

SCOT PROJECT BRIEFING PAPER

EU-ETS TO INCENTIVISE CO₂ UTILISATION?

by the SCOT project (www.scotproject.org)

BACKGROUND

The European Union's Emission Trading Scheme (EU-ETS) governs the emission of significant amounts of industrial CO₂ to the atmosphere by mandating that the emission comes with a price tag, and that the polluter is expected to pay. The system is based on 'Cap and Trade', under a decreasing 'cap' (European emission ceiling) and industry can choose to reduce their emissions or to buy ('trade') allowances. A tightening scarcity of allowances will stimulate further CO₂ emission reductions due to an increasing price. In practice though, there has not been a scarcity of emission allowances resulting in a lack meaningful price signals to really influence European industry to accelerate emission reductions.

There is growing interest in industry to consider CO₂ a source of carbon, a feedstock, and not just as a climate-damaging gas. Carbon from CO₂ can be a valuable feedstock for industries to manufacture a wide range of products. Examples include building materials such as synthetic aggregate, plastics like polystyrene and fuels such as synthetic diesel and methanol. The CO₂ utilisation (CCU) industry is however faced with the problem that utilising CO₂ currently falls outside the accounting scope of the European Union Emission Trading System (EU-ETS).

The Monitor and Reporting Regulation (MRR) of the EU-ETS states that "*the transfer of inherent or pure CO₂ shall only be allowed for the purpose of long-term geological storage*" (CCS)¹. Transferring CO₂ to purposes outside of the EU-ETS definition does not qualify and therefore an emitter is obliged to surrender emission allowances for the transferred CO₂. It seems clear from the existing MRR clause that whenever an emitter wants to transfer CO₂ to an industry that is utilising CO₂ as feedstock, that the emission allowances would still have to be obtained (Figure 1). The current EU-ETS regulations do not financially encourage processes that could utilise CO₂ emissions from EU-ETS emitters as a feedstock and this hampers innovation and investment in the CO₂ utilisation sector.

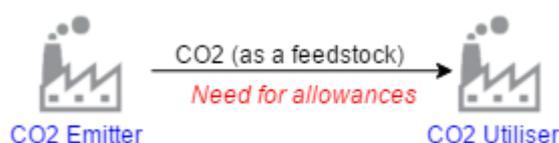


Figure 1 Emitting industries that supply CO₂ as a feedstock to CO₂ utilisers still have to obtain emission allowances

¹ Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and Council. See Article 49.; <http://www.emissions-euets.com/co2-transfer-pursuant-to-the-mar-regulation-under-eu-ets-emission-trading-scheme>

CONTEXT

European Directorates-General (DGs) and industrial actors have identified and debated the narrow focus of the existing clause and have, on several occasions² made suggestions to reform the EU-ETS Directive to take into account the utilisation of CO₂. For instance, the recent Energy Union Package Communication states that: “A forward-looking approach to CCS and CCU will be critical to reaching the 2050 climate objectives in a cost-effective way. This will require an enabling policy framework, including a reform of the Emissions Trading System and the new Innovation Fund”. The required ‘enabling policy framework’ would not only entail expanding the Monitor and Reporting Regulation, but also including advice for extending the scope for the NER400 fund (Innovation Fund) to reserve funds for low-carbon innovation in industry.

Amendments in July 2015³ were brought forward in the legislative proposal to revise the EU-ETS and bring the Directive more in line with the 2030 climate and energy policy framework. According to Ian Duncan, the European Parliament rapporteur on the EU-ETS, the overall aim of the proposal is to drive forward innovation and in that process reduce emissions⁴. The proposal for revision of the EU-ETS foresees the creation of an Innovation Fund that can provide support for demonstration activities in carbon capture and storage, renewables and low carbon innovation in industrial sectors. Demonstration activities in CCU may seek support under the header of innovation in the industry. With respect to CCU, the following amendment stands out.

