

The GHG emission avoidance calculation in practice

Credit for carbon capture and storage

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Carbon Capture and Storage (CCS) - Carbon Capture and Use (CCU)

- Capturing and compressing CO₂ from point sources or the air for injection in a storage site or for incorporation into a product.
- Applications can be submitted by any players in the CCS supply chain (demonstrating the provision of the remaining services).
- EII and RES projects with CCS component: CCS part is calculated according to this section and introduced in EII/RES GHG calculations.
- No difference between CO₂ captured from fossil and biogenic sources. Biogenic CO₂ credit given to the emitting facility.

$$CC_{\text{credit},y} = CC_{\text{storage},y} + CC_{\text{use},y} - (CC_{\text{capture},y} + CC_{\text{pipeline},y} + CC_{\text{transport},y} + CC_{\text{injection},y} + CC_{\text{EHR},y})$$

emissions from the CO₂ capture activities

emissions from transport of CO₂ by pipelines

emissions from injection at the geological storage site

emissions when storage is associated with EHR

= Proj_{transport,road,y} + Proj_{transport,rail,y} + Proj_{transport,maritime,y}

CC_{transport,y} calculation

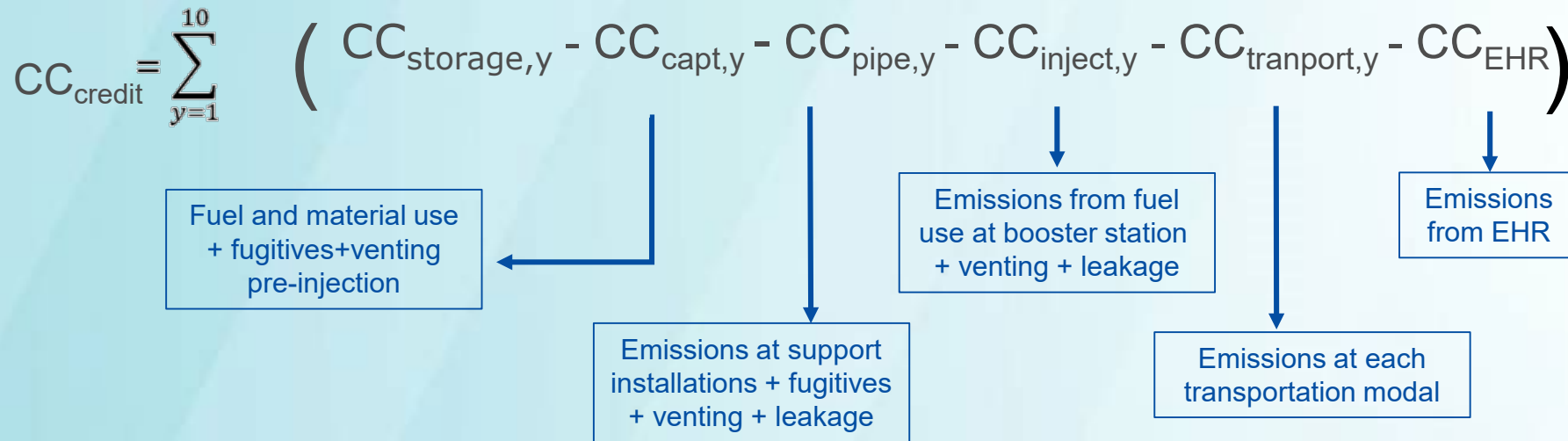
Parameter	=	Equation
CC _{transport,y}	=	CC _{transport,road,y} + CC _{transport,rail,y} + CC _{transport,maritime,y}
CC _{transport,road,y}	=	$\sum_{L=1}^T (K_{road,L} * CO_{2road,L} * EF_{road} * 10^{-3})$
CC _{transport,rail,y}	=	$\sum_{L=1}^T (K_{rail,L} * CO_{2rail,L} * EF_{rail} * 10^{-3})$
CC _{transport,maritime,y}	=	$\sum_{L=1}^T (K_{maritime,L} * CO_{2maritime,L} * EF_{maritime} * 10^{-3})$

Carbon Capture and Storage (CCS)

Example: transport and storage

Potential SIW: omission of project emissions (e.g.: transportation components), poor methodology to estimate leakages, etc.

1. **Description:** Project intends to build a special transport system to transport large volumes of CO₂ by pipeline to the storage site
2. **Sector classification:** EII /other / CO₂ transport&storage
3. **GHG calculation:** Section 3 of emissions avoidance calculation methodology



Note that...

