known that the chemical industry is providing building blocks for materials and product applications that are resulting in GHG emission savings. These contributions are not specifically addressed within the vision of the carbon feedstock. They do have an important contribution in the overall demand of fresh carbon to be brought into the system. By reducing this demand, a lot of additional GHG emissions will be avoided. Some examples: styrofoam for household insulation is instrumental to achieve the various national targets on housing CO_2 emission reduction; battery materials are a key enabler for a net-zero transportation sector; high performance plastic materials are enablers of highly efficient blades for wind power generation.

In discussing the impact of feedstock choices on the planetary carbon budget one should not forget to take other planetary boundaries into account and to also consider the impact on biodiversity, soils, etc. Likewise, the carbon cycles in an industrial system will impact and compete with carbon cycles in other sectors, such as the agriculture sector. These equally important considerations are not subject of this opinion paper but should not be forgotten.

Carbon stocks and their contribution to the climate neutrality objective

To secure a livable future, the EU has committed to achieving climate neutrality by 2050, and has written this target of climate neutrality into law with the European Climate Law (Regulation (EU) 2021/1119). In a first step we need to drastically reduce our greenhouse gas emissions - emission avoidance - and next compensate for residual emissions (e.g. from industry or agriculture) through carbon (CO_2).

In this section we will discuss how feedstock choices in our industrial system, influence the atmospheric carbon budget. The impact can be evaluated by following the CO_2 emissions during processing or end-of-life; (-) means removing CO_2 from the atmosphere, (0) means avoiding additional CO_2 added during processing or end-of-life, (+) means emitting additional CO_2.

Carbon can be sourced from following carbon stocks:

Sustainable Biomass

Atmospheric CO_2 will be stored in biomass through photosynthesis. When biomass is used as a carbon feedstock in our current economic system, part of it will eventually be released back to the atmosphere as CO_2 emissions through incineration or through other degradation routes. This will result in a “neutral[10]” CO_2 balance (0). In a circular economy, less biogenic carbon would go back to the atmosphere as CO_2[11]. This would result in storing the carbon in the economic stock, and in a well-functioning-circular system, one could qualify this situation as approaching removal (-). Carbon capturing and sequestration of biosphere carbon classifies as carbon removal (-). As mentioned above, the efficiency of such removal processes depends highly on the energy source.

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[10] “neutral” is an approximation, as the system is never 100 % efficient

[11] In a vision for circular carbon cycles, landfilling is not considered.

Atmospheric carbon

Using atmosphere carbon as a feedstock for carbon-bearing materials is another option to avoid additional CO_2 (0) from fossil origin, being emitted to the atmosphere. However, technologies like Direct Air Capture (DAC) are today still in full development and not being scaled up. The use of atmosphere carbon can be a low-impact option if further development reduces its energy needs in combination with the use of low-carbon energy. DAC in combination with CCS could be considered as carbon removal (-).

Technosphere carbon

Technosphere carbon is a source of concentrated carbon in industrial emissions in the form of CO_2, and can be brought back in use through Carbon Capture and Utilisation technologies, via e.g. using hydrogen to convert CO_2 into methanol by using industrial emissions from different sectors as a carbon feedstock, again, the release of additional fossil carbon to the atmosphere would be avoided and the impact will be higher in a well-functioning circular system (0). Thus, applying CCS to technosphere carbon from fossil origin will result in a "net-zero emission[12]" if low-carbon energy is used, applying CCS to technosphere carbon of biogenic carbon will result in carbon removal (-).

Geosphere carbon

Current models still rely on carbon feedstock of fossil origin. In today's waste management set-up, this unfortunately often means an additional input of CO_2 to the atmosphere because today, a large portion of waste is still incineration without recovering the CO_2. By increasingly installing circular loops, the C can be seen as stored in the stock of carbon-bearing manufactured products or "carbon chemical pool"[13], hereby avoiding additional CO_2 to be emitted (0), and in a well-functioning circular economy CO_2 in products may approach CO_2 removal, in line with the principles outlined in Annex III. Utilising CCS as a sink for concentrated fossil CO_2 streams, would "permanently" avoid the release (0).

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[12] "net-zero" is an approximation, as the system is never 100% efficient.

[13] As defined in the IPCC Carbon Dioxide Capture and Storage report, available here.

