



Eurosafe – Cologne, 4 & 5 November 2013

An implementer's view on site selection – recent technical and societal experience in Switzerland

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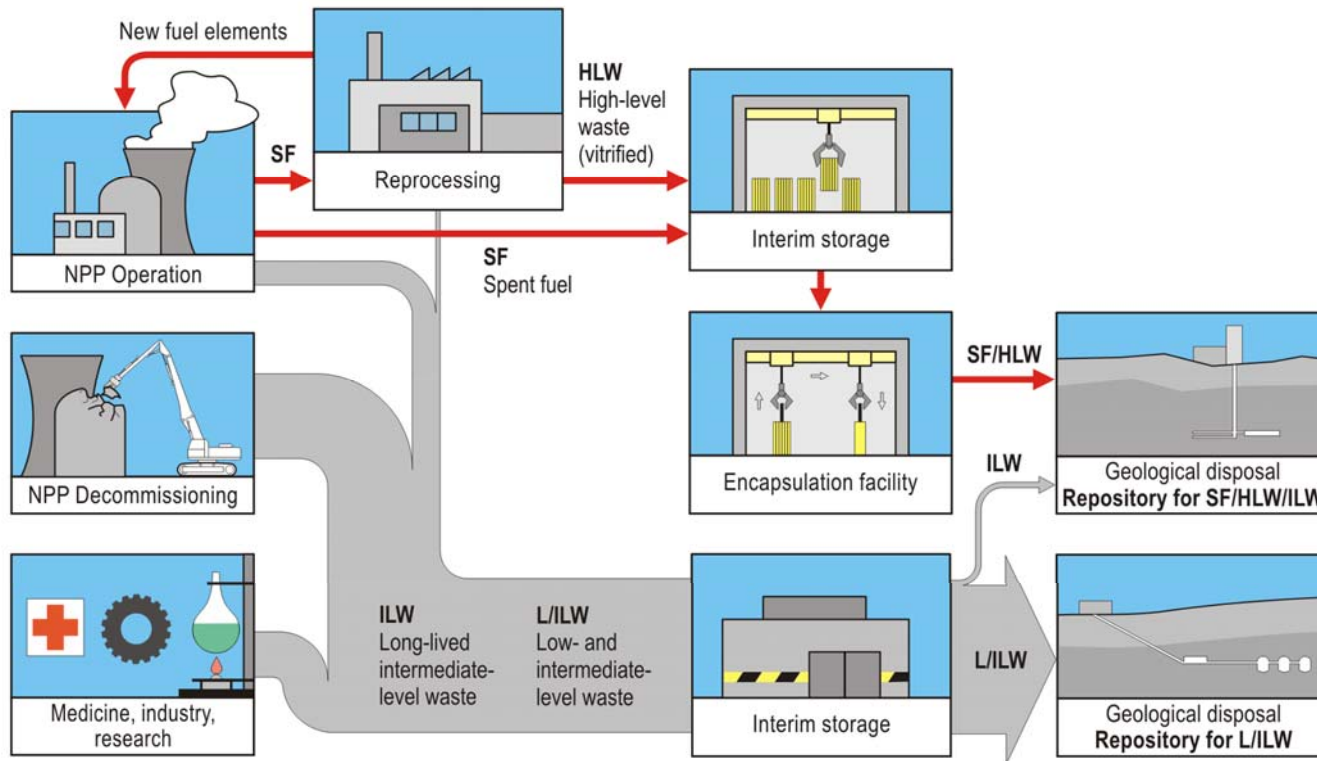
- Brief information on the Swiss siting programme
- Some personal observations

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Swiss waste management concept



- Spent Fuel (SF), vitrified high level waste (HLW) → HLW repository
- Long-lived intermediate waste (ILW) → HLW repository (co-disposal)
- Low and intermediate waste (L/ILW) → L/ILW repository

Swiss programme: Stepwise approach

- Demonstration of **disposal feasibility** (L/ILW: 1988, SF/HLW: 2006)
- **Site selection** ('Sectoral Plan')
 - Stage 1: selection of **geological siting regions**
 - Stage 2: selection of **sites for surface facility** within siting regions, **narrowing down of siting regions** to at least 2 for each repository type
 - Stage 3: **selection of a site** for each repository type & preparation of **general licence application**
- **General licence** (~ 2020)
- **Construction licence** (in situ URL: > 2020; L/ILW: > 2025; HLW: > 2035)
- **Operation licence**
- **Licence for closure**

Swiss programme: Stepwise approach to site selection

- Demonstration of disposal feasibility (L/ILW: 1988, SF/HLW: 2006)



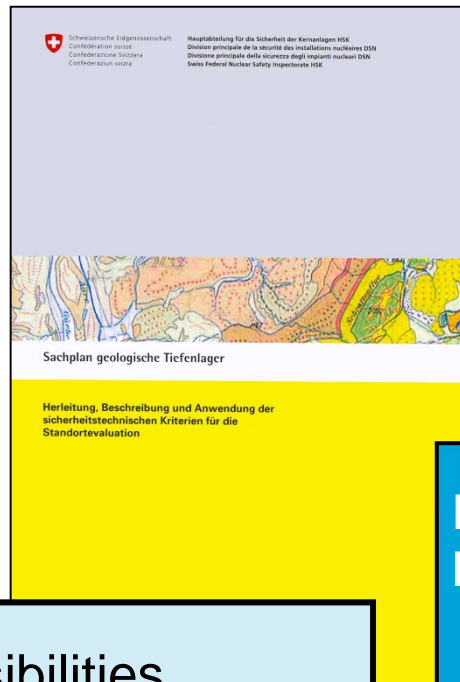
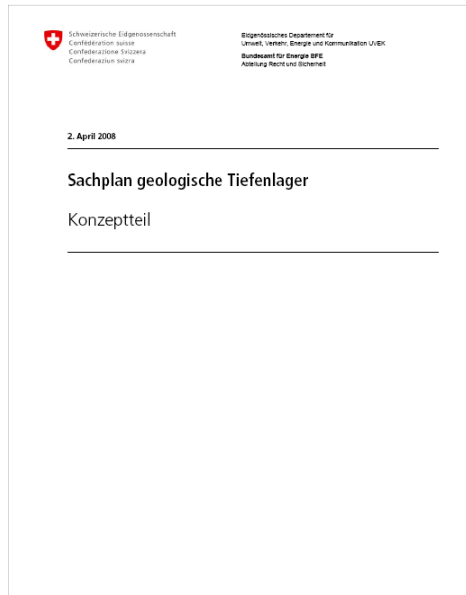
Site selection ('Sectoral Plan')

