

Discussion Document

A Future Direction for the EU ETS

The Paris Agreement establishes the need for the energy system to be at net-zero emissions in the second half of the century, with the Shell **Sky** Scenario indicating a timeline to 2070 to give a high level of certainty ($\geq 85\%$) that the 2°C goal of the Agreement will not be breached.

The 2070 timeline indicates that many developed countries may need to reach net-zero emissions well before this time, largely to balance those that are likely to arrive at such a point later in the century. Within developed countries, we might expect to see sectors such as power generation and industry reach such a goal even earlier to make room for sectors that currently have no clear or medium-term pathway to net-zero emissions.

For a region such as the EU and the sectors covered by the EU ETS, net zero emissions could be considered a goal for 2050. The current trajectory for the EU ETS falls short of such a goal by some 18 percentage points compared to 2013, or 8 years. There will likely be pressure on the EU Commission and Parliament to improve on this situation and 2050 is a year that some are already advocating. This would require shifting the annual linear reduction factor from 2.2% to 3%.

An EU ETS at Net-Zero Emissions

As the years pass and the annual linear allowance reduction within the EU ETS continues, there will come a point where there is no further issuance of allowances under the system, hence no mechanism to emit. This may be as early as 2050 should changes be made, but in any case, will happen in 2058. Considering the latter case, it is unlikely that the sectors covered by the system will be at zero emissions. At a minimum, aviation and some industrial processes will still require some form of emission allowance for at least a portion of their operations and some thermal power plants may continue to operate. Even with the on-site application of carbon capture and storage (CCS) for large emitters, some emissions will remain and direct application of CCS isn't a solution for mobile emission sources.

The net-zero solution to this issue, as guided by Article 4 of the Paris Agreement, is to introduce sinks, or emission removals. An emission removal means that a tonne of CO_2 is offset by the removal of a tonne of CO_2 from the atmosphere. In the case of ongoing fossil fuel emissions, the most appropriate sink is the application of geological storage of CO_2 to some process that removes CO_2 from the atmosphere. Two such processes are under discussion today;

1. Direct capture of CO_2 from the atmosphere through an industrial extraction process.
2. The use of biomass for the provision of energy, which releases CO_2 at the point of energy production and / or energy use. This CO_2 was removed from the atmosphere when the biomass was grown.

The use of carbon within products (CCU) is a possibility, but no measurement protocol exists today to establish this as an accepted process through the determination of effective sequestration because of use. Simple use of CO_2 to make products that subsequently deteriorate or are combusted as waste does not result in sequestration.

No mechanism exists within the EU ETS today to allow the system to operate under conditions of net-zero emissions, nor is the EU making any real progress towards establishing CCS as part of the

industrial system. Both these issues could be addressed through changes to the EU ETS in the medium term, for example when the reduction goal of the system is reassessed as part of the EU review of its climate change policies and Nationally Determined Contribution (NDC) in the light of the Paris Agreement.

A set of proposals for the EU ETS would include the following;

1. Establishing 2050 as the year in which no further allowances (EUA) are issued by governments through auctioning or free allocation.
2. Creation of a new unit under the EU ETS that represents a tonne of CO₂ removed (ERU) from the atmosphere and sequestered in one of two ways;
 1. Permanent geological storage.
 2. Long term sequestration in society through the use of CO₂ to make some product. While the product itself does not necessarily have to exist over the long term, the stock of products held by society must be shown to increase by the necessary amount.

Such a unit would be issued by governments to facilities that removed CO₂ from the atmosphere and sequestered it. A further consideration here is the extent to which nature-based solutions might be included in the second category (e.g. reforestation).

3. A change to the compliance structure such that a removal unit could be surrendered against a tonne of CO₂ emitted.

Accelerating CCS in the Short Term

The above changes to the EU ETS would allow the system to act as an effective compliance mechanism for maintaining net-zero emissions over the long term. The system could also be forced to deliver net-negative emissions, a necessary outcome in the **Sky** Scenario to achieve the goals of the Paris Agreement, by requiring a future surrender ratio for compliance that is greater than one, e.g. 105 units surrendered for every 100 tonnes of emissions.

The changes to the EU ETS should also spur interest in CCS well before the point at which allowance allocation ceases, but in the medium term there may still be a lack of CCS projects. As 2050 approaches (or some other year in which allowance allocation ceases) the market value of an EUA should trend towards the expected value of an ERU, as unused EUAs could presumably be banked for the post-2050 periods and used in that period for compliance.

Ensuring that sufficient CCS capacity is in place for 2050 and beyond could be achieved by introducing an earlier compliance requirement for ERUs. For example, from 2030 onwards, the EU ETS compliance requirement could be adjusted such that for every 100 tonnes of CO₂ emitted, the surrender of 99 EUAs and one ERU is demanded. This ratio could be adjusted throughout the 2030s and 2040s as necessary. A modest compliance requirement of this type would underwrite CCS projects across the EU by introducing a demand for stored CO₂, something which is lacking today.

Alternative approaches are also possible, for example mimicking the mechanism now operating in the USA where a \$50 tax credit is available for a tonne of CO₂ stored geologically.

Including the Transport Sector

The land-based transport sector will also need to become non-emitting in a timeframe either the same as the industrial sector or close to it. At this time, it is also likely to be the case that some forms of transport have ongoing emissions, including a long ICE tail in the passenger vehicle market, some heavy goods transport and some mobile equipment in the building and mining sectors. Aviation, which is already partly covered by the EU ETS (intra EU only), will very likely have ongoing emissions.

Managing the above requirement with standards and mandates becomes cumbersome, which argues for the transport sector to join the EU ETS before 2050 and be part of the net-zero emissions compliance structure utilizing ERUs as necessary. This offers flexibility in managing transport and allows for the continuation of fossil fuel use in transport, at least to the extent that travellers are prepared to pay for the sequestration of CO₂.