European Lime Association A.I.S.B.L.
Association Européenne de la Chaux
Europäischer Kalkverband
Member of IMA-Europe

EuLA Feedback on the Carbon Removal Certification Framework

Brussels, 23/03/2023

EuLA, the European Lime Association, represents European non-captive lime production through its 20 covered Member States (companies & national associations). Lime is one of the essential building blocks of modern industry. It is used in many essential processes, such as making construction buildings, producing iron and steel, treating contaminated land, purifying drinking water, making sugar and even cleaning gases from powers stations. Lime and its derivatives are also important additives for making paper, glass, and agricultural products.

The European Lime Association welcomes the European Commission's proposal for a Regulation establishing a Union Certification Framework for Carbon Removals. The lime sector sees it as an encouraging development to kickstart an EU market to incentivise the removal of CO_2 from the atmosphere.

Key Messages

- Carbon removal is key to generating negative emissions, especially for hard-to-abate sectors facing non-reducible process-related emissions. Carbonation, as a form of carbon removal, should be included in the carbon removal certification framework.
- A regulated framework aimed at promoting carbon removal techniques and technologies must be based on clear and unequivocal rules, in particular on the additionality, quantification and ownership of CDR certificates.
- Storage of CO2 in lime-based products is permanent and should be treated as such.
- Soil liming has to be explicitly highlighted as an essential component of the carbon farming dimension of this proposal.
- Public authorities should determine effective incentives, rewarding investors at the most triggering point in the value chain, while avoiding double counting.

Carbonation & incentivizing the acceleration of carbon removals

Lime reverts to limestone by capturing ambient CO_2, in a process called carbonation (or mineralisation by carbonation). This process occurs as a result of exposing lime to air, and it is central to many uses of lime. For example, mortar containing lime captures CO_2 from the atmosphere and produces calcium carbonate crystals, which hardens the mortar over time. On average, 33% of the lime sector's process emissions will be recaptured during the normal lifecycle of its products[1].

This recapturing process mentioned above can be optimised by maximising the exposure of CO_2, or through pressure and time. With these adjustments, studies have shown that there is a combined carbonation potential of approximately **40% of lime's process CO_2 emissions**.

Most of the carbonation occurs **within the first year**, which ensures that the benefits stemming from that are achieved before lime is removed. Most importantly, **removals via carbonation are**

[1] EuLA (2021) Lime, as a natural carbon sink: Examples of mineral carbonation in lime applications.

permanent, since the only way CO_2 is once again released is if large amounts of heat is applied as used in the lime production process. In other words, without remanufacturing into lime, the CO_2 remains permanently locked-up.

Certifying carbon removal through carbonation/mineralization has the potential to trigger a shift towards more **sustainable building materials that absorb CO_2 from the ambient air, thus satisfying the criterion of additionality.** The same goes for the use of certain techniques which increase the absorption rate of CO_2 and permanent storage in lime-based products. The current draft does not refer to this type of carbonation/mineralization which should be corrected, as there is a huge potential for this type of carbon removals. Always of course taking into account the need to avoid double counting.

A clear and transparent policy mechanism – remaining emissions from hard-to-abate sectors must be balanced by carbon removals

Energy and carbon emissions intensive sectors should focus by priority on reducing carbon emissions, using better technologies, improving energy efficiency and shifting fuels from fossil to non-fossil alternatives. However, some sectors are facing non avoidable emissions due to the very chemistry of their processes. The production of cement clinker and lime automatically generates CO_2 emissions due to the decomposition of limestone, their main or sole raw material: $CaCO_3$ decomposes through the heating process in $CaO + CO_2$. On average, 70% of the CO_2 emissions of the EU lime sector are process emissions.

Robust certification and MRV rules

Technologies such as bioenergy carbon capture and storage (BECCS) and direct air carbon capture and storage (DACCS) will significantly contribute to the EU's overall carbon reduction goals. Therefore, it is imperative that the framework provides a **clear and transparent policy mechanism** that will support carbon removals. It is also necessary to avoid overlaps between different schemes while preserving positive common mechanisms such as the ETS recognition of storage of CO_2 emissions from sustainable biomass. As bioenergy will be widely used as an alternative source of energy, promoting the use of BECCS through the right policy framework is essential to the success of EU climate policy.

Eula supports the QU.A.L.ITY criteria for a robust certification system, but is questioning the feasibility of applying as such the sustainability objectives defined by the taxonomy for sectors/products not yet covered by sectoral standards. As Carbon removals should be rapidly developed, existing methodologies on monitoring, reporting and verification should be recognized.

