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Federal Department of the Environment,
Transport, Energy and Communications DETEC

**Federal Office for the Environment FOEN**
Direktionsbereich Klima

Factsheet

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# $CO_2$ capture, removal and storage: overview of the legal framework

## Summary

Switzerland must achieve its net-zero climate target by 2050. First and foremost, this requires a reduction in greenhouse gas emissions such as $CO_2$. Not all greenhouse gas emissions are entirely avoidable. That is why additional technologies are needed to capture or remove $CO_2$ and store it permanently. These technologies are not yet widely available. The Federal Office for the Environment (FOEN) is committed to supporting the sustainable upscaling of these technologies and putting in place the required framework conditions.

This factsheet provides an overview of the current legal framework for $CO_2$ capture, removal and storage for project developers, buyers of negative emissions in the form of $CO_2$ certificates, cantonal and communal licensing authorities and interested members of the public.

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## What is $CO_2$ capture, removal and storage and why is it needed?

The Climate and Innovation Act (CIA) came into force on 1 January 2025.[1] It enshrines in law the target of net-zero greenhouse gas emissions by 2050 and after 2050 Switzerland should have a net-negative balance (Art. 3). The CIA also sets out greenhouse gas reduction pathways for the buildings, transport and industry sectors (Art. 4) as well as a target of net-zero emissions for companies by 2050 at the latest (Art. 5) and for the central Federal Administration by 2040 (Art. 10).

$CO_2$ capture, removal and storage will be essential for meeting these climate targets.[2] These technologies are needed to address greenhouse gas emissions that are difficult to avoid, such as those from cement production, waste incineration, agriculture and aviation. They can be divided into two categories:

- carbon capture and storage (CCS), which captures and stores fossil and process-related $CO_2$ at installations, thus reducing emissions at the installations themselves, and

- negative emissions technologies (NETs, also known as Carbon Dioxide Removal or CDR), which permanently remove $CO_2$ from the atmosphere.[3]

## The Federal Council's strategy

As set out in its report of 18 May 2022, the Federal Council envisages two phases for the upscaling of CCS and NETs, in line with Switzerland's Long-Term Climate Strategy: a 'pioneering phase' up to 2030 and a 'targeted scaling phase' up to 2050.[4]

The pioneering phase will see the first large-scale CCS/NET applications. The current legal framework, in particular the revised $CO_2$ Act (post-2024)[5] and the CIA, essentially provides a suitable environment for this phase.

The scaling phase will involve developing CCS at all larger Swiss installations by 2050 and procuring significant quantities of negative emissions. Significant regulatory changes will be required for this phase, for example with a view to the construction of $CO_2$ transport and storage infrastructure. Given the limited potential for storing $CO_2$ in Switzerland, cooperation with other countries will be key.

Demand for $CO_2$ storage in 2050 is estimated at around 12 million tonnes, according to the 2021 Long-Term Climate Strategy. As an interim step, the January 2025 Supplement to Switzerland's Long-Term Climate Strategy estimates that around 1.2 million tonnes of $CO_2$ should be stored annually by 2035 in order to reduce Switzerland's greenhouse gas emissions by 65% net in 2035 compared with 1990. Fur-

1 Climate and Innovation Act / Bundesgesetz über die Ziele im Klimaschutz, die Innovation und die Stärkung der Energiesicherheit (KIG), SR 814.310 (de, fr, it)
2 Long-Term Climate Strategy (2021): Climate protection: Federal Council adopts Switzerland's long-term climate strategy; Amendments to long-term climate strategy in January 2025 (Supplement to Switzerland's Long-Term Climate Strategy): Long-term climate strategy to 2050
3 Climate change: Federal Council adopts report on negative $CO_2$ emissions
4 Klimawandel: Bundesrat heisst Bericht zum Ausbau von Negativemissionstechnologien gut (Climate change: Federal Council approves report on the development of negative emissions technologies; de, fr, it)
5 Federal Act on the Reduction of $CO_2$ Emissions ($CO_2$ Act), SR 641.71

thermore, in a report published in February 2024, the Federal Council estimates that additional negative emissions of around 1–2 million tonnes per year will be needed for $CO_2$ emissions from international aviation in 2050.[6]

