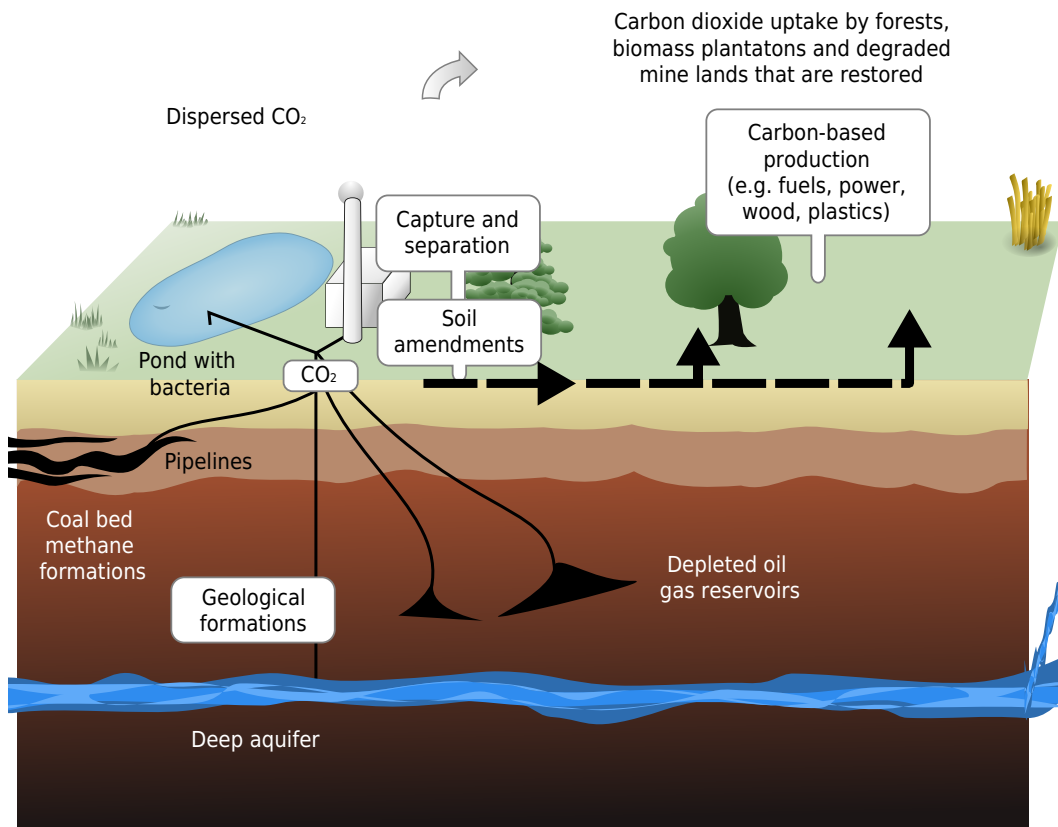


## What can I choose in the calculator?

The calculator lets you choose if the CO<sub>2</sub> emitted during electricity generation from Combined gas cycle and Coal plants in Switzerland is captured and stored or not (0=no CCS, 1=all plants have CCS).

## Carbon Capture and Storage (CCS)



LeJean Hardin and Jamie

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## Contents

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## IMPACT - What are the impacts of CCS?

In Switzerland, applying CCS to Combined gas cycle and Coal plants will have the following impacts:

### Energy system

- ☹️ Increase primary energy demand.
- ☹️ Likely to increase total fossil fuel consumption.

- ☹️ Limited deployment potential in current Swiss energy system due to very small fossil based electricity generation capacity.
- ☹️ Could decrease energy independence by requiring more fossil imports.
- 😊 Can be retrofitted to existing power plants although this may significantly increase the cost.

### **Environment & Climate**

- 😊 Likely to reduce global CO2 emissions.
- 😊 May also reduce other emissions from fossil power plants.

