Carbon offsets: A necessary tool, but only under close scrutiny and precise conditions

By Virginie Derue,
AXA IM Core Head of ESG Research

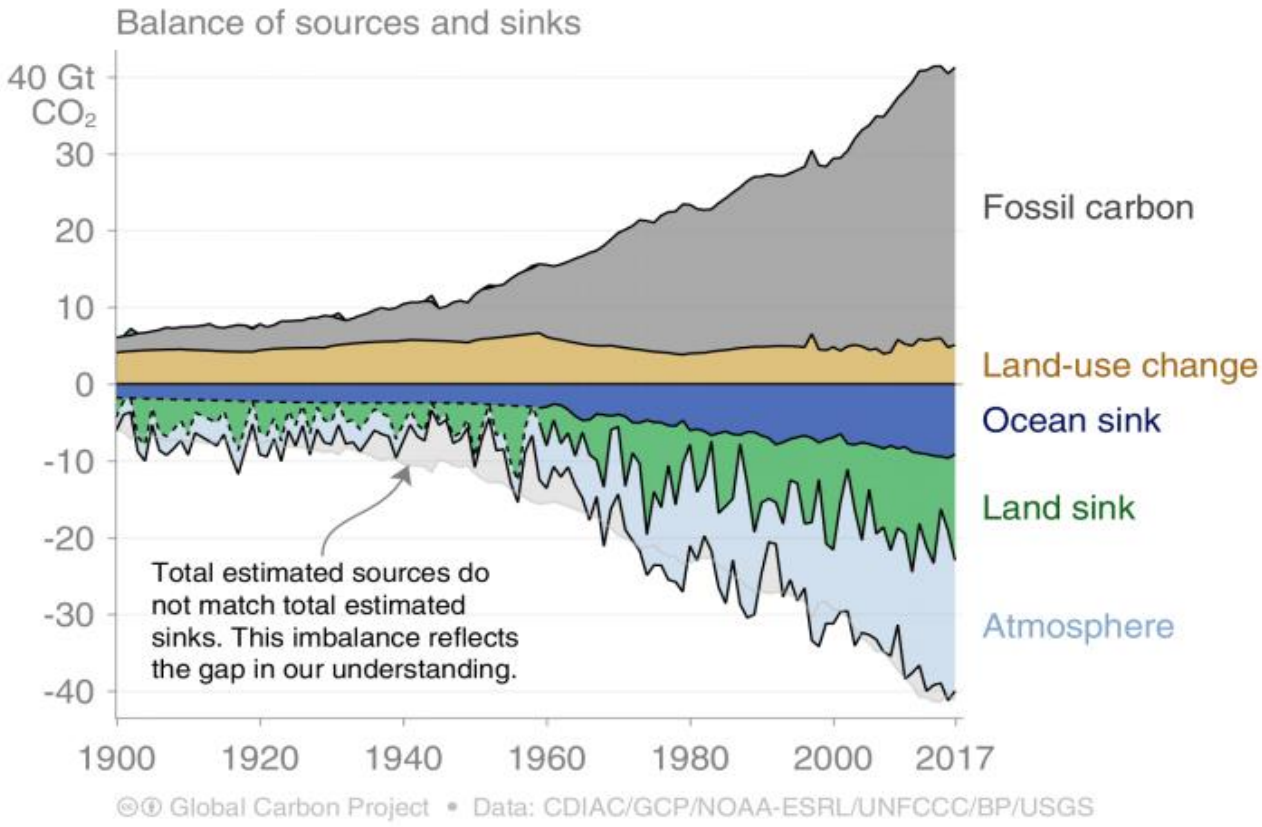
Key highlights

- To meet the Paris Agreement net zero goals, both emissions reductions and carbon offsetting will play a critical role in delivering a manageable transition.
- Reaching net zero will require a vast amount of innovation, policy measures, technological deployment, infrastructure and international co-operation, all of which will take time. An IEA report has set out more than 400 milestones, spanning all sectors and technologies, to mark the path to net zero
- If strategies tackling emissions reduction need to be implemented right now, in the short term, and until new technologies are massively deployed, carbon offsetting will prove unavoidable, especially in the hard-to-abate sectors.
- Carbon offsetting has faced accusations that it amounts to 'greenwashing' by allowing, even incentivising, companies to avoid actually reducing their emissions. It has been rightly criticised when used by highly polluting companies with no clear strategy or plan to reduce their emissions or cut production of profitable polluting product lines
- This paper gives an overview of the main areas where scrutiny should apply, to ensure that carbon reduction by offsetting is verified, enforced, permanent and additional.