*“The main long-term incentive from this Directive for the capture and storage of CO₂ (CCS), new renewable energy technologies **and breakthrough innovation in low-carbon technologies and processes** is the carbon price signal it creates and **that allowances will not need to be surrendered for CO₂ emissions which are permanently stored or avoided.**”*

As can be read, the proposal extends the scope of the EU-ETS Directive by including (1) low-carbon technologies and processes in industry; and (2) allowances will not need to be surrendered for CO₂ emissions which are ‘**permanently stored or avoided**’, which potentially makes room for CCU. However, assuming this amendment will come into force, the actual meaning and interpretation of these two concepts still requires some clarification. The key question worth answering is: would it make sense to award avoided emissions under the EU-ETS as such? To answer this question, we need to go back and clarify how CCU processes can contribute to lower emissions in industry.

² EC and CEFIC (2015) scoping workshop “Transforming CO₂ into value for a rejuvenated European economy”; UN (2015) Climate Action Now: Summary for Policymakers 2015; DG JRC and CLIMA (2013) CO₂ re-use workshop; Trinomics, Ricardo-AEA, and TNO (2015) Support to the review of CCS Directive; DG ENV, 2012, Use of Economic Instruments and Waste Management Performances – Final Report, p. 179

³ COM (2015) 337 - Proposal amending Directive 2003/87/EC to enhance cost-effective emission reductions and low carbon investments

⁴ EP Event, 2016, Re-plumbing the EU ETS: low-carbon innovation and carbon leakage in a post-Paris world

UTILISATION AND STORAGE OF CO₂.

There are two ways CO₂ utilisation can reduce CO₂ emissions. Firstly, by the direct utilisation, transformation and storage of CO₂. The CCU sector utilises CO₂ as a feedstock and locks the carbon into a certain product⁵. Depending on the product and its associated lifecycle, the CO₂ is then either stored temporarily or permanently. Typical CO₂ derived products that store CO₂ temporarily are chemicals and fuels. Take for example polymers, a commonly used chemical building block for the industry. Polymers can be found in many forms from plastic bags to window frames. Window frames obviously have a longer lifetime than plastic bags, but both products may eventually end up as energy from waste facility, and as a result of combustion, the carbon molecules would be released into the atmosphere. If the energy from waste facilities have a CO₂ capture unit, then the carbon can be further utilised, or potentially via permanent storage using CCS infrastructure or mineralisation.

Whereas chemicals and fuels typically only offer a short to medium term store of CO₂, using CO₂ in a mineralisation process, either by accelerating the carbonation of certain types of industrial waste, or with certain types of minerals, permanently stores CO₂. In the process of mineralisation, CO₂ is reacted with selected minerals to form a solid carbonate, which can lead to saleable products primarily for the construction industry. However, as with all CO₂ utilisation processes, in order to build trust in understanding their impact on net emissions, the publication of a transparent Life Cycle Analysis is important. In the case of mineralisation the emissions from mining, material handling and processing could still result in a net release of CO₂.

DISPLACING FOSSIL-BASED FEEDSTOCK

Apart from the direct uptake of CO₂, by transforming CO₂ into products, CO₂ utilisation can also lead to avoided emissions by displacing the traditional use of fossil-based raw materials. Here, the carbon in the CO₂ substitutes carbon that would have otherwise originated from a fossil source (see Figure 2). Taking CO₂-derived aviation fuel as an example, CO₂-derived synthetic fuels can be produced by combining captured CO₂ and H₂ which can lead to a significantly lower carbon-footprint when compared to fossil fuels (when the H₂ is produced using renewable energy). The carbon is embedded in the synthetic aviation fuel, but is only temporarily fixated, and will be re-emitted into the atmosphere when combusted. However, the use of the synthetic aviation fuel has also avoided the use of an equivalent quantity of aviation fuel derived from a fossil source, so the release of additional fossil carbon has been avoided. Therefore, in this simple scenario, an associated X amount of fossil fuel has not been used, which equates to a Y amount of avoided emissions. There are however a number of challenges (e.g. accounting the avoided emissions) and concerns that need to be addressed before such avoided emissions can be acknowledged and rewarded under the EU-ETS (see recommendations).

