SCS Certification Standard for Product Carbon Intensity and Reduction for Chemicals and Co-products

SCS-115

Module C. Carbon Capture, Utilization and Storage (CCUS)

C.1 Introduction

Carbon dioxide generated at a chemicals site as a waste from production of hydrogen, gaseous, liquid and solid chemicals, including those used as process fuel such as natural gas, and plastics or from utilities generation (e.g. power, steam or heat), can be captured and stored at a geological site or reused in another process. Operators certified to this Standard can reduce their emissions by storing or reusing CO_2 in one or more of the following ways:

- By capturing their own carbon dioxide emissions, transporting the captured CO_2, followed by definitive storage at an independently certified geological site.
- By capturing their own carbon dioxide emissions and reusing the captured carbon dioxide, replacing virgin fossil feedstock.
- By purchasing CCS certificates/credits from an external independently certified geological storage site, or from an organization with rights to stored CO_2 credits/certificates.[1]

C.2 Verification of carbon storage sites

C.2.1 The site for geological storage of captured CO_2 shall be certified to the requirements of SCS-115 Section C.2 or an approved Standard[2], for monitoring leakages.

C.2.2 The site shall hold a valid carbon storage permit from a national or state/local permitting body.

C.2.3 There shall be a monitoring, reporting and verification program in place to identify and minimize leakage of carbon dioxide on site, during injection, and after storage.

C.2.4 All potential leakages shall be continuously monitored and quantified, including:

a. Fluxes of CO_2 from the seabed or ground above the storage site;
b. CO_2 emissions during injection; and
c. Leakages in pipework and pumping equipment on site.

[1] Carbon capture and storage certificates or credits are sometimes referred to as 'offsets', e.g., by Together for Sustainability (TfS).
[2] Currently ISCC Carbon Footprint Certification (CFC)

C.2.5 Leakage data shall be used to calculate the emissions savings, see C6.

C.2.6 Leakage in any year shall not be equivalent to or greater than the annual storage rate in that year.

C.2.7 Ambient air monitoring for elevated levels of CO_2 shall be carried out for safety purposes at manned sites.

C.2.8 A geological storage site can be part of the certification scope of an operator certified to this Standard. In this case, the site's monitoring, reporting, and verification program and CO_2 storage efficiency shall be verified during an on-site visit to the storage site.

C.3 Reusing carbon dioxide

C.3.1 When captured fossil CO_2 is reused in an application that produces a long-lived product which replaces the use of virgin fossil feedstocks and results in a product with a lower carbon intensity, then the amount captured can be used to demonstrate reductions against the baseline emissions, subject to the requirements of C.6. This criterion only applies to waste CO_2. It does not apply to CO_2 created on purpose from fossil fuel combustion.

C.3.2 Captured fossil or waste biogenic CO_2 shall only be reused in long-lived products[3], such as durable multi-use plastics. Short-lived products, such as single use plastics, or those which are used as a fuel or fertilizer, are not eligible and neither is CO_2 used as a miscible flood or other unconventional oil and gas recovery. This requirement only applies to operators who produce the final product.

C.3.3 The reuse process shall be carried out on site. An operator can also receive CO_2 captured by another operator, for reuse, providing that the captured CO_2 is certified to SCS-115. The energy that is expended to capture the CO_2 shall be considered as described in C6.

C.3.4 Where the CO_2 under consideration for substitution is already a waste with an established use (e.g., waste CO_2 from ammonia production that is a raw material for the food and beverage industry), then its replacement with a different source of waste CO_2 does not reduce overall emissions, and is therefore not eligible to set against baseline emissions. This requirement only applies to operators who produce the final product.

C.3.5 All operators shall communicate the carbon content from CCU in their product to customers, so it is passed on down the supply chain to the operators that produce the final product. The carbon content from CCU can be allocated as described in C.7.3.

[3] Long-lived products are those that have an average likelihood >90% of not being released into the atmosphere after 100 years. https://doi.org/10.17226/27732 (last accessed March 2025).

C.4 CCS certificates/credits

C.4.1 Operators who are not located close to a storage facility, or choose not to capture their emissions, can purchase storage credits or certificates from any independently certified storage site, to compensate for their own emissions as per C.2.

C.4.2 A credit/certificate for each tonne of carbon dioxide stored shall be purchased and retired for every tonne of carbon dioxide equivalent emitted, after allowing for average additional emissions, which would take place if the carbon dioxide were physically captured, transported, and stored, as described in Section C.6. The operator can use published data, or their own data, to calculate the average emissions. A credit/certificate will always be equal to the amount of net stored CO_2e.