If the world is going to limit global warming to +1.5°C from pre-industrial times, as set out in the Paris Agreement, global carbon emissions need to hit net zero by 2050. Every company will have a unique pathway as they contribute to that goal. Absolute emissions reductions will be the cornerstone, driven by operational adaptations and the deployment of existing and new technologies, but as the transition moves ahead, there remains a crucial place for carbon offsetting – where organisations compensate for emissions by buying carbon credits from certified emissions reduction projects.

The Taskforce on Scaling Voluntary Carbon Markets (TSVCM), sponsored by the Institute of International Finance (IIF), estimates that the carbon credit market could be worth more than $50bn by 2030. Alongside carbon capture and storage, and carbon removal, nature-based solutions will be central to this. McKinsey Nature Analytics estimates there is the potential for nature-based projects to store an additional 6.7 gigatons of CO2 every year by 2030 – around 17% of global CO2 emissions in 2020[1].

The below graph exhibits the evolution of the annual balance of carbon dioxide (CO2) emissions sources and sinks since 1900. In 2017, land and oceans were able to remove more than 40% of the CO2 emitted by human activities. **Preservation of such a large natural offset mechanism is essential**, all the more as the imbalance between carbon sources and sinks has accelerated since the middle of the 20th century, contributing to an accumulation of CO2 in the atmosphere.

