Using forest carbon credits to offset emissions in the downstream business

Current policy conditions are not generally conducive to the use of voluntary carbon credits in the refining sector. Could the development of 'carbon neutral' petrol and/or diesel fuel using forest carbon credits provide a solution?

A forthcoming report by Concawe, entitled *Using Forest Carbon Credits to Offset Emissions in the Downstream Business*, examines whether, and how, forest carbon credits can be used to offset emissions from the European refining and road transport sectors. The work was also presented at the 12th Concawe Symposium held in March 2017.

Forest carbon plays an important role in the global carbon cycle, with emissions from land use, land-use change and forestry (LULUCF) amounting to around 10% of total global greenhouse gas emissions. Vegetation, in particular forests, also act as a carbon sink. Plants sequester carbon from the atmosphere as they grow. Currently, the total global emissions from LULUCF are of a similar magnitude to the sequestration of carbon by ecosystems worldwide. Forest cover and carbon sequestration are generally increasing in the temperate and boreal zones, and deforestation and emissions from LULUCF are concentrated in the tropics.

Forest carbon projects aim to reduce emissions from LULUCF and/or use vegetation to capture CO_2 from the atmosphere, particularly in (but not limited to) the tropics. In this way, carbon credits are generated that, once certified by an independent agency, can be sold on the carbon market. There are two principal types of carbon markets: the compliance market and the voluntary market.

Several compliance markets are operational worldwide, and additional markets are currently being designed. The largest compliance market is the European Union Emission Trading System (EU ETS), which includes emissions from the refining sector, but not from road transport. Forest carbon credits are not allowed to be traded in the EU ETS. However, with a number of restrictions, forest carbon credits are traded in other operational compliance markets including those in California and New Zealand.

The voluntary carbon market has an annual turnover of around 90 million tonnes (Mt) CO_2e. Around one-third of the credits traded on the market are from forest carbon projects. There are two principal types of buyers of these credits: (i) companies offsetting their emissions on a voluntary basis, generally driven by a mix of corporate social responsibility and marketing motivations; and (ii) retailers that sell carbon credits on to consumers, for instance to people that want to offset emissions from air travel that they are undertaking. Both groups purchase roughly half of the credits on this market. Suppliers of carbon credits include specialised companies that develop carbon projects (including forest carbon projects) and, to a lesser degree, NGOs developing carbon credits. Most of the forest carbon credits are generated in developing countries, where land is relatively cheap, forests grow fast due to climatic factors, and where showing additionality of carbon credits is relatively easy given that many tropical countries are subject to deforestation. Currently, there is oversupply on the market. Prices of carbon credits are generally low, ranging from US$ 3 to 10 per tonne CO_2 for forest carbon projects.

Both the compliance and voluntary carbon markets are highly dynamic. In addition, in the context of the Paris Agreement, the EU is designing the Effort Sharing Regulation (ESR), which will involve compulsory emission reduction targets for member states including all sectors that are not covered by the EU ETS. LULUCF credits are likely to become part of the ESR (with restrictions on quantity and type), however it is still unclear whether this would include credits generated outside of the EU.

A key factor that may drive changes in the voluntary market is the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which would involve airline companies purchasing carbon credits to achieve the sector's aspirational goal of no net increase in CO_2 emissions from international aviation as of 2020. This would require a volume of credits, beyond 2020, which is several times the size of the current voluntary market volume. Implementing the CORSIA initiative would depend upon an increase in the supply of carbon credits on the voluntary market. The carbon credit sector has shown to be responsive to increases in demand in the past, and may scale up the development of carbon credits rapidly if demand were to increase. The aviation sector may also tap into unused Clean Development Mechanism (CDM) carbon credits (generated as part of the Kyoto Protocol), which are now offered by the UN Climate Change Secretariat under the label of the Climate Neutral Now (CNN) initiative. Several companies have endorsed the

This article was written by Lars Hein, Wageningen University.

CNN initiative and purchased CDM credits. However, the additionality of the CNN credits, and thereby their actual impact on mitigating climate change, varies between the various credit types offered by the CNN.

Based on an analysis of forest carbon markets and changes therein, several options to use carbon credits in the refining and road transport sector have been explored. The forthcoming Concawe report shows that current policy conditions are not generally conducive to the use of voluntary carbon credits in the refining sector. The sector is covered by the EU ETS, and needs to obtain carbon emission allowances for the sector's total CO_2 emissions. Voluntary carbon credits could be purchased to offset residual emissions but they would not currently be recognised in the EU ETS.

A more promising option is to develop a 'zero carbon' or 'carbon neutral' petrol and/or diesel fuel for sale at retail stations. The sector would need to show that this fuel is made using best available technology (i.e. the most energy-efficient technology). Residual emissions could be offset with forest carbon credits. The price of offsetting these carbon emissions is almost the same for petrol and diesel, and is estimated (on the basis of well-to-wheel emissions) to range from 1.5 eurocent per litre (assuming a carbon price of 5 euros/tonne CO_2) to 3 eurocents per litre (on the basis of a carbon price of 10 euros/tonne CO_2). This product would, in line with 'green electricity' sold to households, probably not need fully separated supply chains as long as the sector commits to offsetting an amount of carbon equivalent to the carbon in purchased petrol. It is also important to demonstrate, in bringing this product to market, that the fuel is produced using best available technology, and that customers are offered the option of offsetting residual emissions.

Electric vehicles and 'carbon-neutral petrol' powered vehicles would have a very different environmental footprint. Their relative performance would be strongly influenced by how the electricity used to power electric vehicles is generated. A comparison would need to consider, among others, CO_2 and other emissions related to both electricity production and petrol and diesel use, and the environmental impacts of batteries during their life cycle.

Pending verification of the overall environmental performance of carbon neutral road transport, bringing carbon neutral petrol to market would offer a number of benefits including:

- offering consumers a carbon neutral product that is suited for people with driving requirements that cannot be met with electric cars;
- offering a low-cost, easy-to-implement option for compensating emissions from driving; and
- biodiversity conservation in tropical forests that would be conserved as a consequence of the use of carbon offsets.

Hence, carbon neutral petrol could bring substantial, low-cost benefits to both the industry and society in general, and the option needs to be studied in more detail and tested. Further steps required to bring the product to market include a basic life-cycle assessment to compare carbon neutral petrol and diesel powered cars to electric cars, working out the specifics of the carbon offsetting mechanism, development of a communication and marketing strategy, and piloting the approach in one or more countries. The forest carbon market is currently a buyer's market but this may change if the aviation industry continues with implementing the CORSIA initiative. The downstream sector should therefore consider evaluating the approach in the short term. If the sector decides to move ahead, access to carbon credits by working with carbon credit developers could then be obtained on the most favourable terms.