

Bundesamt für Energie BFE
Office fédéral de l'énergie OFEN
Ufficio federale dell'energia UFE
Swiss Federal Office of Energy SFOE





## **SWISS RISK MITIGATION SCHEMES**

### T3.2 - Framework conditions for establishing a geothermal risk mitigation scheme

### Five key aspects of a risk mitigation scheme (RMS)

- 1. Identification of the risk(s) to be addressed: Which precise risk(s) need(s) to be transferred?
- 2. Legal and regulatory boundary conditions: What is the basis for a specific RMS?
- 3. Funding of the risk transfer scheme: *How is the RMS financed?*
- 4. Procedural aspects: What is the process for granting aid?
- 5. Performance indicators: How is the RMS performing?

#### https://www.georisk-project.eu/publications



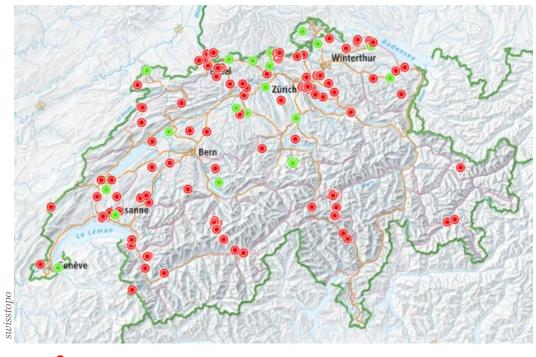




### 1. WHAT RISKS ARE COVERED IN SWITZERLAND?

#### 1. Geological risks (D risks)

- Unknown subsurface
- Access and development of geothermal reservoirs (incl. EGS)
- 2. In case of "no reservoir", severe negative financial consequences (B risks)
- 3. In a few locations, societal acceptance (B risks)
- Legal and regulatory framework in Cantons (Concessioning, Permitting, Oversight) (B risks)
- 5. Know-how and How-to of actors in the geothermal value chain (C risks)



- Well deeper than 500 m
- Well deeper than 500 m with free access to data

The main barrier to the development of geothermal energy in Switzerland is the lack of knowledge of the subsurface.



## 1. WHAT RISKS ARE COVERED IN SWITZERLAND?

Bespoke RMS are developed for short term geological risks

#### Concessions, permitting and regulatory oversight provided by Switzerland's 26 Cantons **Surface and production Subsurface activities Exploration & Construction and Prospection Subsurface** operation **Development** Characterize the subsurface - Confirmation of a Goals Generate revenue streams Define well locations and productive geothermal paths reservoir Production and injection wells Construct surface facilities Activities Data acquisition Well and reservoir stimulation Operation Analysis and interpretation Testing and logging Monitoring - Innovation Sampling and analysis Managing and optimizing Innovative elements Proven geothermal reservoir and its productivity Safe and economically Subsurface constructions to develop a reservoir viable production from Ready for surface installations (power plant, heat plant, etc.) assets

The development of a future competitive technology requires public support



## 2. LEGAL AND REGULATORY BOUNDARY CONDITIONS IN SWITZERLAND

Long is the legal road...

#### 2011

11 March - Trigger: Fukushima plus convergent trends (cost reduction renewables, climate change, political instability in Middle East and North Africa...)

**25 May -** Federal Government and Parliament decide on a gradual phase-out of nuclear energy

**June**: Government with approval of Parliament develops a new energy strategy Mo. 11.3562 SR Gutzwiller: Deep Geothermal Energy. Masterplan: «more risk coverage; more international research and innovation; more seed funding; simplified and accelerated permitting;

clear regulatory framework; political support for

geothermal»

Mo. 11.3563 SR Gutzwiller: Deep Geothermal
Energy. Exploring Switzerland: «organize and

finance geothermal exploration in Switzerland»

Mo. 11.4027 NR Riklin: Action Plan Geothermal Energy: «explore Switzerland by running seismic campaigns and drilling wells; develop regulatory guidelines including for managing induced seismicity risks»

**Po. 13.3103 NR Trede**: Hydraulic Stimulation in Switzerland: «ban Fracking and get neighboring countries to do the same»

**2013** 

September: Federal Government sends bills to Parliament. Features: exit nuclear when no longer technically safe, up efficiency & savings, decrease fossils, increase renewables

In parallel, a people's initiative (100'000 signatures) called for the shut-down of nuclear after 45 years of operation - 45 years means that 3 of 5 plants to be shut in by the end of 2017!



### 2. LEGAL AND REGULATORY BOUNDARY CONDITIONS IN SWITZERLAND

### Long is the legal road...

### 2016

30 September: both chambers approve the Energy Act (optional referendum if 50'000 signatures are collected within 3 months against the Act)

Nationalist conservatives successfully launched collection of 68'000 signatures

But, Swiss voters rejected «accelerated» phase-out vs. «orderly» phase-out on 27 November with a solid majority of 54%.