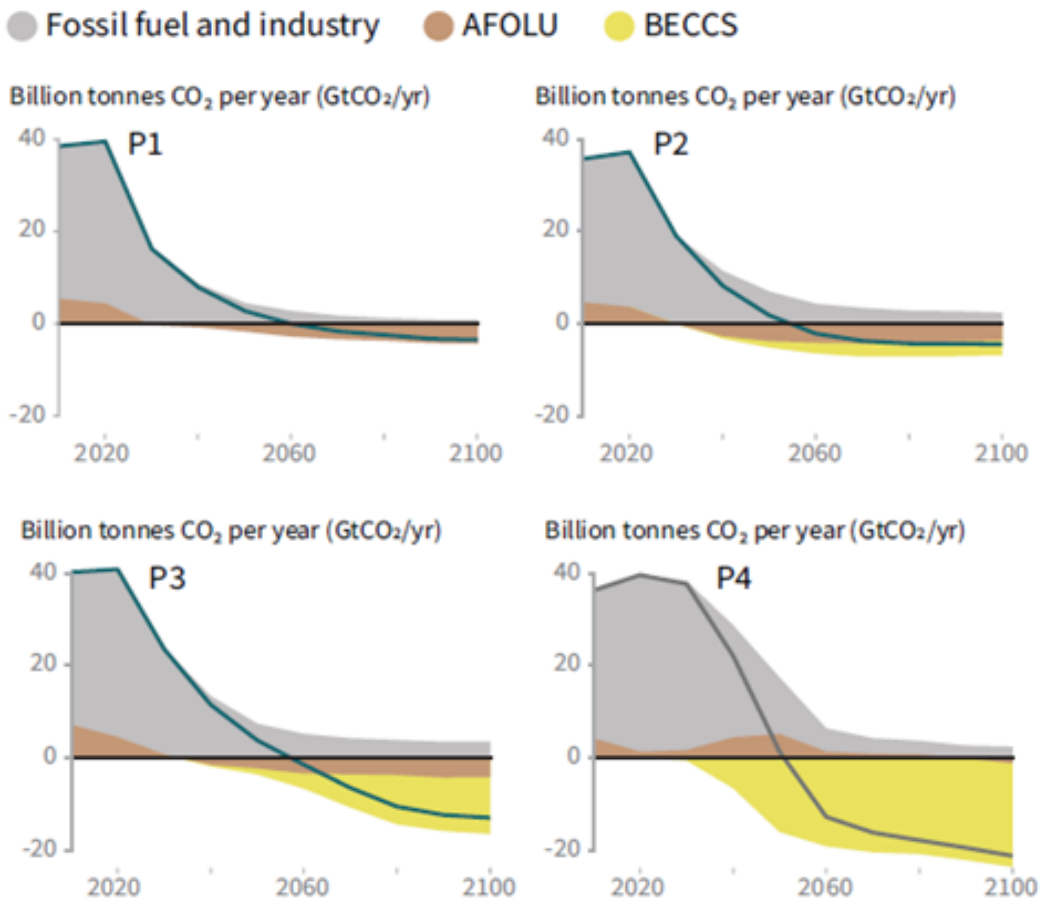


Source: Global Carbon Project, 2018

[1] Natural climate solutions are key to mitigation | McKinsey

For us to hit net zero by 2050, the amount of CO2 entering into the atmosphere must equal the amount removed. As the transition progresses, this will necessarily be an evolving balance between strategies to reduce emissions and improve CO2 removal.

The Intergovernmental Panel on Climate Change's (IPCC) 2018 report shows four pathways of global anthropogenic CO2 emissions that lead to net zero by 2050. They are four scenarios or 'storylines', each of them representing different demographic, social, economic, technological, and environmental developments, with a different focus on environmental protection and social equity. They entail different potential mitigation approaches, all of them using some carbon offset strategies, including Carbon Dioxide Removal (CDR), Bioenergy Carbon Capture and Storage (BECCS) and removals in the Agriculture, Forestry and Other Land Use (AFOLU) sector. It is worth noting that they do not assume explicit climate policy intervention.