C.4.3 The retirement of a credit/certificate shall be carried out via an approved independent registry, i.e., the American Carbon Registry (ACR), Climate Action Reserve (CAR), Gold Standard, or Verra (VCS), or a government registry such as AB TIER.[4]

C.4.4 CCS certificates/credits shall have been retired in the 12-month period prior to when they are counted in claims about reducing a dated baseline product carbon intensity.

C.4.5 CCS certificates/credits shall be valid at the date of retirement according to national or local government regulations.

C.4.6 CCS certificates/credits are deemed to be no longer valid five years after their issue date, or within the timeframe specified by national or local government regulations for the CCS certificates/credits purchased, whichever is shorter.

C.5 Methane

C.5.1 In addition to minimizing fugitive methane emissions from processes, methane emitted at a chemicals site by power generation or as waste from chemical production can also be compensated for by purchasing and retiring CCS certificates/credits from an independently certified geological storage site.

C.5.2 The latest 100-year global warming potential published by the IPCC shall be used to calculate the quantity of credits required for each tonne of methane emitted, subject to C.6.

C.5.3 Emissions of other Kyoto greenhouse gases cannot be compensated for by purchase of CCS certificates/credits.

[4] Users may propose independent registries for SCS Standards' consideration by contacting standards@scsstandards.org and providing a rationale for the request.

C.6 Methodology for calculating emissions savings

C.6.1 To compensate accurately for emissions from the manufacture of products, the emissions from steps in the CCS process shall be accounted for.

C.6.2 All emissions from capturing, transporting, injecting, and storing the CO_2, including those from electricity used, shall all be added to the emissions from the system boundary. Actual measured leakages from injection and storage shall be accounted for, as described in C.4. Measurements at a representative sample of locations, on each certified site where leaks have been detected during LDAR (leak detection and repair protocol) are sufficient. Remote sensing, e.g., using infra-red cameras, can be used to estimate leaks.

C.6.3 In the case of CCU, emissions from capturing and re-pressurising the CO_2 and any additional purification or transport shall be accounted for as described in C.4. The carbon intensity calculation shall assume that fossil CO_2 is a waste with a carbon intensity of zero at its generation. Waste biogenic CO_2 can be included in the carbon intensity calculation as a negative value.

C.6.4 Certified raw materials are accepted as inputs into the system boundary if their carbon intensity has been reduced by CCS, and if they have a certified carbon intensity from a recognized scheme.[5]

C.7 Methodology for allocating emissions savings

C.7.1 CCS or CCU carried out on site should reduce the overall emissions inventory of the system as per C.8.1 (after the addition of emissions from capture and storage/reuse as described in C.6.2).

C.7.2 GHG emissions from the system can be allocated to products according to product category rules.

C.7.3 Savings from physical CCS or CCU can be preferentially allocated to certain products within the system boundary to reduce their product carbon intensity, up to a maximum of the carbon dioxide and methane emissions physically emitted during their production according to the methodology described in this Standard. There is no minimum threshold for the fixed proportion of a product to which savings from physical CCS or CCU can be preferentially allocated. A mass balance shall be maintained as described in C.7.4.

C.7.4 Savings from CCS certificates/credits can be allocated to a fixed proportion of a product produced in one calendar year. This proportion shall exceed 5% (i.e., a material change) of the system boundary production by mass of product in a 12-month period.

a. A mass balance system shall be maintained to reconcile quantities of the same product with different carbon intensities.

[5] For example, ISCC CFC.

b. The mass balance system shall be site specific, and the mass balancing period shall be three months.
c. A positive balance can be carried forward into the next mass balance period, up to a maximum of four times, after which the surplus shall be lost.

C.7.5 Allocation of emissions savings from stored carbon dioxide or CCS credits/certificates shall comply with local regulations.

C.7.6 The product carbon intensity cannot be reduced to a negative value using CCU content and/or CCS credits/certificates.

C.8 CCS carried out on site

C.8.1 The amount of CO_2 stored in the previous year shall be documented and justified. Emissions from capture, injection, and storage shall be accounted for.

C.8.2 Where the operator wishes to allocate emissions savings from carbon capture and storage implemented on site to CO_2 emissions from the production of a particular product, the baseline used for claims and communications for all products produced on the site shall not include net CO_2 savings from the use of CCS, providing that;

a. The energy used to capture CO_2 shall be separately metered and verifiable. Energy to transport CO_2 to storage can be estimated as a proportionate share of the total, based on the share of CO_2 volume from the different sources that the pipeline receives.
b. This shall be subject to the requirements of C.7.4.