- The applicant shall secure a buyer of their technology and cover the whole cycle from capture to storage in their submission, which shall be part of the boundaries of GHG emission avoidance calculation. Companies will be required to monitor and report on emissions across all stages.
- Applications can be submitted with or without a Consortium. It is up to the applicants and players to organise themselves and split the revenues and liabilities.

Data: CO₂ transferred to capture facility; quantity of fossil fuel consumed; for fugitives (unintentional), leakage events and venting (planned) it will depend on the monitoring plan to be proposed by the applicant, and method of quantification selected.

Carbon Capture and Storage (CCS)

Example: cement plant with CO₂ capture and storage

1. **Description:** Project intends to produce cement in an innovative way and capture and store some of the CO₂ released
2. **Sector classification:** EII / cement & lime / cement
3. **GHG calculation:** EII, Section 2 of Annex C with CC (Section 3) integrated.
4. **Reference:** Cement EU ETS benchmark

$$\Delta\text{GHG}_{\text{abs}} = \underbrace{\sum_{y=1}^{10} (\text{Ref}_y - \text{Proj}_y)}_{\text{EII}}$$

$$= \sum_{y=1}^{10} \left(\text{Ref}_y - (\text{Proj}_{\text{inputs},y} + \text{Proj}_{\text{processes},y} + \text{Proj}_{\text{eol},y} + \text{Proj}_{\text{combustion},y} + \text{Proj}_{\text{changeuse},y} + \text{Proj}_{\text{non-principal},y}) \right)$$

Aside from all the EII processes involved in the production of cement, introduce also:

- The full amount of CO₂ generated by the project as a **positive term** (even though some of this CO₂ is to be captured)
- The CC credit calculated according to section 3 (CCS) as a **negative term**

Carbon Capture and Storage (CCS)

Example: waste to energy plant with CO₂ capture and storage

1. **Description:** Project intends to produce bio-electricity from a waste to energy plant and capture and store some of the CO₂ released
2. **Sector classification:** EII / other / electricity
3. **GHG calculation:** RES, Section 4 with CC credit (Section 3) integrated.
4. **Reference:** expected 2030 electricity mix

$$\Delta\text{GHG}_{\text{abs}} = \underbrace{\sum_{y=1}^{10} (\text{Ref}_y - \text{Proj}_y)}_{\text{RES}} = \sum_{y=1}^{10} \left(\text{Ref}_{\text{electricity}} - \text{Proj}_y \right)$$

Possibility to claim net carbon removals credit if the project emissions are negative

Aside from the RES project emissions involved in the production of bio-electricity, introduce also:

- The amount of **biogenic CO₂** generated by the project **with an emission factor of zero** and the **fossil CO₂** generated as a **positive term** (even though some of this CO₂ is to be captured).
- The CC credit calculated according to section 3 as a **negative term**

Potential SIW: double-counting biogenic emissions.

Carbon Capture and Storage (CCS)

Example: Direct air capture and storage (DACCS)

1. **Description:** Project intends to remove CO₂ from ambient air and store it
2. **Sector classification:** EII / Other / CO₂ storage
3. **GHG calculation:** CC, Section 3

Possibility to claim net carbon removals credit if the overall project emissions are negative

$$CC_{\text{credit},y} = \sum_{y=1}^{10} \left(\frac{CC_{\text{storage},y}}{\text{Amount of CO}_2 \text{ stored}} - \frac{CC_{\text{capt},y} + CC_{\text{pipe},y} + CC_{\text{inject},y} + CC_{\text{transport},y} + CC_{\text{EHR},y}}{\text{Fuel and material use + fugitives + venting + leakage}} \right)$$

Relative GHG emission avoidance will be set at 200% to grant DACCS with an advantage over conventional CCS

Net carbon removals

- Total project emissions should be negative
- Negative emissions can only be claimed excluding any credit for timed operation
- non-principal products cannot be the only source of negative emissions
- Direct air capture projects shall be given an adjusted relative emissions avoidance score of 200% even if they claim credit for timed operations.

$$\widehat{\Delta\text{GHG}}_{\text{rel}} = \frac{\Delta\text{GHG}_{\text{abs}} + \sum_{y=1}^{10}(\text{TO}_y)}{\sum_{y=1}^{10}(\text{Ref}_y)}$$

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