## What incentives exist to develop these technologies?

**Funding and roadmaps under the CIA:** From 1 January 2025, the CIA provides funding for innovative technologies and processes aimed at reducing greenhouse gas emissions and promoting $CO_2$ capture, removal and storage. To benefit from this funding, companies must draw up a net-zero decarbonisation roadmap setting out the measures that are to receive funding.[7]

The Climate Protection Ordinance (CPO, Art. 3)[8] stipulates that CIA roadmaps must include not only a reduction pathway for emissions but also a development pathway for negative emissions to balance the company's remaining emissions in the longer term (net-zero emissions). The development pathway can include negative emissions to be implemented in the company and the purchase of negative emissions in the form of attestations issued under the $CO_2$ Act. From 2022, international and national attestations for negative emissions can be issued if they meet the requirements of the $CO_2$ Ordinance[9] (projects and programmes for increasing the carbon sink effect).[10] In the case of national attestations, it should be noted that the Federal Office for the Environment (FOEN) generally records the impact of these measures in the Swiss greenhouse gas inventory.[11] Consequently, this impact counts towards Switzerland's national climate targets under the $CO_2$ Act as well as its targets under the Paris Agreement. Companies that purchase such attestations should take this fact into account in any communication regarding roadmap implementation, to avoid the impact being counted twice towards national and voluntary targets.

The Ordinance on Climate Disclosures, which has been in force since 1 January 2024, requires larger companies with over 500 employees to publish a transition plan/roadmap that is comparable with the Swiss climate targets.[12] For companies in the non-financial sector, minimum requirements for these roadmaps are set out in the CPO. Principles-based minimum requirements for companies in the financial sector are to be added to the Ordinance on Climate Disclosures.[13]

**Funding under the $CO_2$ Act**: Operators of installations that are required to participate in the emissions trading system (ETS) are able to apply for funding for decarbonisation measures, including CCS/NET measures, since 1 January 2025 (Art. 37*b* $CO_2$ Act). The financial assistance is granted only for investment costs, not to operating costs. For CCS and NETs, it may therefore be more advisable for project developers to apply for funding under the CIA (see explanations above). Some of the proceeds from the auctioning of emission allowances for ETS installations are used for the funding.[14]

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6 Carbon neutral aviation: Federal Council adopts report
7 Further information and guidelines on net-zero roadmaps and funding for innovative technologies and processes: Promoting innovative technologies and processes / contact: itinero@bfe.admin.ch
8 Climate Protection Ordinance / Verordnung zum Bundesgesetz über die Ziele im Klimaschutz, die Innovation und die Stärkung der Energiesicherheit (Klimaschutz-Verordnung, KlV), SR 814.310.1 (de, fr, it)
9 Ordinance on the Reduction of Carbon Emissions ($CO_2$ Ordinance), SR 641.711
10 Further information: $CO_2$ compensation / contact: kop-ch@bafu.admin.ch
11 Switzerland's greenhouse gas inventory
12 Ordinance on Climate Disclosures / Verordnung über die Berichterstattung über Klimabelange, SR 221.434 (de, fr, it)
13 Federal Council press release of 6 December 2024
14 Further information: Decarbonising industry

**Crediting of CCS in connection with exemption from the $CO_2$ levy**: Operators of installations participating in the ETS or that have a reduction obligation can count CCS as an emission reduction from 2025, provided that the relevant requirements of the $CO_2$ Ordinance are met. This increases the financial incentives for investment.[15]

**Crediting of CCS and NETs in connection with the compensation obligation for fuel importers:** $CO_2$ storage in Switzerland and abroad is eligible since 2022, subject to the requirements of the $CO_2$ Ordinance, as a way for fuel importers to meet their compensation obligation.[16]

**CCS agreement between the Confederation and waste incineration plants:** In an agreement with the Confederation, waste incineration plants (represented by the industry association VBSA) have undertaken to put a $CO_2$ capture facility into operation by 2030 with a nominal capacity of 100,000 tonnes of $CO_2$ per year. In return, these plants are exempted from participating in the ETS. The Environmental Protection Act (Art. 32a para. 1 EPA)[17] allows for a uniform increase in disposal fees for all Swiss waste incineration plants in order to finance CCS at such plants.[18]

**Strengthening the circular economy and conserving resources:** The revision of the EPA under parliamentary initiative 20.433 'Strengthening the Swiss circular economy' has laid the foundations for closing gaps in material cycles and strengthening the circular economy for products and buildings. The majority of the legislative changes came into force on 1 January 2025. The FOEN is currently drafting proposals for implementing ordinances.[19]