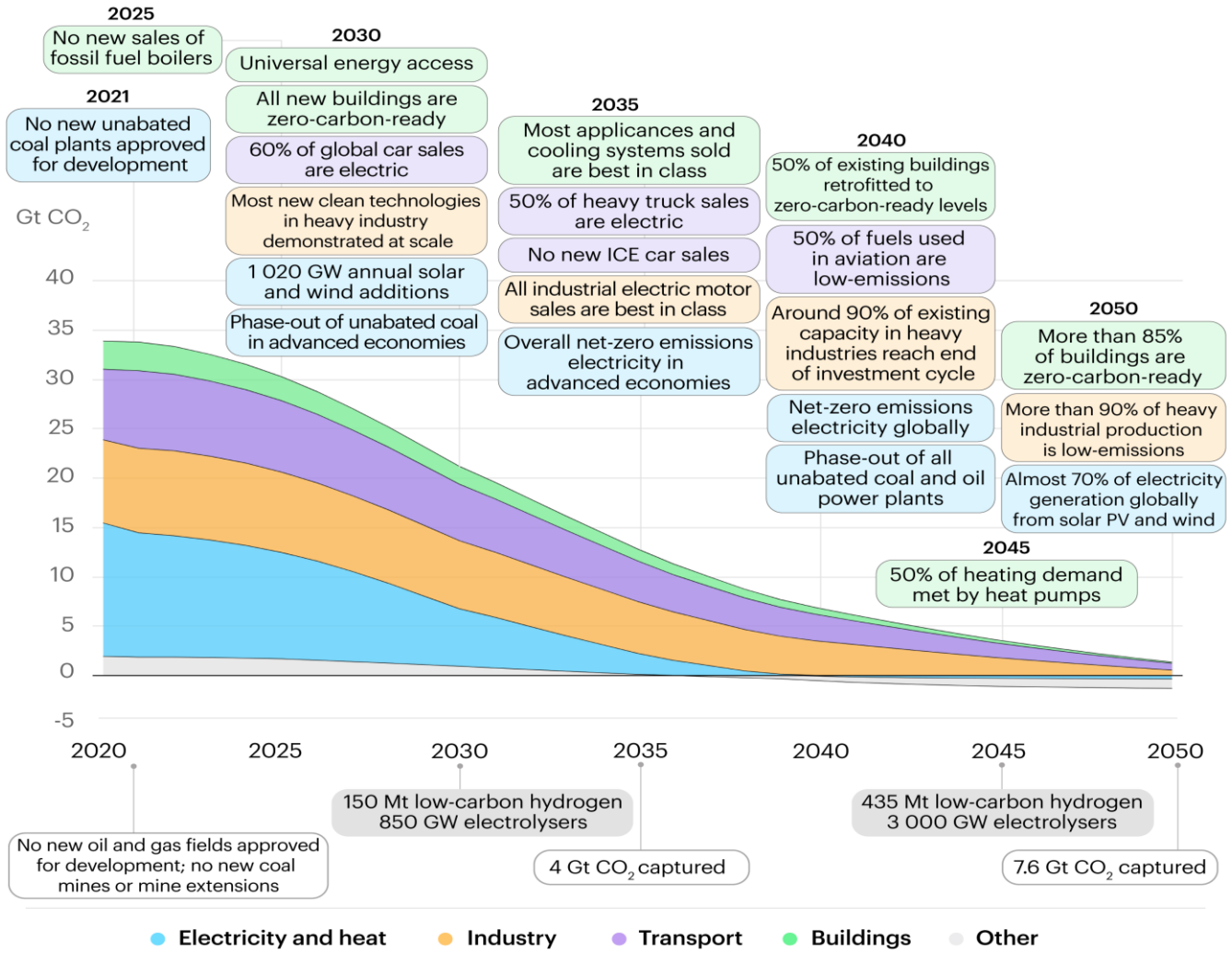


Source: IPCC, 2018

The first two scenarios – displaying no-to-limited carbon offsets – are quite disruptive when set against our existing model, either because social, business and technological innovations result in lower energy demand up to 2050 in the first narrative, or because of the broad focus on sustainability in the second, including low-carbon technology innovation. By contrast, the third scenario, is described as 'middle-of-the road' where societal and technological development follows historical patterns.

It seems reasonable at this stage to focus on this more realistic scenario i.e. to rely to some extent on carbon dioxide removals from nature in the transition period, until technological innovations are deployed at a larger scale.

The complexity of the energy transition has been well illustrated in the graph below from the International Energy Agency (IEA) in its May 2021 report.



Source: International Energy Agency, IEA: Net Zero by 2050 – A Roadmap for the Global Energy Sector, May 2021

In this analysis, the IEA sets out a specific pathway to net zero by 2050, and outlines more than 400 milestones in total, spanning all sectors and technologies, in terms of what needs to happen to transform the global economy from one dominated by fossil fuels, into one powered predominantly by renewable energy like solar and wind. **It requires vast amounts of investment, innovation, policy design and implementation, technology deployment, infrastructure building, international co-operation, and efforts across many other areas.**

What are carbon offsets?

Carbon offsetting is a mechanism through which an individual or an organization can compensate for their CO2 emissions through the support of certified projects that absorb or reduce CO2 emissions. The **term "offset" was first used in the late 1970 as part of the US Clean Air Act, in which new emissions in high-pollution areas were allowed only where other reductions were made to offset the increases.**

The Science Based Target initiative differentiates between projects or actions that help avoid or reduce emissions (compensation measures) and projects that seek to remove carbon from the atmosphere (neutralisation measures). Both neutralisation and compensation measures are being used by companies to offset emissions.