- Stage 1: selection of geological siting regions
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- **General licence**
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Final decisions concerning siting are taken at highest level (Federal Council, for General licence: additionally parliament, optional national referendum)

The 'Sectoral Plan' (the rules for site selection)¹

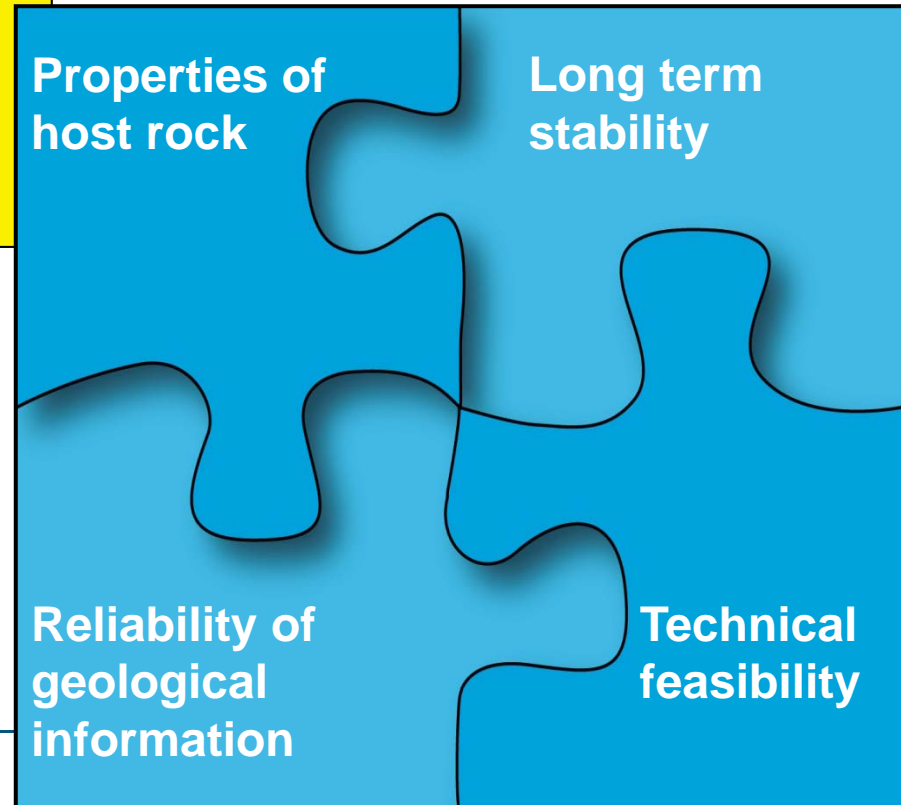


... with strong societal involvement

- Process & responsibilities
- Criteria (safety, environmental impact, socio-economic issues)

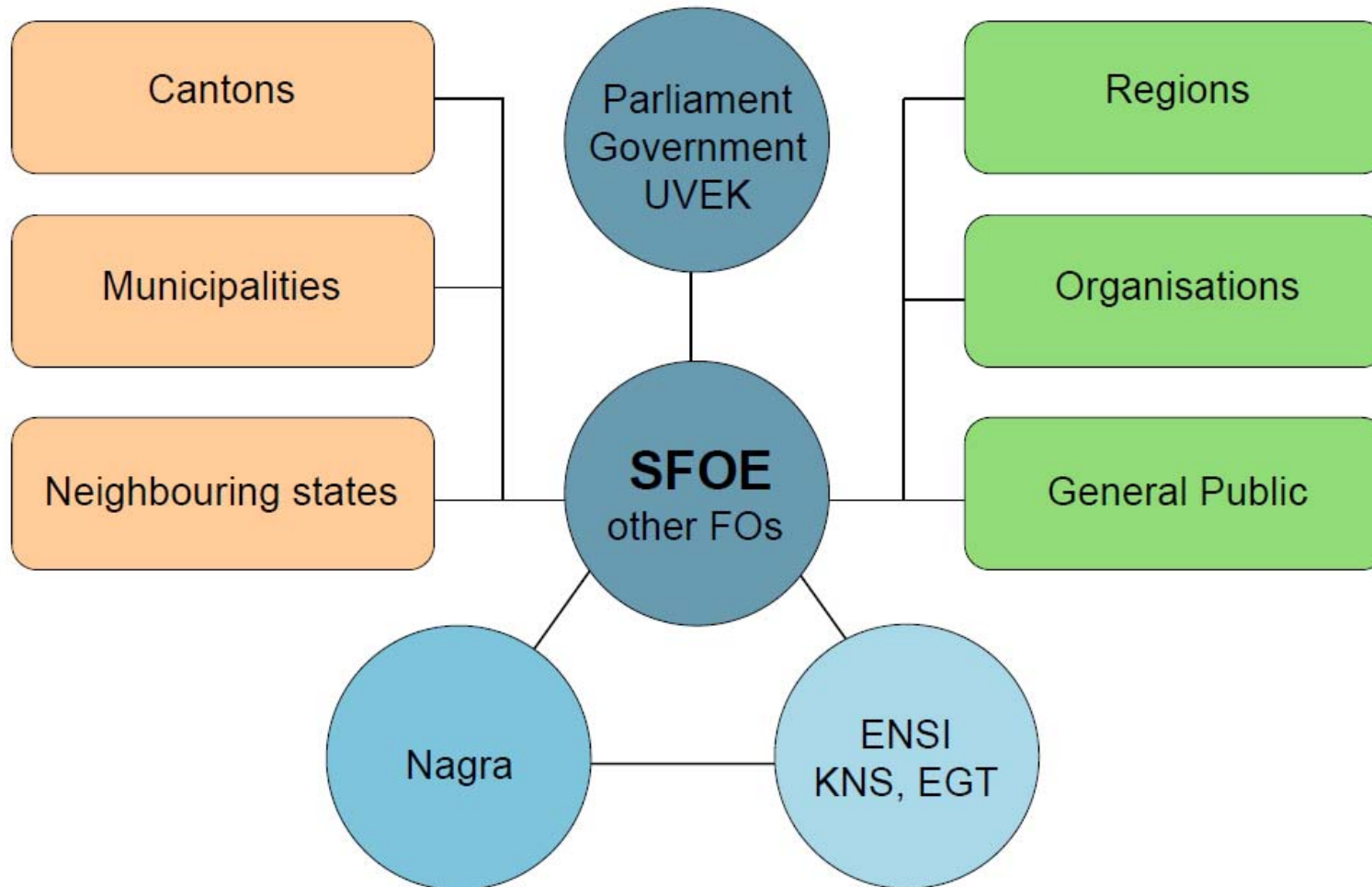
**Safety: 13 technical criteria
(4 interrelated groups)**