This revision included an enhancement of the waste recovery hierarchy, so that recycling and preparation for reuse are prioritised over incineration. Depending on how the new legal provisions are implemented, this could reduce the quantity of waste and possibly the amount of CCS required at waste incineration plants. In addition, the cantons are tasked with setting limit values for grey energy in the construction of new buildings and substantial changes to existing buildings. This is intended to incentivise emission-saving construction methods. For its part, the Federal Council is given the power to set requirements for resource-efficient construction, with the Confederation expected to act as a role model in this area (Art. 35j para. 2 EPA). Limit values for grey energy and any other requirements for resource-efficient construction could increase the use of building materials that store $CO_2$ (e.g. timber, mineralised concrete).

Further, since 2017 the Forest Act (Art. 34b) has stipulated that the Confederation must promote the use of sustainably produced timber in its own buildings and installations.[20] In public procurement, the life cycle assessment data for the construction sector, provided by the Coordination Conference for Public Sector Construction and Property Services (KBOB) and updated in 2024, must be observed.[21] This data contain values for the carbon in building materials and helps to determine the greenhouse gas emissions of a building throughout its life cycle (Scope 1 to 3).

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15 Further information: ETS: Emissions trading system (ETS) / contact: emissions-trading@bafu.admin.ch; reduction obligation: Exemption from the CO2 levy: Reduction obligation / contact: co2-abgabebefreiung@bafu.admin.ch

16 Further information: see footnote 10

17 Environmental Protection Act / Bundesgesetz über den Umweltschutz (Umweltschutzgesetz, USG), SR 814.01 (de, fr, it)

18 See 24.3958 | Solidarische Finanzierung von Carbon Capture auf KVA | Geschäft | Das Schweizer Parlament (de, fr, it)

19 Gesetzesänderungen zur Stärkung der Schweizer Kreislaufwirtschaft treten mehrheitlich ab 2025 in Kraft (Most of the legislative changes to strengthen the Swiss circular economy will come into force from 2025; de, fr, it); 20.433 | Schweizer Kreislaufwirtschaft stärken | Geschäft | Das Schweizer Parlament (Strengthening the Swiss circular economy; de, fr, it)

20 Federal Act on Forest (Forest Act, ForA), SR 921.0

21 Ökobilanzdaten im Baubereich (Life cycle assessment data in the construction sector; de, fr, it)

## What are the legal frameworks?

### $CO_2$ transport is classed as carriage of dangerous goods and is already common in small quantities

$CO_2$ is regularly transported within Switzerland and beyond its borders, for the chemical and food industries for example.[22] The transport of dangerous goods such as $CO_2$ by road, rail and ship is based on international agreements and is regulated in, among others, the Ordinance on the Carriage of Dangerous Goods by Road (SDR),[23] the Ordinance on the Carriage of Dangerous Goods by Rail or Cableway (RSD)[24] and the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN, directly applicable in Switzerland).[25] The competent authorities are the Federal Roads Office (FEDRO) and the Federal Office of Transport (FOT).[26]

### $CO_2$ captured for disposal is legally classified as waste

Unlike in the EU, $CO_2$ captured for storage underground is not exempt from waste legislation in Switzerland.[27] In the case of $CO_2$ export, for example, this places an additional administrative burden on project developers, as they have to obtain an export licence from the FOEN under waste legislation (the same applies to any $CO_2$ imported with a view to disposal).[28] Furthermore, underground $CO_2$ storage is currently not permitted under waste legislation, as the existing law does not provide for any type of waste disposal site where $CO_2$ may be deposited.

### There is currently no national legislation for $CO_2$ pipelines and $CO_2$ underground storage facilities

As there is no Switzerland-wide regulation of $CO_2$ pipelines and underground storage facilities, rules in areas such as planning, construction and operation must be set at cantonal level. However, according to an expert opinion by the Federal Office of Justice dated 24 September 2024, the Federal Council has comprehensive powers to issue regulations on $CO_2$ pipelines and underground storage facilities, based on Article 74 of the Federal Constitution.[29] In light of this, the Council of States Environment, Spatial Planning and Energy Committee (ESPEC-S) has submitted a motion instructing the Federal Council to draw up framework legislation for the capture, transport and storage of $CO_2$ and to submit it