Carbon offsets come in a variety of types:

1. There are nature-based solutions where projects protect existing forests, improve soil management and restore damaged habitats, leading to reforestation and the implementation of climate-smart agriculture practices. They aim to absorb more CO2 from the atmosphere and can lead to the trading and sale of carbon credits (see notes below).

2. They can be technology-related, such as Carbon Capture and Storage (CCS) facilities, or Carbon Capture Utilisation and Storage (CCUS), whereby CO2 from industrial processes is captured and stored, and in the case of CCUS, used.

3. Carbon Dioxide Removal or DACCS (Direct Air Capture and Storage) is where CO2 is removed from the atmosphere and stored in geological or ocean reservoirs, or in products.

Issues with technological offsetting solutions

Regarding CCUS, facilities around the world can currently capture and store around 40 million tonnes (Mt) per annum of CO2 whilst 830Mt of CO2 captured would be needed annually by 2030 to meet the sustainable development scenario, and 5.6 gigatons by 2050[2].

Although pipelines of projects underway, mostly based on the development of industrial hubs, could add an additional 50Mt of capacity per year, the increase in annual capacities required by the Sustainable Development Scenario remains significant, raising doubts as to the feasibility. The issue less about the need for technological breakthroughs, because the technology is already well-known and only needs to be adapted to certain industrial activities. However, it is still too expensive to be developed at a large scale without policy support.

This explains why natural carbon offset projects are needed for and during the energy transition – and until the capacity for a technological capture solution is found. Meanwhile, global standards to assess carbon neutrality at a corporate level have yet to be defined, and this means there is a risk of 'greenwashing'. Ambitious companies set targets that require deep emissions reductions across the value chain but questions remain over the viability and scale of reductions where they exert little or no control, as this requires heavier reliance on offsetting practices.

[2] Source: Energy Technology Perspectives 2020, special report on Carbon Capture Utilisation and Storage, IEA

Our view is that a delicate balance needs to be found; one between ambitious, but still credible targets, and one with limited reliance on carbon offsets, that should be used partially until the long-term strategy pays off.

In that context and until technological carbon capture mechanisms are available at a large scale, nature-based solutions remain a useful accompanying tool for companies with a credible commitment to reaching net zero, but knowledge of management teams and close engagement will be key to help monitor the transition.

As for carbon removal, a process to standardise accounting of the practice by corporates is being conducted by the Greenhouse Gas (GHG) Protocol, with final guidance expected in early 2022.

Most importantly, the use of carbon offsetting should not help companies postpone necessary emission reduction measures. It should be viewed as an interim solution to complement hard-to-abate emissions in the short term while transitioning to net zero, and only a permanent solution where a particular part of an industry, or industrial process, defies any practical decarbonisation pathway.

Given the uncertainties and challenges around the different pathways to net zero at the global scale, the priority for companies needs to be the implementation of CO2 emission reductions. **Carbon offsets should not be used as an excuse to put off the systemic reforms needed to prevent climate-related catastrophe and should only take place once a company has identified its climate footprint, and defined and initiated a strategy to reduce it as much as possible by 2050.**

In other words, carbon offsetting should follow a hierarchy of decarbonisation measures:

1. Science-based strategy to reduce scope 1 and 2 emissions – those under the direct control of the issuer

2. Definition of a strategy and timeframe to tackle 'indirect' scope 3 emissions, acknowledging current issues with the availability and comparability of scope 3 emissions assessment and data.

   Scope 3 emissions are mostly outside of a company's control and relate to the demand side of products or services. This means they may be appropriate for the use of carbon offsets in the transition phase as a complement to actual reduction plans. It can be argued that offsetting can also address scope 1 emissions in specific sectors, until technologies are mature enough to cut emissions

3. Purchase of high-quality credits to compensate for residual emissions during the transition to low carbon

The Institutional Investors Group on Climate Change (IIGCC) is currently working on addressing the use of offsetting and negative emissions technologies in more detail. A paper is to be released by the end of the summer 2021 and its conclusions are likely to be closely scrutinised.