¹ available in English



Actors in the site selection process

Roles and responsibilities as well as information flow are clearly defined



Swiss programme: Stepwise approach to site selection

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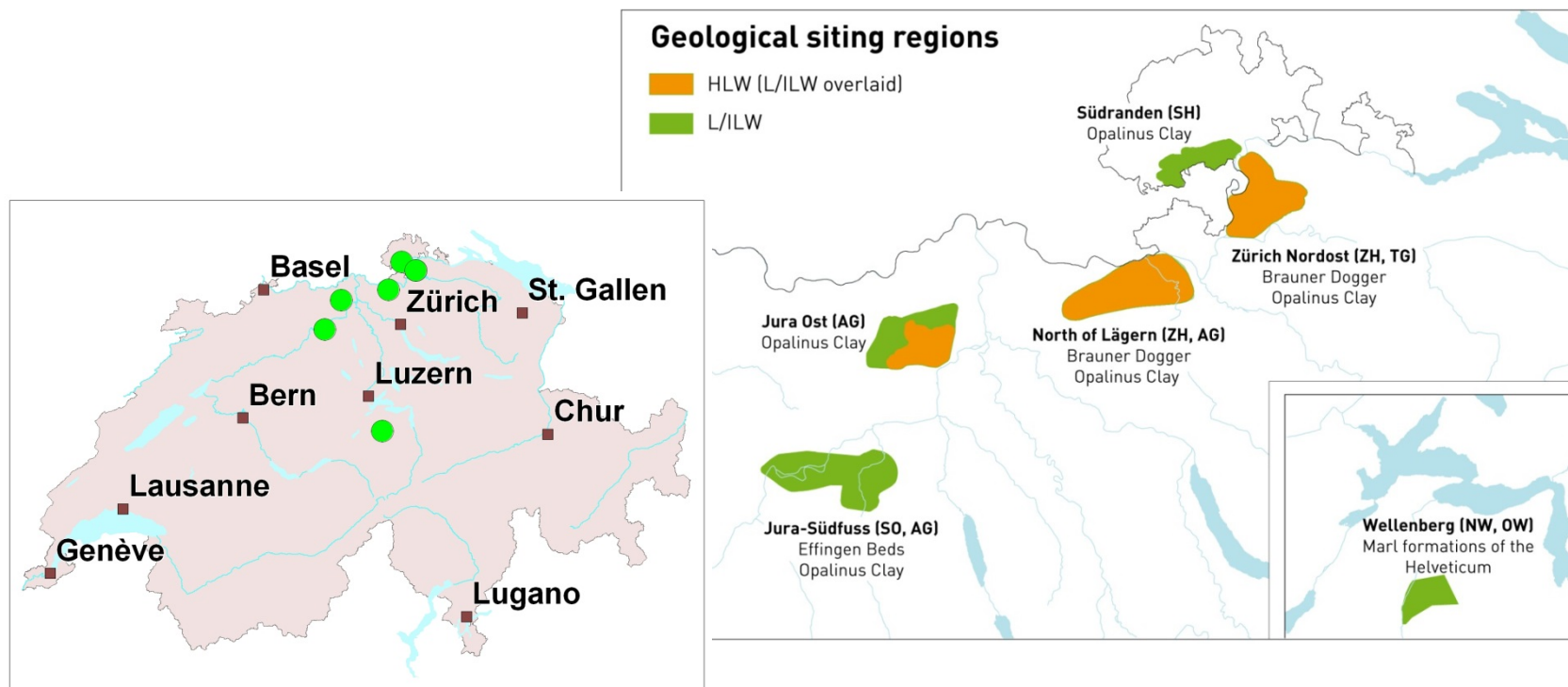
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Development of Nagra's proposal for siting regions ...



- ... starting with the **whole of Switzerland**
- ... and then – in a **systematic step-wise manner** – narrowing down to 3 & 6 geological siting regions for the HLW- & L/ILW-repository
- ... to ensure **full transparency** in the development of the proposals (*'why here and not there'*), see illustrations in next overheads

At a large scale: what is acceptable?

