

What can I choose in the calculator?

The calculator lets you choose the share of total centralised heat demand covered by Deep Geothermal in Switzerland in the selected year (2035 or 2050).

Deep Geothermal



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IMPACT - What are the impacts of Deep Geothermal?

In Switzerland, increasing the share of Deep Geothermal will have the following impacts:

Energy system

😊 Reduces final energy demand.

- 😊 May decrease total electricity consumption.
- 😊 Likely to reduce total fossil fuel consumption.
- 😊 Likely to increase the share of renewable energy sources in the energy mix.
- 😊 Likely to increase energy independence and energy security by providing sustainable baseload electric power.

Environment & Climate

- 😊 Very likely to reduce global CO2 emissions.
- 😊 Avoid emissions of harmful pollutants by replacing combustion processes.
- 😞 Drilling and injection may cause seismic activity and have other unforeseen environmental impacts.

Society & Economy

- 😊 Likely to decrease the cost of the energy transition.
- 😊 May improve balance of payments by reducing fossil fuel imports.
- 😞 Likely to reduce Confederation income from the tax on mineral oil under the current taxation system.

GLOBAL MARKET - What is the global market for Deep Geothermal?

In 2013 there were 68 geothermal power plants in Europe, of which 8 were installed in 2013. The total electric capacity of these plants is about 2 GW_e. Also in 2013 there were 237 geothermal district heating plants in Europe of which 15 were installed in 2013. The total thermal capacity of these plants is about 4 GW_{th}. [3]

DEFINITION / CONSTRAINTS

DEFINITION - What is Deep Geothermal?

Deep geothermal systems draw heat from the earth's interior and use it to generate heat, electricity or both.

Systems that generate electricity either use the steam that is generated geothermally (steam plants) or use an intermediate working fluid (binary plants). In order to generate electricity, systems with relatively high operating temperatures are required (typically 200°C or above for steam plants and 120°C or above for binary plants). Systems that extract heat at lower temperatures are typically only

used to generate heat.

Given the relatively high cost of drilling deep holes—often as deep as several kilometres—only large deep geothermal systems are likely to be economically viable.

CONSTRAINTS - What are the key barriers facing Deep Geothermal deployment?

- The drilling and liquid injection associated with deep geothermal systems can cause seismic activity.
- There is often significant uncertainty involved in the drilling process meaning that total plant costs are difficult to estimate until completion.
- Geothermal wells inherently have a limited lifetime of about 20-30 years after which the temperatures drop too low to continue operating the well economically. There is also uncertainty surrounding the lifetime of geothermal wells as the rock characteristics could change with time and use.