C.8.3 If C.8.2 cannot be met, product carbon intensity reduction from carbon dioxide captured on site, then utilized or stored at a physically connected, certified storage site, shall be integrated into the baseline calculation by the time of the next audit.

C.8.4 CCS certificates/credits can be purchased to compensate for a disruption in CCS operations.

C.9 Selling of CCS credits/certificates from on-site CCS

C.9.1 Carbon dioxide captured on site and stored at a physically connected, certified storage site can be sold as SCS-115 certified CCS credits/certificates to other operators instead of reducing the operator's own emissions.

C.9.2 It is the responsibility of the purchaser of the credits/certificates to include additional emissions from capture, transport and storage, as described in Section C.6. The certified purchaser can use published data, or their own data, to calculate the average emissions that will be verified by the auditor. A credit/certificate will always be equal to the amount of net stored CO2e.

C.9.3 A credit/certificate for each tonne of excess carbon dioxide stored shall be retired for every tonne of carbon dioxide equivalent sold, as described in C.4.3.

C.9.4 The amount of CO_2 stored in the previous year, and credits/certificates sold, shall be documented and justified.

C.10 Compensating for emissions of the supply chain for non-certified entities

C.10.1 Because carbon dioxide storage sites are likely to be set up for more than one user, to take advantage of the economies of scale, the operator can compensate for carbon dioxide and methane emissions from its supply chain as described below and illustrated in the diagram.

C.10.2 Supply chain operators can be included within the certification scope of the certified operator, who can compensate for their carbon dioxide and methane emissions with credits/certificates from the same carbon storage facility. Such supply chain operators cannot make public SCS approved claims about the carbon intensity of their intermediate products.

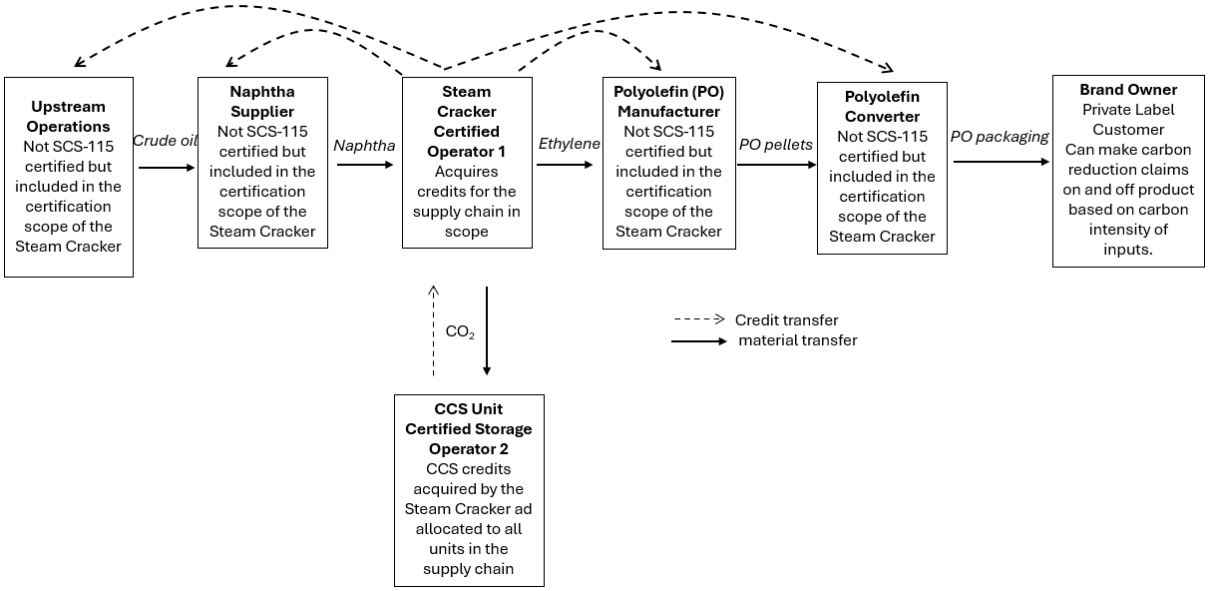
C.10.3 The carbon intensity of intermediate products and processes shall be calculated using primary data. Data shall be made available to the auditor.

C.10.4 The name and address of the supply chain operator where the intermediate product is made shall be included in the confidential audit report.

C.10.5 The physical flow between sites of raw materials and intermediate products, and their conversion into end products, shall be demonstrated.

C.10.6 The claimed emissions savings from the entire supply chain shall be documented and justified.