Long-term stability

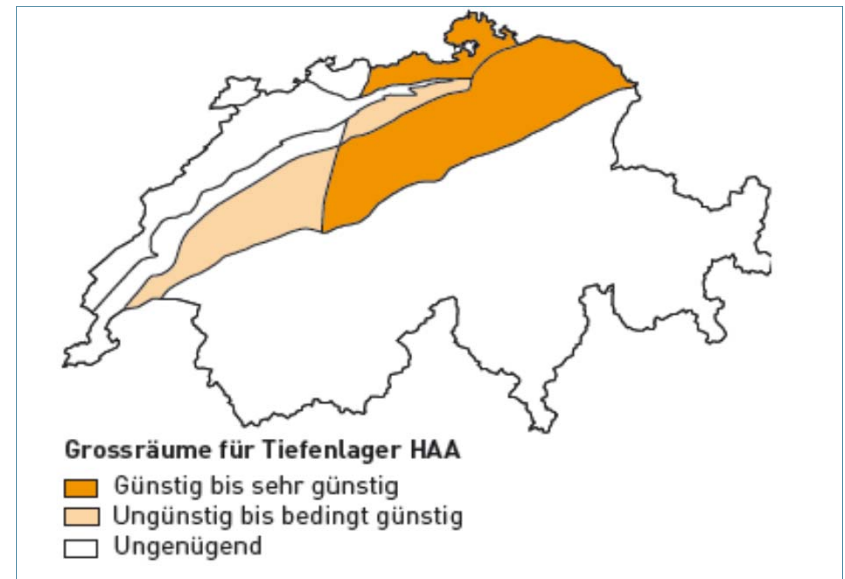
Spatial conditions (space, complexity) & explorability

L/ILW repository (100'000 a)

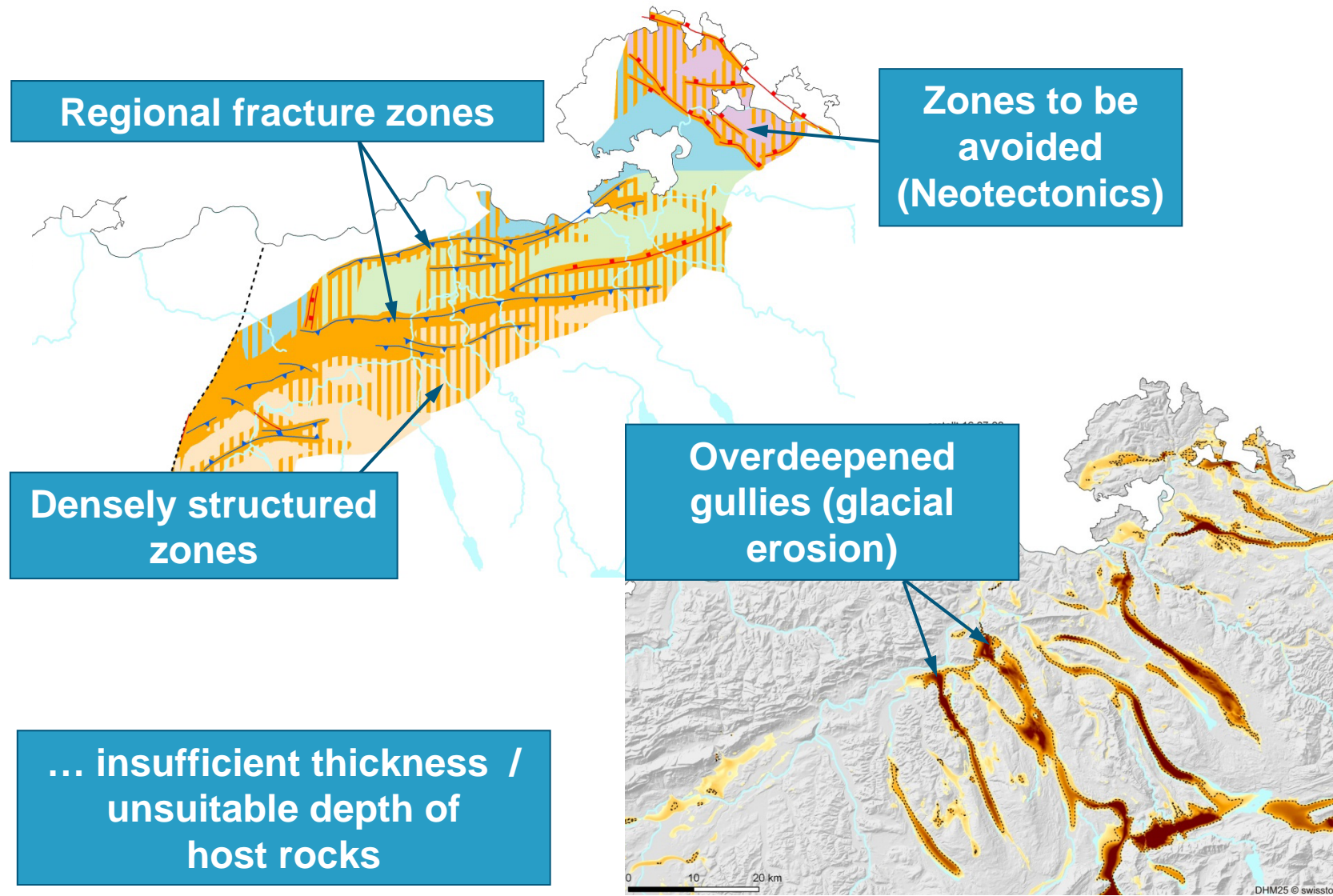
- All of Switzerland possible
- But: geometric complexity of Alps & Folded Jura acknowledged

HLW repository (1 Million a)