### **Society & Economy**

- 😊 Likely to increase the cost of the energy transition.
- ☹️ May worsen balance of payments by increasing fossil imports.
- 😊 Could increase Confederation income from the tax on mineral oil under the current taxation system.

## **GLOBAL MARKET - What is the global market for CCS?**

As of 2014 there are a total of 12 large scale integrated CCS projects that are in operation. Altogether , these projects can store about 25 million tonnes of CO2 per year. 95% of this capacity is to enhance the recovery of oil or gas from an existing oil or gas field. [1]

## **DEFINITION / CONSTRAINTS**

### **DEFINITION - What is CCS?**

Carbon capture and storage (CCS) refers to processes by which the CO2 in the flue gases of power plants (or industrial processes) are captured and then stored. The capture can take place either post-combustion using solvents such as amines or pre-combustion such as in integrated gasification combined cycle (IGCC) plants.

Carbon capture processes are already used commercially in other industrial processes but the application to the capture of CO2 from power plants is still largely at the demonstration phase.

The captured CO2 can be stored in underground storage locations, such as depleted oil or gas fields, or in saline aquifers, and must typically be compressed to high pressure to be pumped into these storage locations.

## CONSTRAINTS - What are the key barriers facing CCS deployment?

- The main drawback of CCS technology is that the capture and compression processes involved are quite energy intensive and would reduce the net output of a coal (resp. natural gas) power plant by about 24-40% (resp. 11-22%), severely impacting on its economic viability [2]. CCS may thus only be economically justified in the context of high emitted CO2 taxes.
- Capture technology must still be scaled-up to full commercial scale.
- There is public concern—which may or may not be justified—regarding the injection of CO2 into storage locations near inhabited areas.
- Long term stability of CO2 storage sites must still be demonstrated.

## REFERENCES

[1] [Global CCS Institute, 2014, CCS Project Database.](#)

[2] IPCC, Carbon Dioxide Capture and Storage, A Special Report of Working Group III of the Intergovernmental Panel on Climate Change, Sep. 2005.

```
.dokuwiki div.page { padding: 5px; } #wrapper #content h1 { margin-top: 0; padding-top: 0; }
#wrapper #content.padded, #wrapper #content .padded { padding: 0 0px; } #wrapper #content
.blocWrapper { margin: 0 5px 0 5px; } #wrapper #content .blocGroupWrapper { margin: 0; width:
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#content .bloc header { padding: 1px 5px; } #wrapper #content .bloc header.lined { border-bottom:
1px solid #c2c2c2; } #wrapper #content .bloc h2 { font-size: 20px; font-family: 'ProximaNovaCond-
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#content .bloc.single { width: 295px; } #wrapper #content .bloc.double { width: 610px; } #wrapper
#content .bloc.triple { width: 915px; } #wrapper #content .bloc.bgWhite { background: #fff; }
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#content .bloc header.bgOrange .blocLink { border-left: 1px solid #fe984d; color: #fff; } #wrapper
#content .bloc .blocLink { float: right; line-height: 17px; border-left: 1px solid #c2c2c2; padding-left:
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#content .bloc .newsBloc h3 { font-size: 14px; margin-bottom: 10px; } #wrapper #content .bloc
.newsBloc p { font-size: 13px; line-height: 17px; margin-bottom: 10px; } #wrapper #content .bloc a {
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{ color: #fe6b00; margin-bottom: 10px; font-size: 14px; line-height: 17px; } #wrapper #content
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{ float: left; margin-right: 4px; } #wrapper #content .questionAnswer .bg { float: left; color: #fff;
border-radius: 8px; width: 15px; height: 15px; text-align: center; font-size: 11px; font-weight: normal;
} #wrapper #content .questionAnswer .bg.question { background: #fe6b00; } #wrapper #content
.questionAnswer .bg.answer { background: #535559; } #wrapper #content .intro { margin-bottom:
60px; } #wrapper #content .intro .img { float: left; width: 460px; } #wrapper #content .intro .txt {
float: left; width: 480px; } #wrapper #content .intro .txt h1 { font-family: 'ProximaNovaCond-
```