### 2017

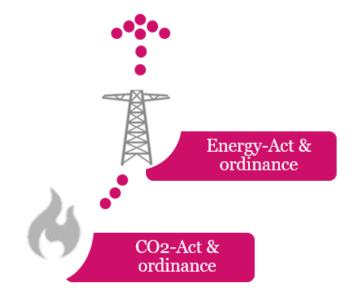
1 February: Federal Administration launches the consultation process of ordinances (implementation rules of policy support measures)

21 May: Swiss population has voted and approved with a 58% majority the revised Energy Act.

### 2018

1 January - Energy Act and various ordinances enter into force.

### Geothermal energy





### 3. FUNDING OF THE SWISS RISK TRANSFER SCHEMES

#### RMS FOR GEOTHERMAL POWER PROJECTS

*Energy Act – enforced since 1.1.2018* 

#### High voltage transmission grid surcharge



# Geothermal guarantee scheme

Increased coverage to <u>60%</u> of total sunk subsurface development cost

Paid only if the subsurface does not live up to expectations

#### **Exploration subsidies**

Max. 60% of eligible costs

#### **Surface exploration**

All pre-spud exploration activities

#### **Exploration drilling**

First well to confirm the presence of a geothermal reservoir

#### **Feed-in tariffs**

For 15 years for project with first power at the latest in 2023

#### In 2016:

~ 50-55 TWh transmitted through the grid

~ 1 bln CHF / year for all renewables support measures

# Geothermal guarantee and exploration subsidies

Max. de 0.1 ct./kWh

~ **50 mio CHF / year**Until 1.1.2031

#### **Feed-in tarriffs**

1.3 ct./kWh ~ 550 mio CHF / year (for all renewables) Until 1.1.2024



### 3. FUNDING OF THE SWISS RISK TRANSFER SCHEMES

#### RMS FOR DIRECT USE OF GEOTHERMAL ENERGY FOR HEAT PRODUCTION

Revised CO<sub>2</sub> Act – **Building Program** 



- The **Building Program** is aiming at reducing the CO<sub>2</sub> emissions of the building sector.
- A third of the CO<sub>2</sub> tax on heating (fossil) fuels, but a max. of 450 mio CHF per year, is to be used to finance supporting measures to reduce on the long term CO<sub>2</sub> emissions from the building sector.

#### **Exploration subsidies**

Max. 60% of eligible costs

# Surface exploration

All pre-spud exploration activities

# Subsurface development

All the subsurface investment required for first heat into a heat plant.

- A max. budget of 30 mio CHF per year is allocated to support geothermal direct use projects.
- Until 01.01.2025



### 4. PROCEDURAL ASPECTS: HOW ARE THE SWISS SUBSIDIES GRANTED?

Lean procedure described in the relevant ordinances

Request

**Evaluation** 

Contracting

**Execution and completion** 

Download and fill up the request form

Send it back with all relevant documents to SFOE

**Expert committee** 

- max. 6 experts
- 1 representative of Swiss Geological Survey
- 1 representative of canton

- Milestones
- Payment plan
- Information duties
- Access to data

**Execution** 

- Follow-up and reporting
- Contract cancellation in case of deviation from project milestones and terms and conditions of the contract

#### **Recommendations to SFOE**

- Technical aspects
- Project milestones
- Subsidy amount
- Follow-up person

**SFOE** decision

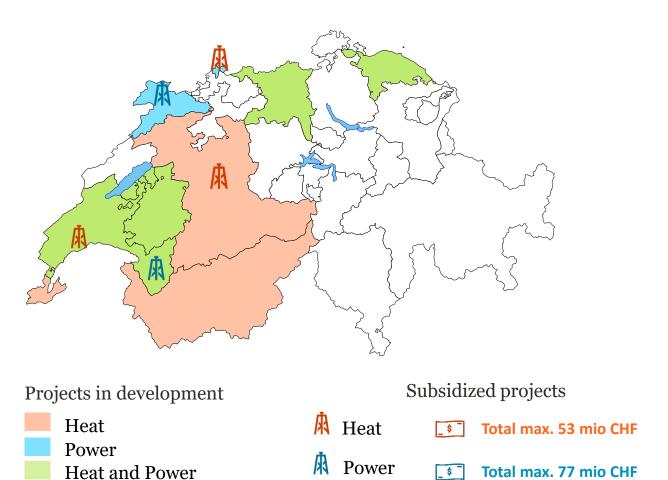
#### Completion

- Reevaluation by expert committee
- •Transfer of geodata to the Swiss Geological Survey and the canton



### 5. HOW ARE THE SWISS RMS PERFORMING?

Geothermal energy lives a "boom", in particular in the heat sector.



#### **Drivers:**

- 1. Investment subsidies
- 2. Legal and regulatory framework
- 3. Regional studies that describe geothermal potential in a meaningful manner
- 4. Studies related to demand (heat, power, energy/heat storage)



### THE GEOTHERMAL DECADE

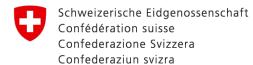


Ongoing revisions of Energy-Act & CO2-Act

Constant QC & QA of evaluation procedures of subsidy request

Better communicating about geothermal energy





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