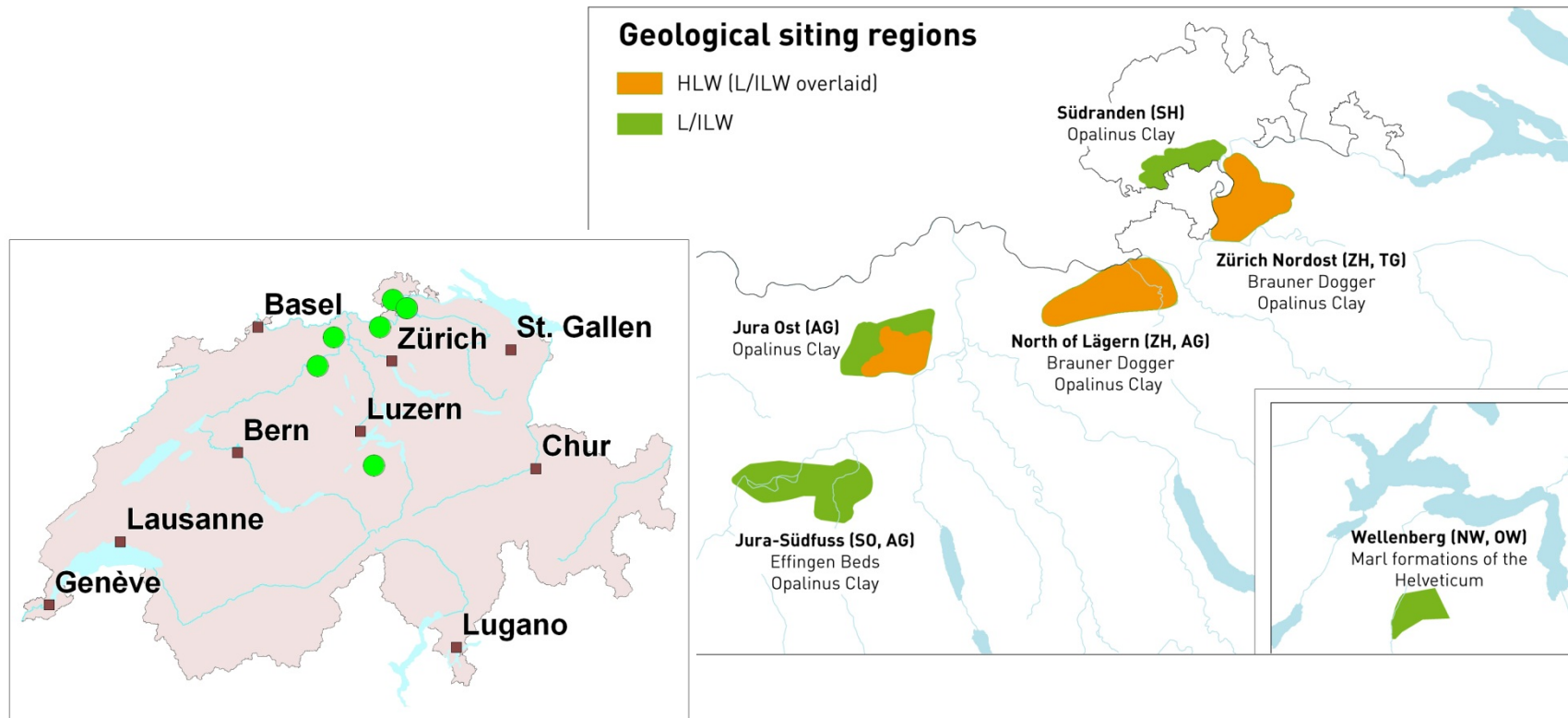
- Mittelland & eastern Tabular Jura possible
- Alps & Folded Jura excluded (long-term stability, spatial conditions)



Siting regions: locally, what needs to be avoided? (HLW)



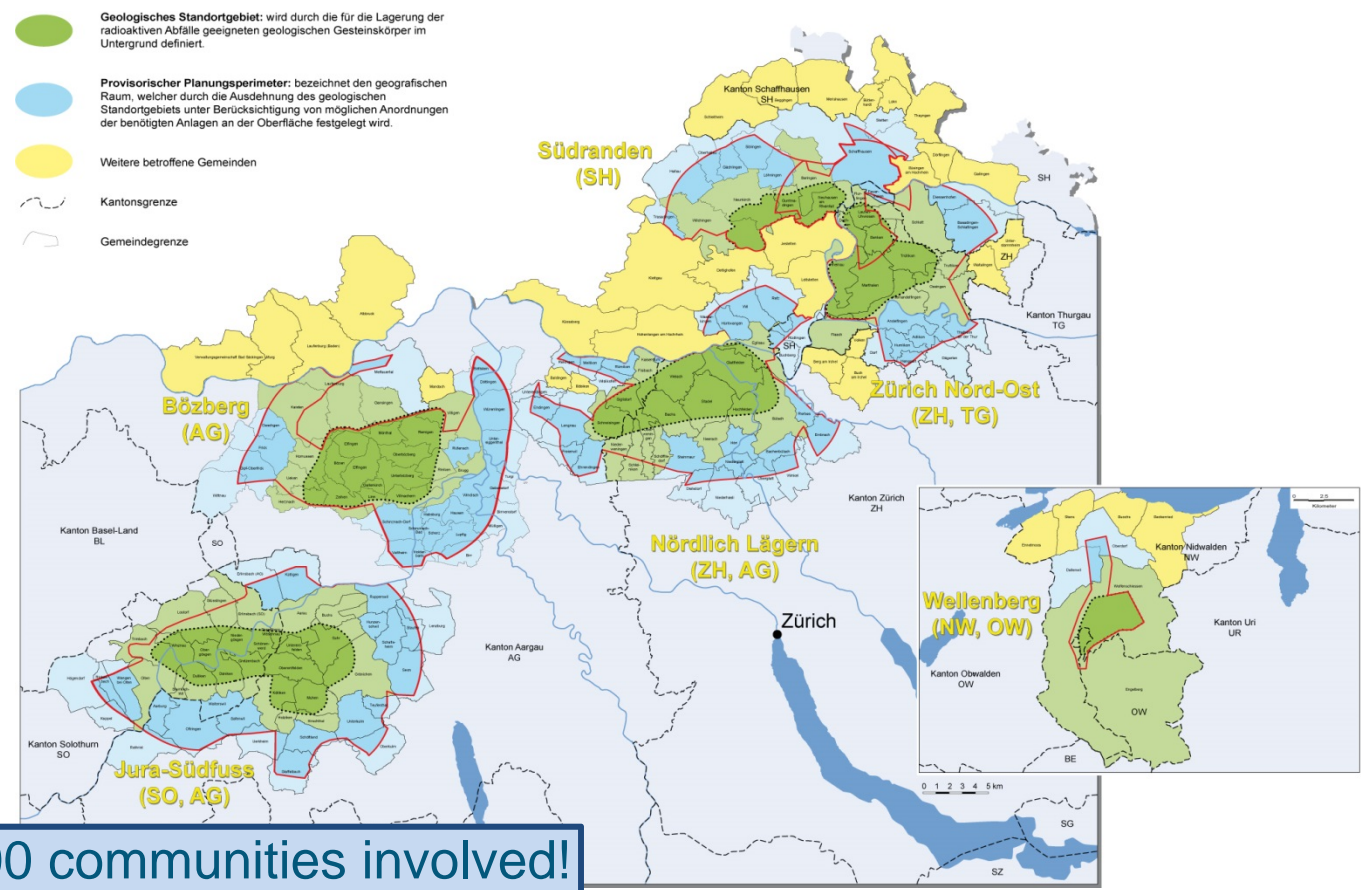
Endpoint of stage 1: Nagra's proposal for siting regions ...