Annex II: Cefic proposal for a methodology to calculate the share of sustainable non-fossil carbon in chemical and plastic products

In its Communication on Sustainable Carbon Cycles and the so-called Industrial Sustainable Carbon challenge, the European Commission sets an aspirational target that "at least 20% of the carbon used in the chemical and plastic products should be from sustainable non-fossil sources by 2030, in full consideration of the EU's biodiversity and circular economy objectives and of the upcoming policy framework for bio-based, biodegradable and compostable plastics".

With this paper, Cefic is proposing a series of principles to underpin the methodology for calculating the share of sustainable non-fossil carbon in the chemical sector.

1. POINT OF CALCULATION

The simplest approach in order to avoid double counting, is to calculate the share of sustainable non-fossil carbon **at the source point**, i.e. when the carbon-based feedstock enters the chemical industry perimeter (i.e. all installations that are classified under NACE C20)[14].

2. DEFINING THE SCOPE OF THE TARGET

- *"Sustainable non-fossil sources"* should include:
  - sustainable biomass (including biomass derived from agricultural waste and residues)[15];
  - waste (carbon from both mechanically and chemically recycled materials), even when originally coming from fossil carbon;
  - CO_2 (and CO as well as other possible gaseous carbon streams) captured from industrial processes (even when originally coming from fossil carbon) and CO_2 from the atmosphere.
- *"Chemical and plastic products"*:
  - should be defined as products that have carbon in their structure (organic chemicals, plastics, etc.), i.e. feedstock for hydrogen production is not included;
  - for reasons related to data availability the most realistic approach is to look at EU production, whether consumed in Europe or exported. Nevertheless, it will be important to also monitor imports so that they evolve in line with the objectives of sustainable carbon cycles.

3. CALCULATING THE SHARE

The share of sustainable non-fossil carbon used in chemical and plastic products, should be calculated by multiplying the tons of input used by its carbon content, which allows to get an equation where the nominator and the denominator are a mass figure (i.e. tons of carbon), as follows:

- **NUMERATOR**= [SUM (sustainable non-fossil input **i** (in tons) * carbon content **i**]

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[14] The proposed calculation methodology is aligned with the latest Cefic's position on Chemical Recycling, available here. Therefore, recycled feedstock entering the chemical industry perimeter should be calculated according to the Mass balance chain of custody with a Fuel use exempt model.

[15] According to the RED II (Directive 2018/2001 on the promotion of the use of energy from renewable sources) sustainability criteria.

- **DENOMINATOR**= [total input **i** (in tons) * carbon content **i**]

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Annex III: Cefic position on the Commission proposal for a Union certification framework for carbon removals

Cefic welcomes the Commission's initiative to develop a regulatory framework for the certification of carbon removals. Cefic hopes this initiative will pave the way for recognizing the contribution of technological solutions to carbon removals: the Commission's long-term strategy which underpins the EU Climate Law clearly emphasizes the role of industrial removals solutions for the achievement of the climate-neutrality objective. Carbon removal in our industry is negligeable today but will be important towards 2050, in order to balance remaining hard-to-abate emissions and achieve climate-neutrality. As the deployment of industrial solutions will require time, infrastructure and massive investments, the upcoming Regulation on carbon removal certification sends an important first signal to investors. In the meanwhile, we still believe that the priority of both the industrial sector and of the EU should be to avoid emissions in the first place, notably by reducing the carbon intensity of production processes and value chains. This is why the ETS MRR Regulation needs to appropriately recognize avoided GHG emissions through Carbon Capture and Usage.

Avoidance and circularity should come first

Clear investment signals are needed today in order to guarantee the amount for carbon removals needed for achieving climate-neutrality. However, avoiding emissions in the first place should remain the EU's priority while removals will need to focus on hard-to-abate emissions. Capturing sources of concentrated CO_2 at industrial point sources[16], which is less costly and energy-consuming then Direct Air Capture, should be prioritized.

In order for the EU to reduce its dependence on fossil carbon, it needs to ensure greater circularity of the carbon that is already circulating in the economy. Capturing CO_2 from industrial processes and using it as circular feedstock for chemicals and plastic needs to be recognised appropriately in the EU ETS framework[17] by using robust GHG accounting based on the origin of the carbon and the release in the atmosphere as basis.