Storage in lime-based products is permanent

Specifically for the lime sector, when CO_2 is stored in a lime-based product, it is never released into the atmosphere. The very essence of carbonation/mineralization is that lime binds with the CO_2 to turn into calcium carbonate crystals that will not release CO_2. **Storage in these products is therefore permanent and should be treated as such.**

Proposal for Input

According to the final trilogue compromise for a directive amending the ETS directive 2003/87/EC, a new paragraph 4a will be added in the article 30 of the directive. This article requests the commission to report to the EU Parliament and to the Council on how negative emissions resulting from greenhouse gases that are removed from the atmosphere and safely and permanently stored, could be accounted for and how these negative emissions could be covered by emissions trading, if appropriate. **Eula recommends a consultation of the stakeholders in the process of elaboration of this report from the commission and is more than willing to take an active role in this process.**

We refer to the annex for a more thorough explanation on how the lime sector can contribute to the decarbonation strategy of the EU.

Conclusion

The recognition of **carbonation (or mineralisation through carbonation)** is critical to reaching carbon neutrality, and an effective CRCF is one that clearly recognizes its function **as a key carbon removal solution.** In parallel, the rapid and effective deployment of BECCs and DACCS (as well as CCUS technology in general) will reduce the industrial sectors' impact, and help the EU reach its net-zero target. A high-quality removal certification framework is essential to ensure environmental integrity and allow effective incentives for broad-scale uptake and implementation of all CDR solutions.

Micah Ton
EuLA Climate & Energy Adviser
m.ton@ima-europe.eu
+32 492 11 26 52

Rodolphe Nicolle
EuLA Secretary General
rodolphe.nicolle@eula.eu
+32 495 79 05 09

Annex: The contribution of lime-based products to Carbon Removals

Lime reverts to limestone by capturing ambient CO_2. This is called carbonation (or mineralisation by carbonation) and is essential to many uses of lime. For example, mortars containing lime capture CO_2 from the atmosphere, which reacts with the lime to produce calcium carbonate crystals. This is why lime mortars harden over time. The natural carbonation rate across the European lime sector is estimated to be, on average, 33% of the process CO_2 emissions initially generated by the production of lime.[2] This process happens as a result of the lime in use. However, in some cases, it is possible to enhance this process in order to maximise the carbonation rate by increasing the contact between the lime and the CO_2, both in terms of surface area, the CO_2 concentration, as well as the pressure and time. Through these adjustments, studies have shown that there is a combined carbonation potential of approximately 40% of lime's process CO_2 emissions, when both carbonation techniques are taken into consideration.

While large differences exist in the carbonation timescales for different applications, most of the carbonation reactions occur within the first year. Plus, CO_2 capture via carbonation is permanent, as a large amount of heat energy is required to release it again. In other words, without remanufacturing into lime, the CO_2 remains permanently locked-up. Therefore, lime can truly be considered a permanent carbon sink. In the context of mineral products in buildings and infrastructure (concrete, mortar, lime), this reaction is often referred to as recarbonation and is recognised by the IPCC (and others) as highly significant in the context of the climate change and carbon accounting. In fact, the IPCC Mitigation of Climate Change report (2022) stated that CO_2 carbonation is a carbon sink. As a result, clearly defining and accounting for the role of lime in CO_2 removal and permanent storage will allow the European lime sector to be a strong partner in shared amibition for a carbon netural Europe, while remaining competitive within a global market.

The lime industry is a hard-to-abate industrial sector, as almost 70% of the total CO_2 emissions are process emissions. This means that irrespective of what fuels are used, or energy efficiency measures improved, unavoidable emissions will remain due to the chemical processes. Therefore, carbon capture and storage technologies are critical, as they enable the reduction of CO_2 emissions, and allow for neutral industrial processes. Specific targets for CO_2 removal from the atmosphere and permanently stored through these technologies will enable the EU to reach its net-zero climate targets.

Restoring acidic soil and adopting liming as a good soil management practice should be integral to the carbon farming initiative. Recent scientific studies have demonstrated that a balanced acid-base equilibrium in the soil – and good soil properties – are relevant for overall positive carbon capture. And, more importantly, that liming is positively affecting GHG emission balance and improving carbon sequestration. Therefore, agricultural liming is a very relevant strategy to mitigate – and even reduce – the quantity of GHG emitted into the atmosphere. More particularly, a recent scientific review has reported the following positive effects of liming[3]:

- GHG emissions: decrease of soil N_2O emissions (-32%), increased upland CH_4 uptake (+ 13%), and improved soil CO_2 respiration (+11%)
- Increase in Soil Organic Carbon (SOC) stock (+7%) in the mineral layer.
- Improved plant growth and crop yield (+90%).

In total, the GHG flux balance of liming treated soils shows an average reduction of **118 tCO2eq** emissions per hectare per year.

[2] EuLA (2021) Lime, as a natural carbon sink: Examples of mineral carbonation in lime applications.

[3] Mario Grosso et al., February 2023, 'Literature Review on the Assessment of the Potential Benefits of Soil Liming in Mitigating GHG Emissions,' Politechnico Di Milano.