- ... **accepted by Federal Council** (Nov 30, 2011), based on thorough review by safety authorities and broad consultation
- ... are **basis for selecting the sites** for general licence application (stage 2 and stage 3 of Sectoral Plan)


Endpoint of stage 1: ... and participation formally organised

Communities formally involved in stage 2 (through regional conference & working groups (surface facilities, safety, socio-economic & ecologic issues))
(P.S.: changes possible for stage 3)



more than 200 communities involved!

Swiss programme: Stepwise approach to site selection

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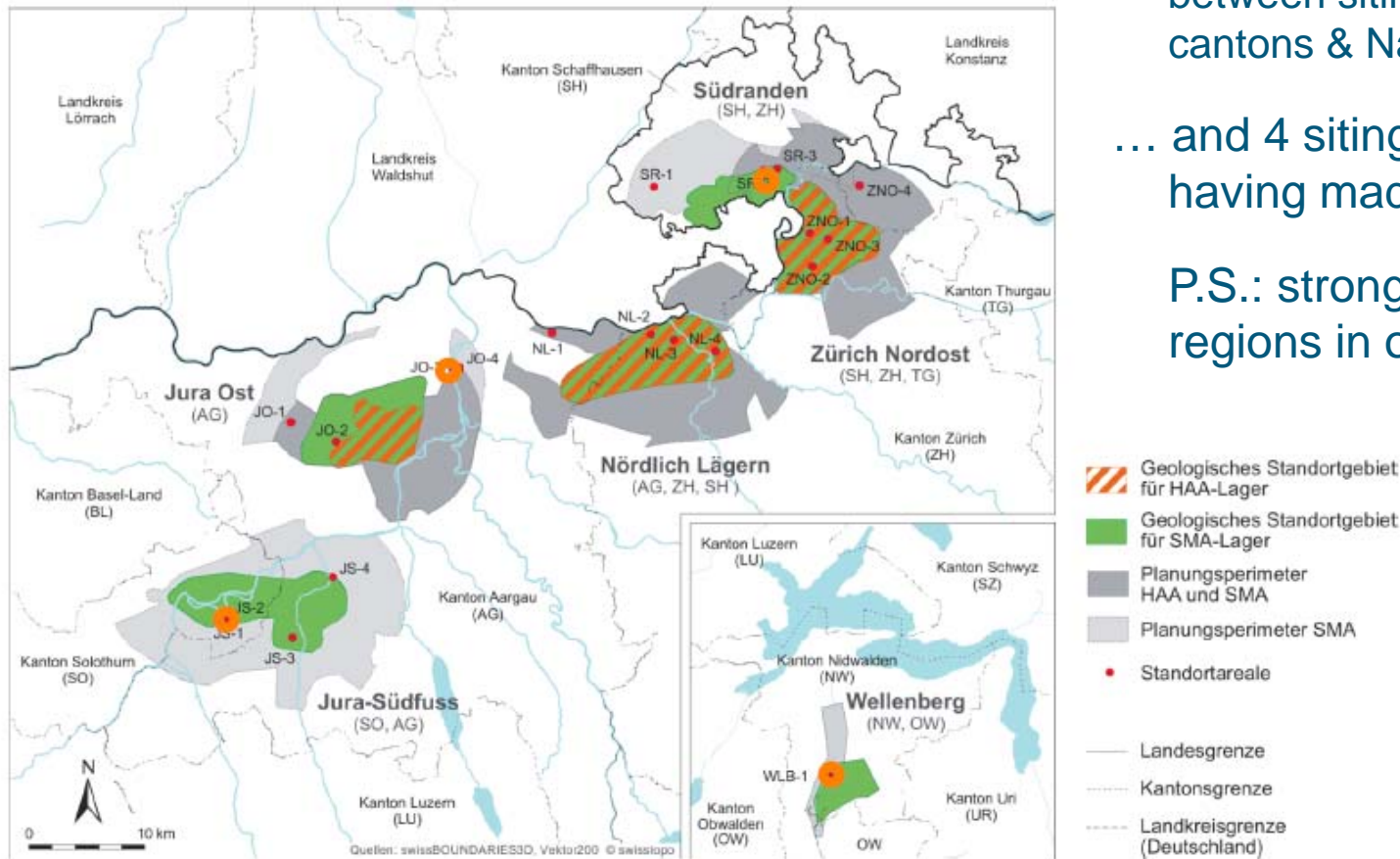
Surface facilities: Proposed sites (within siting regions)

20 sites for surface infrastructure in 6 siting regions (January 2012; NTB 11-01)

... with 13 additional proposals (developed in co-operation between siting regions, siting cantons & Nagra)