⁵ Also described as sequestering or storing CO₂ in products.

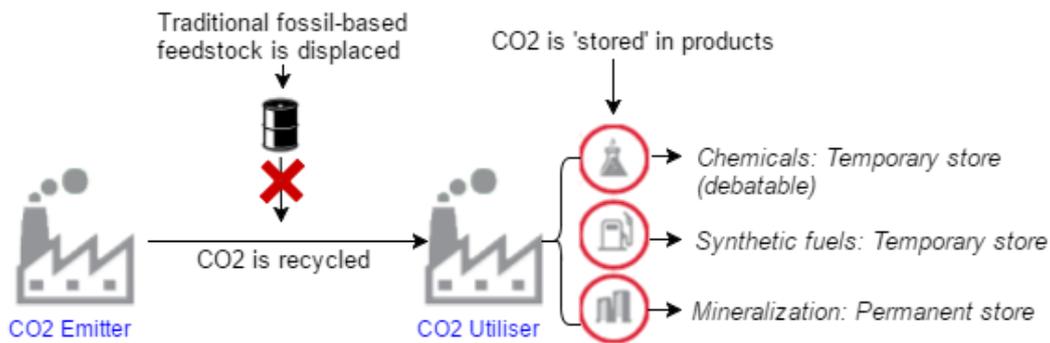


Figure 2 CO₂ utilisation reduces CO₂ by storing it in products and by avoiding fossil-based feedstock

Recommendations

Now that we have explained how CCU processes can contribute to lower emissions in industry, the following recommendations can be made on whether or not it make sense to incentivise the utilisation of CO₂ under the EU-ETS.

1. Accredit utilised CO₂? **Yes, if...**

It is highly challenging for the EU-ETS legislation to, in some way, recognise, measure and accredit the **temporary** fixation of CO₂ in products and therefore it is the view of the SCOT project that any change to the legislation should focus on incentivising CCU processes that store CO₂ **permanently**, similar to CCS. As the processes of locking up CO₂ via mineralisation routes is an accelerated version of the geological processes of mineral carbonation, the lifetime of the products is arguably similar to that of geological processes too. It should therefore be incentivised equally under the EU-ETS if it can be proven that the processes and products offer the capacity to lock away CO₂ from the atmosphere for suitably long periods of time. The SCOT project advises that the Monitor and Reporting Regulation are amended and expanded to include mineralisation that meets certain CO₂ storage requirements such as the longevity of the product.

Recommendation 1: *The transfer of inherent or pure CO₂ shall only be allowed for the purpose of long-term geological storage or by mineralisation (to achieve that mineralisation of wastes and minerals are covered by the amendment).*

2. CO₂ avoided and displaced under ETS-allowance scheme? **No, but...**

Currently, the SCOT project would not advise accrediting CO₂ displaced or avoided to be included in the actual scheme of EU-ETS allowances due to the following two reasons:

Firstly, it seems extremely challenging to accredit avoided emissions in individual industrial processes transparently and fairly due to the potentially arbitrary nature of calculating the amount of avoided emissions as an industrial average or in specific cases. There is an LCA methodology that is able to measure and verify avoided CO₂ emissions, the ISO 14040/14044. However, the issue is that the ISO guidelines do not oblige users to agree and practice the same set of boundary conditions. What is included and excluded from the scope can therefore provide highly divergent results for avoided emissions. This makes the interpretation and comparison of these studies extremely challenging or

indeed impossible. A standardised methodology and set of LCA boundary conditions to allow a transparent robust and comparable LCA analysis that could be scrutinised by an EU-ETS body would be a prerequisite to changes that aim to accredit avoided emissions. This still seems some way off, and therefore the SCOT project suggests additional clarity around the methodology to determine how the CO₂ emissions that are avoided emissions can be calculated.