How do offsets work in practice? The role of carbon markets

The Kyoto Protocol was adopted on 11 December 1997 and entered into force in February 2005 after a complex ratification process. Developed as part of the United Nations Framework Convention on Climate Change (UNFCCC), it requires industrialised countries and economies in transition to reduce GHG emissions in accordance with agreed individual/national targets.

To facilitate this, it has established three market-based mechanisms:

- International Emissions Trading System (ETS)
- Clean Development Mechanisms (CDM)
- Joint Implementation (JI)

With emissions trading systems, companies and governments have pre-determined GHG emissions allowances. Unused allowances (CO2 that was not emitted) can be traded, to make a profit or to meet predetermined regulatory targets. ETSs trade so-called "permits to pollute" in the future, whilst in voluntary offsetting markets such as CDM and JI, traded emissions have already happened. ETSs include the European Union Emissions Trading System and California Cap-and-Trade Program notably. It is worth noting that unlike other ETSs, the EU ETS currently does not allow carbon sequestration from forestry projects to be included.

CDM and JI are voluntary and project-based mechanisms. The CDM involves investment in emission reduction projects in developing countries which contribute to their sustainable development. They not only have environmental benefits, b**ut also co-benefits, such as biodiversity protection and support to local communities**. JI enables developed countries to carry out emission reduction- or removal-enhancement projects in other developed countries.

Although nice in theory, in practice the additionality of CDM and JI mechanisms has been questioned, either because emerging markets projects involved were mandated by law i.e. emission reduction would have happened anyway, or because countries are using those credits to replace other emission reduction efforts. The Oeko-Institut estimates that 85% of CDM projects would have been operated even without CDM revenues.

As for JI, as the Kyoto targets were widely considered to be weak, they were over-achieved by several countries, which sold unused credits to private companies. The latter were able to use them, meaning polluting more without obliging countries to put in any extra effort. This obviously did not help the case for carbon offset mechanisms.

Challenges: Quality and the risk of double counting

Several challenges remain around carbon offsets – the first relates to quality. With nature-based solutions, and more specifically forests for example, the CO2 captured by a tree varies greatly. The capacity to remove carbon though forestation depends on location, the species of trees planted, the ability to manage the resource and biophysical constraints play a significant role, for example soil quality, vulnerability to flood, drought, fire and disease.

Therefore, and to minimise greenwashing possibilities, we would echo NGOs like the World Wildlife Fund (WWF) and highlight that carbon offsetting needs to be:

- **Certified**: This must take account of how offset certification processes vary across jurisdictions, bringing uncertainties as to the quality of the certification
- **Verified:** Once a project is certified, it needs to be verified periodically by a third party, to ensure that the amount of carbon credit corresponds to the actual carbon emission reduction realised
- **Additional:** For example, reducing GHG emissions by more than would have occurred in the absence of the offset project, or enhancing the CO2 absorption capacity of the existing projects
- **Permanent**: The offset must be ensured i.e. a tree planted in year one should not be removed in the future
- **Carbon offset must no create leakage**: For example, an offset might unintentionally increase emissions elsewhere, such as when afforestation projects are aimed at producing timber

The best-known verification/certification agencies are: The Gold Standard (established in 2003 by WWF and other NGOs); the Verified Carbon Standard (Verra); Plan Vivo and; Climate Action Reserve for the North American Market. Yet, some certification schemes are themselves subject to controversies, which can be difficult to assess for non-experts.

We note the Gold Standard does not issue credit for avoided deforestation projects. It also advocates for a "reduce within/finance beyond" model, where companies first reduce emissions in line with what is required by science to stay well below 2°C and in addition, finance emission reductions elsewhere in an amount at least equivalent to residual emissions. Beyond requirements on values and processes, monitoring, reporting and verification, the Gold Standard Compliance Buffer requires that projects reserve 20% of their emissions reduction issuance in the event that carbon is no longer sequestrated, due to forest fires for example.