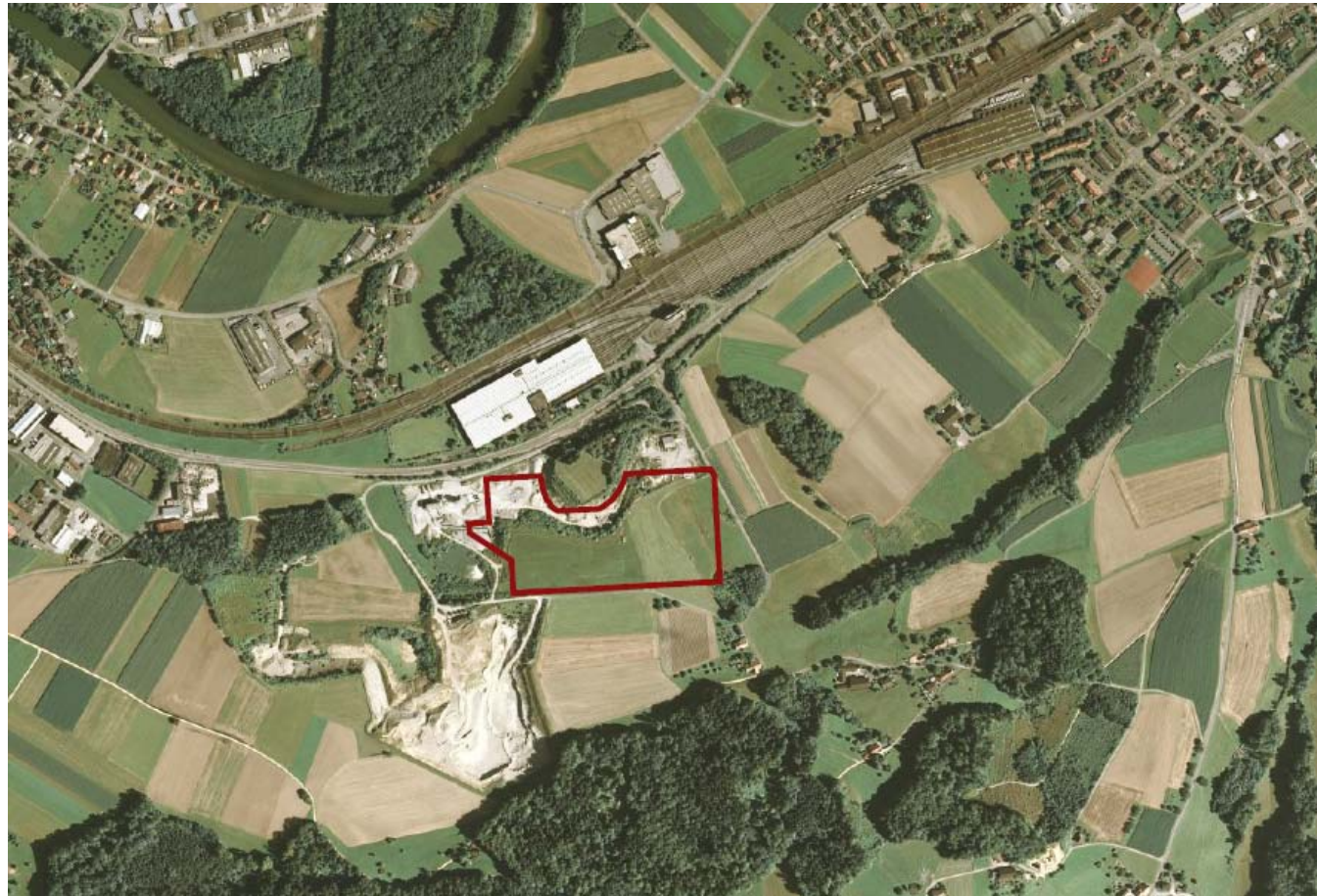
... and 4 siting regions having made their choice

P.S.: strong interest of regions in operational phase



In Switzerland, there is always somebody close by ...

... and this leads to strong public involvement through a participatory process (normally in a critical, but constructive manner)



(NTB 11-01)

Siting of surface facilities: important factors / criteria

■ Safety & technical feasibility

- Access from existing rail / road network (distance, conflicts, ...)
- Situation at site (size, topography, geotechnical conditions, ..)
- Access to underground (groundwater, geotechnical conditions, ...)
- Safety → «external events» (flooding/erosion, landslides, dams (breaching), military facilities, gas pipelines, ...)

■ Compatibility with **land use planning & environmental impact legislation**

- Residential areas, nature conservation, landscape protection, forests, valuable farm land, wild life, ...
- Water protection (surface waters, groundwater (different levels of protection))

■ Integration into region

- Current land use (used/unused industry, gravel pits, ...)
- Relation / distance to towns, villages, ...; relation to recreational areas, parks, ...
- Visibility, compatibility with landscape (skyline, ...)

(NAB 12-07)

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■ Compatibility with **land use planning & environmental impact legislation**

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Different weighting of criteria leads to different sites
(together with different stakeholders: regions, cantons)

■ Integration into region

- Current land use (used/unused industry, gravel pits, ...)
- Relation / distance to towns, villages, ...; relation to recreational areas, parks, ...
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(NAB 12-07)