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22 Around 40,000 tonnes of $CO_2$ are imported and 10,000 tonnes are exported each year. Source: Federal Office for Customs and Border Security (FOCBS), Swiss-Impex

23 Ordinance on the Carriage of Dangerous Goods by Road / Verordnung über die Beförderung gefährlicher Güter auf der Strasse (SDR), SR 741.621 (de, fr, it)

24 Ordinance on the Carriage of Dangerous Goods by Rail or Cableway / Verordnung über die Beförderung gefährlicher Güter mit Eisenbahnen und Seilbahnen (RSD), SR 742.412 (de, fr, it)

25 European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways / Europäisches Übereinkommen über die internationale Beförderung von gefährlichen Gütern auf Binnenwasserstrassen (ADN), SR 0.747.208 (de, fr, it)

26 Competent authorities: Federal Roads Office (FEDRO) > Gefährliche Güter (de, fr, it); Federal Office of Transport (FOT) > Transportvorschriften (de, fr, it)

27 See FOEN-commissioned legal opinion by Professor Astrid Epiney, 2024: Rechtliche Vorgaben für die CO2-Speicherung im Untergrund – EU-Recht, Rechtsvergleich und Implikationen für das Schweizer Recht (Legal requirements for underground $CO_2$ storage – EU law, comparative law and implications for Swiss law)

28 Further information: Transboundary movements of waste (valid for the Principality of Liechtenstein and Switzerland)

29 24.4256 | Nationale Regelung zu Abscheidung, Transport und Speicherung von CO2 | Öffentliche Kommissionsunterlagen | Das Schweizer Parlament (National regulation on the capture, transport and storage of CO2; de, fr, it)

to Parliament as part of the development of post-2030 climate policy (motion 24.4256).[30] This legislation must respect the existing constitutional powers, for example with regard to cantonal licensing procedures. Like the revised $CO_2$ Act, the framework act is to come into force on 1 January 2031.

### There are currently gaps in the licensing requirements for installations

The cantons play a key role as licensing authorities and must adhere to relevant national legislation, for instance with regard to environmental impact assessments. The Confederation assists the cantons to ensure harmonised enforcement. The following environmental regulations currently apply:

- Environmental impact assessment (EIA): New installations for the direct capture of $CO_2$ from the atmosphere (direct air capture), pipeline transport or underground storage of $CO_2$ are currently not subject to an EIA, as they are not mentioned in the annex to the Environmental Impact Assessment Ordinance (EIAO).[31] However, environmental protection regulations must be applied even in projects that are not subject to an EIA (Art. 4 in conjunction with Art. 3 EIAO). If existing installations subject to an EIA (e.g. waste incineration plants, cement kilns) are modified to incorporate a unit for capturing $CO_2$ from their flue gas, this adaptation requires an EIA (Art. 2 para. 1 let. a and b EIAO). The FOEN is currently examining the necessary amendments to the EIAO in collaboration with the cantons. An EIA requirement for CCS units is also being looked at in this context.

- Major Accidents Ordinance: Installations for the capture, pipeline transport or underground storage of $CO_2$ are not currently subject to the Major Accidents Ordinance (MAO), as there is no threshold quantity for $CO_2$ according to the criteria set out in the MAO.[32] However, initial investigations indicate that, depending on the topography and settlement density, substantial $CO_2$ emissions can cause serious harm to the public, within the meaning of the MAO. The FOEN is currently examining whether $CO_2$ should be included in the MAO's list of exceptions with a specified threshold quantity (based on Art. 1 para. 3 MAO and Art. 10 EPA). Establishments that could cause serious harm can already be made subject to the MAO in individual cases on the basis of Article 1 paragraph 3.

- Air pollution control: Installations used to capture $CO_2$ after combustion processes may generate additional emissions. For example, capture by means of amine absorption is likely to result in the emission of additional air pollutants, including carcinogenic degradation products such as nitrosamines and nitramines. In principle, all stationary installations that emit air pollutants are subject to the Ordinance on Air Pollution Control (OAPC).[33] The EPA stipulates that pollutant emissions must be limited at their source as a preventive measure. Pollutant emissions from $CO_2$ capture units are currently not explicitly regulated in the OAPC; it is therefore up to the cantons to set preventive emission limits based on what is technically feasible (Art. 4 OAPC). The FOEN is at present carrying out detailed investigations and is assisting the cantons with drawing up recommendations for enforcing a standardised assessment of specific $CO_2$ capture projects. Limit values will be derived based on experience and measurements at comparable operational units and incorporated into the OAPC at a later stage.