Secondly, the EU-ETS has been set-up with the aim to reduce emissions from industrial installations themselves, rather than its end-products. The current accounting rules do not apply to downstream emissions such as the end of life combustion emissions from crude oil or its products as these fall outside the scope of the EU-ETS. An amendment to the EU-ETS that may seek to consider any downstream emissions therefore enters a particularly grey area, as it likely to interfere with legislation that is already put in place to tackle downstream emissions and incentivise products which have a lower carbon footprint (e.g. via the Renewable Energy Directive, Fuel Quality Directive).

Taking these two significant challenges into consideration, seeking to accredit avoided emissions through the EU-ETS may even negatively affect the credibility of the EU-ETS. The costs of trying to do this now already seem to outweigh the benefits at this stage.

Recommendation 2: *Research should be undertaken into the challenges of determining avoided emissions so that findings may be considered at the 2025 mid-term review of the EU-ETS*

However, we think that CO₂ utilisation technology is an important innovation route with substantial carbon mitigation potential that deserves support from European funds. We have elaborated this in detail in the SCOT SERIA and SCOT JAP⁶. We are therefore in favour of including CO₂ utilisation technologies as potential beneficiaries from EU-ETS funds steering at Innovation and Modernisation (including NER400) as currently under discussion.

Recommendation 3: *Include all CO₂ utilisation technologies in all funds related to EU-ETS that are set up to stimulate investments in innovation and modernisation.*

Next steps

In January 2016, the Parliament and Council received a summarised feedback from the public on the legislative proposal. In this it is stated that “several industry stakeholders call for carbon capture and use (CCU) to also be eligible”⁷. As a next step, the text is to be discussed by the co-legislators, i.e. the European Parliament and the Council. The legislative proposal is under control by the ENVI parliamentary committee, which shares competencies on carbon leakage issues and the Innovation Fund with the industry committee (ITRE). The Dutch Presidency has scheduled for the proposal to be discussed at an Environment Council meeting taking place on 20 June 2016⁸. The Parliamentary vote for the EU-ETS reform should subsequently be on the agenda around February 2017.

⁶ <http://scotproject.org/content/seria-and-jap>

⁷ http://ec.europa.eu/clima/policies/ets/revision/docs/swd_2015_297_en.pdf

⁸ Bellona, 2016, Where is the EU ETS reform at present? <http://bellona.org/news/climate-change/2016-02-where-is-the-eu-ets-reform-at-present>

Conclusions

Currently, the Monitor and Reporting Regulation of the EU-ETS discourage the usage of CO₂ as a resource for CO₂ utilisation, as the transfer of inherent or pure CO₂ is **only** allowed for the purpose of long-term geological storage. It appears that the July 2015 EU-ETS revision proposal tries to incorporate the re-use of CO₂ by opening up the possibility of “*permanently stored or avoided*” emissions being within scope for the Innovation fund. This should be welcomed as it strongly supports the overall aim of the proposal: driving forward innovation and in that process reducing the emissions. However, it may not be straightforward to promote CO₂ utilisation activities under the EU-ETS.

In addition to the three main recommendations mentioned above, the SCOT Project also recommends:

Recommendation 4: Detailed analysis must be undertaken with stakeholders in the CO₂ mineralisation sector (process developers and academic community) to determine how best to incorporate mineralisation into the EU-ETS e.g. criteria and monitoring of various different mineralisation processes.

Recommendation 5: That allowances would not need to be obtained for industrial processes that utilise CO₂ to be permanently stored in an end-product (e.g. mineralisation). This would put this route on a similar footing to the permanent geological storage of CO₂.

Recommendation 6: That prior to the 2025 mid-term review of the EU-ETS, an analysis of the potential of accrediting avoided emissions under the EU-ETS should be undertaken. The results of such an analysis should be taken into account at the mid-term review to determine whether it is fruitful to introduce some kind of avoided or carbon negative emissions accreditation scheme under the EU-ETS.