Example 1 of an operator compensating for Supply Chain CO_2 savings via CCS



Where:

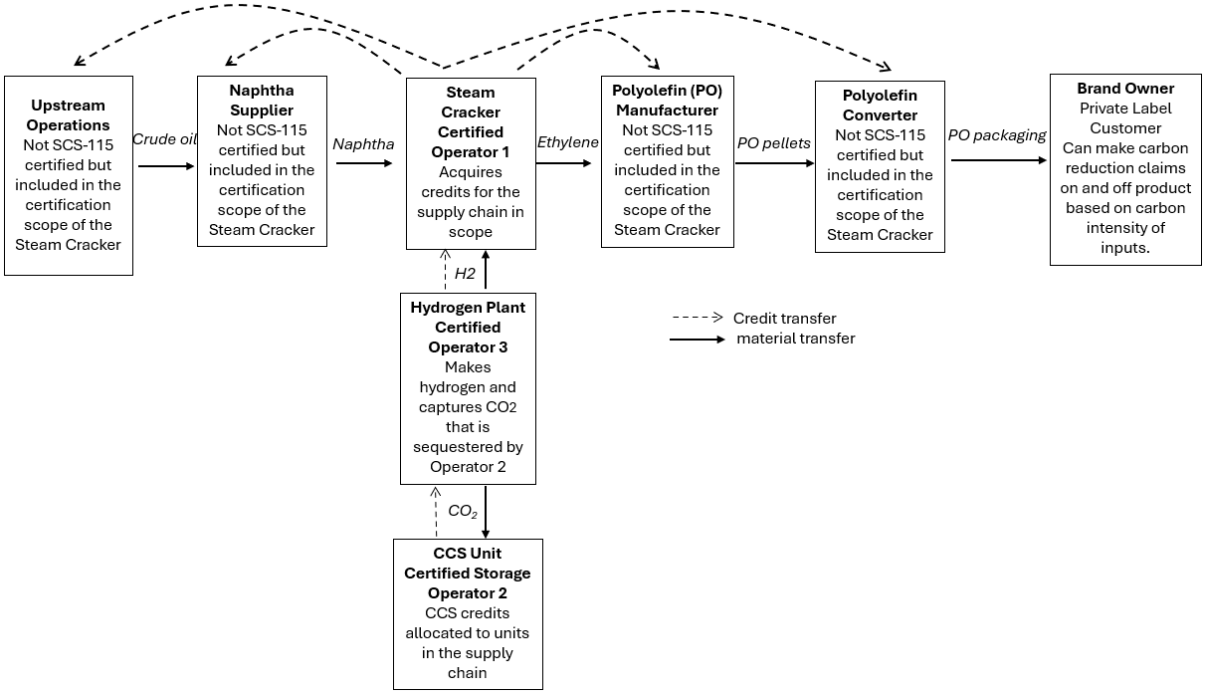
Operator 1 is certified to SCS-115 and captures CO_2

Operator 2 is certified to SCS-115 or a scheme recognized therein and sequesters the CO_2.

Operator 1 acquires sufficient credits/certificates from Operator 2 to compensate a portion (or all) of its operations and the associated emissions of some or all other participants upstream and downstream of the supply chain that are in the scope of certification of Operator 1.

The private label customer (in this example, the brand owner) receives certified material that has reduced carbon intensity and can make associated claims about the relevant product (in this example, the packaging).

Example 2 of an operator compensating for Supply Chain CO_2 savings via CCS



Where:

Operator 1 is certified to SCS-115.

Operator 3 is certified to SCS-115, produces hydrogen and captures CO_2.

Operator 2 is certified to SCS-115 or a scheme recognized therein and sequesters the CO_2 captured by Operator 3.

Operator 1 acquires sufficient credits/certificates from Operators 2 and/or 3 to compensate a portion (or all) of its operations and the associated emissions of some or all other participants upstream and downstream of the supply chain that are in the scope of certification of Operator 1.

C.11 Claims

C.11.1 Only operators certified to this Standard can make public claims about reducing the carbon intensity of their products by CCS or CCU. Operators that are included within the certification scope of a certified operator, but with no certification of their own, cannot make public claims.

C.11.2 A certified geological storage operator cannot make claims about reducing the carbon intensity of products.

C.11.3 Claims about reducing the product carbon intensity via CCS certificates/credits shall indicate that a credit/certificate has been used, as described in Section 10 of this Standard.

C.11.4 Claims about reductions in product carbon intensity achieved by CCS on site, or by the transport and storage of carbon dioxide from the system boundary to a storage site, shall follow Section 10 of this Standard. No additional text is required.

C.11.5 Where externally stored carbon dioxide or CCS certificates/credits are allocated to a fixed proportion of a product, the term 'by mass balance' shall be added to the claim as described in Section 10 of this Standard.