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#newsWrapper { background: #fff; } #wrapper #content #newsWrapper .news { padding: 20px; }
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font-family: 'ProximaNovaCond-Regular'; font-size: 28px; margin-bottom: 15px; } #wrapper #content
#newsWrapper .news p { font-size: 16px; margin-bottom: 20px; } #wrapper #content
#newsWrapper.detail { margin-bottom: 20px; } #wrapper #content #newsWrapper.detail img {
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#1d1d1b; margin-bottom: 20px; } #wrapper #content #faqWrapper .blocWrapper .bloc { height:
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#faqWrapper.detail { margin-bottom: 40px; } #wrapper #content #faqWrapper.detail li {
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font-size: 18px; } #wrapper #content #lexiqueWrapper .ulWrapper ul li a.active { color: #000; }
#wrapper #content #lexiqueWrapper #listWrapper { margin: 20px 0; } #wrapper #content
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#c2c2c2; } #wrapper #content #lexiqueWrapper #listWrapper ul li h4 { font-family:
'ProximaNovaCond-Regular'; font-size: 24px; margin-bottom: 6px; } #wrapper #content
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100%; height: 550px; background: #e8e8e8; } /* TEXTE PAGES ET ADMION */ #content.text,
.redactor_box { font-family: Arial, Helvetica, Sans Serif; font-size: 16px; color: #333333; padding:
20px; } #content.text body, .redactor_box body { background: none; } #content.text h1,
.redactor_box h1, #content.text h3, .redactor_box h3 { font-family: 'ProximaNovaCond-Light'; color:
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size: 20px; } #content.text h2, .redactor_box h2, #content.text h4, .redactor_box h4 { font-family:

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'ProximaNovaCond-Semibold'; font-size: 44px; color: #000; text-transform: uppercase; margin-bottom: 10px; } #content.text h4, .redactor_box h4 { font-size: 26px; } #content.text p, .redactor_box p { color: #333333; margin-bottom: 20px; } #content.text #wysiwyg, .redactor_box #wysiwyg { margin-bottom: 80px; } #content.text ul li, .redactor_box ul li { margin-bottom: 10px; line-height: 20px; display: block; padding-left: 20px; background: url(lib/tpl/ses/images/bg_bullet-text.png) top left no-repeat; background-position: 0 8px; } #content.text table, .redactor_box table { margin-top: 50px; } #content.text table td, .redactor_box table td { vertical-align: top; } #content.text table td p, .redactor_box table td p, #content.text table td li, .redactor_box table td li { font-family: Arial, Helvetica, Sans Serif; font-size: 16px; color: #535559; } #content.text table td.w50, .redactor_box table td.w50 { width: 460px; padding-right: 20px; } #content.text table td.w50.right, .redactor_box table td.w50.right { width: 460px; padding-right: 0; } hr { background: none; border: none; border-top: 1px solid #c2c2c2; } hr.marged { margin: 40px 0; } .pagination { margin: 20px auto 40px auto; height: 20px; } .pagination ul li { float: left; padding: 0 10px; border-left: 1px solid #c2c2c2; } .pagination ul li a { font-family: 'ProximaNovaCond-Light'; font-size: 20px; line-height: 23px; color: #797a7f; } .pagination ul li a.active { color: #000; } .pagination ul li.prev, .pagination ul li.next { width: 11px; height: 20px; } .pagination ul li.prev, .pagination ul li.nobl, .pagination ul li.next { border-left: 0; } .paddedContent { padding: 20px; } #sponsorsWrapper { margin: 40px 0 30px 20px; } #sponsorsWrapper h2 { font-family: 'ProximaNovaCond-Regular'; font-size: 14px; text-transform: uppercase; } #sponsorsWrapper .sponsor { float: left; margin-right: 60px; } .dokuwiki div.page { overflow: auto; }
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