What about double counting risk?

Carbon credits are issued every year, in the form of an electronic unit that represents one ton of CO2 equivalent that is reduced, avoided, or sequestered from projects applying an approved carbon credit methodology. Third-party auditors verify the number of emissions absorbed or avoided by the project compared to a base line, following methodologies established by the standards, which then can issue the corresponding carbon credits.

The risk of double counting stems from two or more organisations monetising and claiming the same credit – in practice, this risk is prevented by standards' registries and by focusing on more recent project vintages.

Double counting would also arise if a project is already included in a government's national inventory. On that front, once an organisation decides to purchase carbon credits, intermediaries such as ClimateSeed settle the transaction on behalf of their clients, transferring the credits and cancelling them once the credits are retired i.e. when the corresponding carbon allowances are removed from the regulated ETS. **This retirement mechanism does in practice remove any risk of double counting.**

Finally, the requirement to assess the broader implications of those offsets should not be ignored. In particular, the large-scale deployment of terrestrial carbon sequestration has the potential to trigger excessive levels of land conversion, resulting in adverse social and environmental impacts, according to the IPCC. These negative impacts may include desertification, land degradation, food insecurity, displacement of local communities, worsened livelihoods, loss of natural ecosystems, loss of biodiversity, and pollution[3].

From theory to practice: Shell example

Energy names such as Shell and Total have expanded their use of nature-based solutions to generate carbon credits.

Shell's strategic approach is stated as "avoid, reduce and only then mitigate", which seems at first sight to be aligned with the Paris Agreement objectives. In its Energy Transition Strategy 2021, it mentions nature-based solutions as having a role to play in reducing the impact of the CO2 emissions from the energy products that it sells, i.e. in its scope 3[4]. This is indeed where it has less control, so it makes sense. As part of this, in 2019, Shell initiated a programme to offer retail customers with the option to drive "carbon neutral", by offsetting the CO2 emissions from their fuel purchases.

Shell aims to offer customers "nature-based solutions to offset around 120Mt per annum of our scope 3 emissions by 2030". To put that in perspective, 120Mt of CO2 accounts for roughly 25% of its targeted reduction in CO2 emissions between 2020-2030. Total, meanwhile, is targeting a nature-based solutions sequestration capacity of 5Mt CO2 per year by 2030[5].

Looking ahead

While we understand some concerns around carbon offsets, we believe that their transitory use should be viewed very differently to their potential long-term use.

The IEA itself, in its May 2021 report, concludes that the transition to net zero by 2050 requires vast amounts of investment, innovation, skilful policy design and implementation, technology deployment, infrastructure building, international co-operation and efforts across many other areas. It is not only an issue of supply, but of demand too.

[3] Source: Dooley and Kartha, 2018
[4] https://www.shell.com/promos/energy-and-innovation/shell-energy-transition-strategy/_jcr_content.stream/1618407326759/7c3d5b317351891d2383b3e9f1e511997e516639/shell-energy-transition-strategy-2021.pdf
[5] https://totalenergies.com/system/files/documents/2021-03/2020-universal-registration-document.pdf

We believe the use of carbon offsets by corporates requires a rigorous approach that includes a focus on the wider strategy of the company and on its alignment with the Paris Agreement. We should also understand how each company frames its transition, under which scenario, and how the use of carbon offsets is articulated in this long-term strategy. In hard-to-abate sectors where there is no credible decarbonisation route at this stage, use of carbon offset could be envisaged on a permanent basis for residual emissions.

Finally, we encourage the use of the highest standards of certification and verification of those offsets, which means that further work has to be done at company level when assessing the transition to a net zero world and especially with regards to the use of nature-based solutions.