- Water: Pollutants from $CO_2$ capture (in particular amine scrubbing) could contaminate water bodies in the form of wastewater or by entering the groundwater. The Waters Protection Ordinance (WPO) requires that, when industrial wastewater is discharged, the necessary state-of-

[30] 24.4256 | Nationale Regelung zu Abscheidung, Transport und Speicherung von CO2 | Geschäft | Das Schweizer Parlament (National regulation on the capture, transport and storage of CO2; de, fr, it)
[31] Environmental Impact Assessment Ordinance / Verordnung über die Umweltverträglichkeitsprüfung (UVPV), SR 814.011 (de, fr, it)
[32] Ordinance on Protection against Major Accidents (Major Accidents Ordinance, MAO), SR 814.012
[33] Ordinance on Air Pollution Control (OAPC), SR 814.318.142.1

the-art measures be taken to prevent pollution of waters.[34] In addition, the discharge of wastewater into waters must be authorised by the cantons. In principle, therefore, there is no need to amend the WPO. Whether the annex to the WPO should be amended to ensure legal certainty will become clear during the actual implementation process. As far as groundwater protection is concerned, the WPO imposes restrictions on installations and underground constructions if they affect exploitable groundwater. The FOEN believes the current water protection legislation to be sufficient for CCS-related issues in the area of groundwater protection.

- Soil: CCS/NETs can affect soils in several ways, for example by the introduction of biochar into soils,[35] the spreading onto soils of ground minerals that chemically bind $CO_2$ (known as 'enhanced weathering') or the (unlikely but possible) leakage of $CO_2$ from an underground storage facility. Further investigations, including field trials, are required to determine whether legal adjustments need to be made to address soil pollution from CCS/NETs.

**International cooperation requires bilateral agreements with partner countries**

In November 2023, the Federal Council laid the groundwork for the export of captured $CO_2$ for subseabed storage (ratification of the 2009 amendment to the London Protocol).[36] Export based on the London Protocol requires additional bilateral agreements with the relevant storage countries. To purchase negative emissions from abroad and count these towards climate targets requires bilateral agreements with partner countries in accordance with the Paris Agreement. The Confederation has already concluded a number of such agreements (primarily for the purchase of emission reductions).[37] The FOEN is leading discussions with countries such as Norway, Sweden, Denmark and Kenya to examine cooperation on $CO_2$ export and/or negative emissions trading. The aim is to have bilateral agreements that regulate the export of $CO_2$ from Switzerland for storage in the partner country and/or the trading of $CO_2$ certificates based on NETs under Article 6 of the Paris Agreement. A comprehensive agreement with Norway (covering $CO_2$ export and negative emissions trading) is expected to be concluded in 2025.

It should be noted that $CO_2$ exported from Switzerland to the European Economic Area (EEA) for storage in an underground storage site authorised under EU law[38] falls within the scope of the EU ETS, regardless of the source of the $CO_2$. This means, for example, that in the event of leakage during transport or storage in the EEA, this $CO_2$ must be reported in the EU ETS and covered by emission allowances.[39]

[34] Waters Protection Ordinance (WPO), SR 814.201
[35] See the factsheet 'Pflanzenkohle in der Schweizer Landwirtschaft: Risiken und Chancen für Boden und Klima' (Biochar in Swiss agriculture: risks and opportunities for soil and climate) published by the Federal Office for the Environment (FOEN), Federal Office for Agriculture (FOAG) and Cercle Sol's Intervention Values and Risk Assessment Working Group (AGIR)
[36] Federal Council lays groundwork for export of $CO_2$ for sub-seabed storage (admin.ch)
[37] Bilateral climate agreements (admin.ch)
[38] In accordance with Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide
[39] See Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012

## What is the roadmap for further legal developments at national level?

The Federal Council is expected to open the consultation on post-2030 climate policy in the in the second quarter of 2026 at the latest (revision of the $CO_2$ Act after 2030, new CCS framework act in implementation of motion 24.4256). The dispatch(es) is/are likely be submitted to Parliament in summer 2027 for a planned entry into force on 1 January 2031.

## Further information:

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FOEN information for specialists: CO2 capture, removal and storage