It would also make sense to clarify and detail the concept of "hard-to-abate emissions" and how it may vary according to local conditions, as there is general consensus on the fact that carbon removals should compensate for this type of emissions. The amount of "hard-to-abate" emissions that needs to be absorbed by more advanced sectors or countries will certainly depend on technological developments and local conditions. Establishing sectoral roadmaps for sectors of the economy and of the industry (in a coordinated manner) would provide more visibility for the long-term.

The proposal for an intermediate climate target for 2040 as foreseen in the European Climate Law, provides the opportunity to assess and determine the contribution and eligibility of carbon removal solutions towards the EU climate objectives.

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[16] CO_2 present in the atmosphere is highly diluted, which means Direct Air Capture is very energy intensive and will require massive quantities of defossilised electricity. It is generally more efficient to capture CO_2 from concentrated sources, before they are emitted by industry.

[17] In alignment with the conditions set out in the proposed delegated act GHG calculations for RFNBOs.

Criteria for a robust EU certification system: the QU.A.L.ITY criteria

QUantification: In order to deliver unambiguous benefits for the climate, carbon should only be considered as "removed", if it causes a net reduction in atmospheric CO_2 concentration. That is to say, the carbon is either captured directly from the atmosphere (through Direct Air Capture) or it comes from a biogenic source.

Tailored certification methodologies should clarify the rules applying to capture and storage of biogenic carbon. CCS applied to bioenergy is not the only potential form of carbon removal. Other sources of biogenic CO_2 capture with durable storage, in line with the IPCC definition of carbon dioxide removal, should be considered as removal as well as bio-based materials with a demonstrated long-term storage capacity. For example, hydrogen and ammonia production approximately represent a quarter of the EU chemical industry's direct emissions. Considering capture and storage of CO_2 process emissions when biomethane is used for steam reforming would give reassurance that investment into carbon capture technologies and storage infrastructure can get a return on investment, even if the share of natural gas in the energy mix goes down in the longer-term.

Additionality: We understand the principle of additionality for removals into natural sinks. However, such concept is not applicable as such to technological carbon removals through technological solutions. As carbon removals in industry[18] are negligeable today, the relevant baseline is effectively close to zero.

Long-term storage: We believe it is important to clarify the contribution of circularity to the carbon removal objective. The contribution of the chemical sector and its products to balance remaining emissions is clearly recognized in the Commission's long-term strategy, which indicates that the chemical sector would be carbon negative by 2050.

If atmospheric or biogenic carbon is captured into products, ensuring their circularity will help keeping this carbon into "carbon chemical pool" instead of re-emitting it. As recycling loops may not be perfect and result into losses (i.e. partial release of carbon into the atmosphere), certification systems should be able to account for these losses. This could be addressed with the Commission establishing threshold standards per methodology, as is for example already done with carbon stored in products in buildings. The methodology and threshold would have to be specific to the product but in the end should reflect the principles of long-term storage, end use and application and risk mitigants.

Finally, we find that the notion of "carbon storage in products" is not adequate in order to describe a carbon removal activity. Carbon storage in products equals the very notion of organic chemistry. As the proposed Regulation is only about atmospheric or biogenic carbon, we believe that "carbon removal products" would be more appropriate.

SustainabilITY: Cefic agrees with the application of the "do no significant harm" principle within certification systems.

[18] As defined in the European Commission's proposal.

Carbon removals also need recognition under the EU ETS

The contribution of negative emissions is clearly recognised in the Commission's long-term strategy. For industry to invest in carbon removal solutions, it will be important - once a credible certification system is in place - that removal credits are recognized under relevant enabling policy frameworks, including the EU ETS. The Commission's report to be published in 2026 as part of the review of the EU ETS Directive is an important step in this direction.

Solutions will need to be in place in a timely manner for emissions, which cannot be abated while the ETS cap continues to go down and approaches zero e.g. a flexibility mechanisms with the LULUCF and/or the ESR sector or the introduction of "negative EUAs".

While the Commission's proposal on carbon removal certification is addressing voluntary markets, the regulatory framework needs to align with the ETS MRV Regulation, in order to ensure regulatory consistency and to allow the possibility to use carbon removal certificates for EU ETS compliance in the future.

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About Cefic:

Cefic, the European Chemical Industry Council, founded in 1972, is the voice of large, medium and small chemical companies across Europe, which provide 1.2 million jobs and account for approximately about 15% of world chemicals production.