Regional conference at work

Discussions



Visit at potential surface site

Interaction also at the national level: TIME RIDE¹⁾

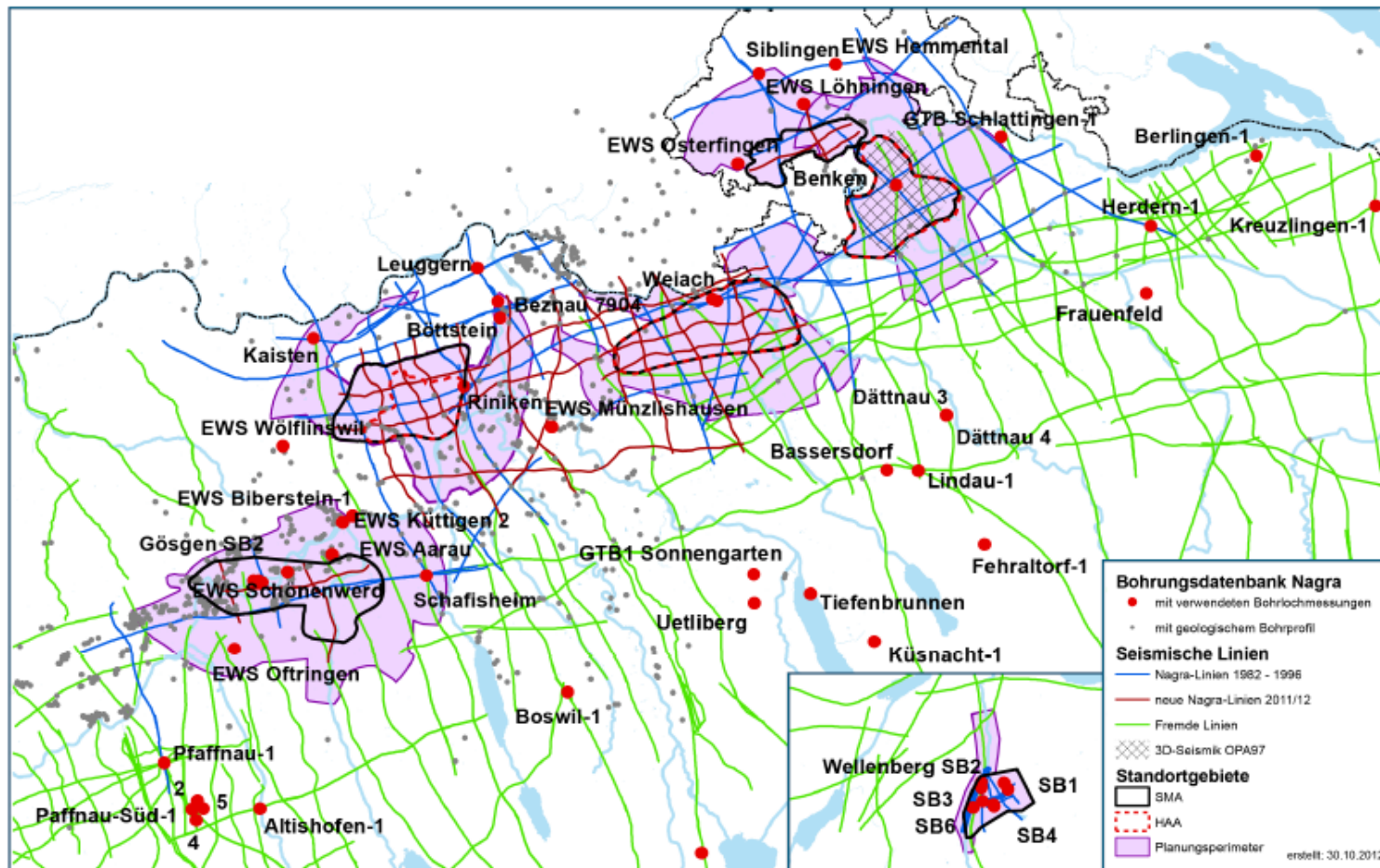


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Stage 2: narrowing down of geological siting regions

- Formal assessment of **relevance of uncertainties** for narrowing down number of siting regions (*are available data in siting regions sufficient?*)
- Focussed collection of **additional data**
- Safety-based comparison** (*clear disadvantages?*) of siting regions underway



Swiss programme: Stepwise approach to site selection

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Stage 3: **selection of a site** for each repository type & preparation of **general licence application**

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Some personal observations (the story is not yet finished ...)

- **Success** requires ...
 - technically & scientifically sound projects (with well chosen sites)
 - adequate acceptance by (local) society
 - support by politics (the need for disposal & to make a step forward now)
- This is can be achieved in a **stepwise process** ...
 - ... with clearly defined **criteria** to develop & refine the **project proposals** in a transparent manner (based on the principle 'first priority to safety')
 - ... with clearly defined **rules in decision-making** (roles & responsibilities of the different stakeholders, ensuring strong involvement of society)
 - ... with **decisions** taken **at the highest level** (Federal Council) based on ...
 - a **thorough technical review** by a competent regulator (& other technical groups)
 - a **broad consultation** involving all stakeholders
- This should allow (local) **society to become an informed partner** ...
 - ... by getting the necessary **information** in an understandable format
 - ... by developing an **understanding of 'why here and not there'**
 - ... and through **involvement in developing (parts) of project** (transition from 'siting' to 'hosting')

The societal process ...

... is often like a meandering river: not always the direct path, it may take more time



The societal process ...

- ... is often like a meandering river: not always the direct path, it may take more time
- ... but as long as it stays within certain bounds (the basic rules are observed), this is acceptable



Success factors (but: the story is not yet finished ...)

- National commitment to progress with disposal of radioactive waste
- Clarity in stepwise process (defined before start of site selection)
 - phases & milestones with adequate objectives (stepwise refinement of options and narrowing down of options)
 - suitable criteria to develop & independently evaluate the options
 - roles & responsibilities to reach sustainable decisions at the highest level (taking the views of the different stakeholder into account)
- Correct & professional behaviour of all stakeholders ensured through a capable & strong process owner (government agency)
- Projects of high technical quality, considering the needs (→ benefits) of local society (developed by competent implementer & reviewed by credible and independent regulator)
- Information & communication understandable for the respective stakeholders to become familiar with the issues

Summary and conclusions

- In Switzerland a **suitable framework** is **available** for implementation of disposal facilities (law, **sectoral plan**, other documents)
- **Stage 1** of sectoral plan (geological siting regions for HLW- & L/ILW-repository identified; participation defined) **successfully completed**
- **Stage 2** of sectoral plan underway; **participatory process** to identify **sites for surface facilities** requires hard work by all stakeholders involved, but seems to be successful (not yet finalised everywhere)

Narrowing down of number of geological siting regions underway, based on **safety-oriented comparison** of different regions

- Key factors
 - Clearly **defined** stepwise **process & criteria** defined before start of site selection
 - All **stakeholders** prepared to **engage** and **work together** (and to accept basic rules defined beforehand)
 - Importance of **strong process owner** to keep project on track



thank you
for your attention
nagra.