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.blocWrapper { margin: 0 5px 0 5px; } #wrapper #content .blocGroupWrapper { margin: 0; width:
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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
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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;
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.questionAnswer .bg.answer { background: #535559; } #wrapper #content .intro { margin-bottom:
60px; } #wrapper #content .intro .img { float: left; width: 460px; } #wrapper #content .intro .txt {
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#1d1d1b; font-size: 16px; line-height: 20px; margin-bottom: 20px; } #wrapper #content
```

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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 {
width: 440px; float: left; margin: 0 20px 20px 0; } #wrapper #content #faqWrapper h2 { text-align:
center; font-family: 'ProximaNovaCond-Semibold'; font-size: 26px; text-transform: uppercase; color:
#1d1d1b; margin-bottom: 20px; } #wrapper #content #faqWrapper .blocWrapper .bloc { height:
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20px; } #wrapper #content #faqWrapper .blocWrapper .bloc h3 { font-family: 'ProximaNovaCond-
Semibold'; font-size: 26px; text-transform: uppercase; color: #1d1d1b; text-align: left; } #wrapper
#content #faqWrapper .blocWrapper .bloc h4 { font-family: 'ProximaNovaCond-Light'; font-size: 19px;
text-transform: uppercase; color: #1d1d1b; margin-bottom: 20px; } #wrapper #content #faqWrapper
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#faqWrapper .blocWrapper .bloc .bluecornerlink a { color: #fff; } #wrapper #content
#faqWrapper.detail { margin-bottom: 40px; } #wrapper #content #faqWrapper.detail li {
background: #fff; padding-top: 20px; border-bottom: 1px solid #c2c2c2; cursor: pointer; } #wrapper
#content #faqWrapper.detail li .number { float: left; width: 30px; height: 30px; margin: 0 35px 15px
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#content #faqWrapper.detail li.noborder { border-bottom: none; } #wrapper #content
#lexiqueWrapper .ulWrapper { text-align: center; } #wrapper #content #lexiqueWrapper .ulWrapper
ul li { display: inline-block; *display: inline; zoom: 1; border-right: 1px solid #c2c2c2; padding: 0 11px;
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#content #lexiqueWrapper .ulWrapper ul li a { color: #535559; font-family: 'ProximaNovaCond-Light';
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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#lexiqueWrapper #listWrapper ul li p { margin-bottom: 20px; } #wrapper #content #map { width:
100%; height: 550px; background: #e8e8e8; } /* TEXTE PAGES ET ADMION */ #content.text,
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.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;
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#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
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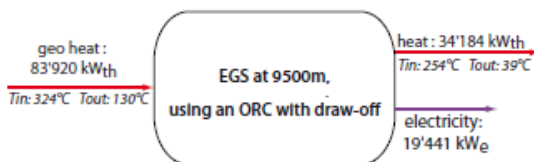
ASSUMPTIONS - WHAT ARE THE ASSUMPTIONS CONSIDERED IN THE CALCULATOR?

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text-transform: uppercase; margin: 0; } #wrapper #content .bloc.bgWhite { background: #fff; }
#wrapper #content .intro .txt h2 { font-family: 'ProximaNovaCond-Light'; font-size: 32px; color:
#535559; text-transform: uppercase; margin-bottom: 6px; } #wrapper #content #newsWrapper
.news h2 { font-family: 'ProximaNovaCond-Regular'; font-size: 28px; margin-bottom: 15px; }
#wrapper #content #faqWrapper h2 { text-align: center; font-family: 'ProximaNovaCond-Semibold';
font-size: 26px; text-transform: uppercase; color: #1d1d1b; margin-bottom: 20px; } /* 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; }
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bottom: 10px; } #content.text p, .redactor_box p { color: #333333; margin-bottom: 20px; }
#content.text #wysiwyg, .redactor_box #wysiwyg { margin-bottom: 80px; } 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 h2 {
font-family: 'ProximaNovaCond-Regular'; font-size: 14px; text-transform: uppercase; } .dokuwiki
div.page { overflow: auto; }

```

The selected technology for this model is an Enhanced Geothermal System at 9'500m that uses an ORC cycle with draw-off for the production of electricity and heat. This system is presented in L. Gerber [2]. This EGS produces 19 MW of electricity and 34 MW of heat as shown on the next balance:



Emissions		
	2035	2050
CO ₂ -eq. emissions [kgCO ₂ -eq./kWh _e]	0.0105	0.0105
Deposited waste [UBP/kWh _e]	19.8	19.8
Cost		
	2035	2050
Specific investment [CHF/kW _e]	11'164	6'310

REFERENCES

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#wrapper #content .bloc header.lined { border-bottom: 1px solid #c2c2c2; } #wrapper #content
.bloc h2 { font-size: 20px; font-family: 'ProximaNovaCond-Light'; color: #535559; font-weight: normal;
text-transform: uppercase; margin: 0; } #wrapper #content .bloc.bgWhite { background: #fff; }
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#535559; text-transform: uppercase; margin-bottom: 6px; } #wrapper #content #newsWrapper
.news h2 { font-family: 'ProximaNovaCond-Regular'; font-size: 28px; margin-bottom: 15px; }
#wrapper #content #faqWrapper h2 { text-align: center; font-family: 'ProximaNovaCond-Semibold';
font-size: 26px; text-transform: uppercase; color: #1d1d1b; margin-bottom: 20px; } /* 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 h2, .redactor_box h2, #content.text h4, .redactor_box h4 { font-family:
'ProximaNovaCond-Semibold'; font-size: 44px; color: #000; text-transform: uppercase; margin-
bottom: 10px; } #content.text p, .redactor_box p { color: #333333; margin-bottom: 20px; }
#content.text #wysiwyg, .redactor_box #wysiwyg { margin-bottom: 80px; } 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,
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font-family: 'ProximaNovaCond-Regular'; font-size: 14px; text-transform: uppercase; } .dokuwiki
div.page { overflow: auto; }
```

[1] [European Geothermal Energy Council, Geothermal Market Report 2013/2014](#)

[2] L. Gerber (2012), Integration of Life Cycle Assessment in the conceptual design of renewable energy conversion systems.

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