

Press Release

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Swissgrid is concentrating on a few important lines

Swiss grid operator presents the «Strategic Grid 2025»

Swiss transmission grid operator Swissgrid presents the «Strategic Grid 2025» report. It demonstrates which grid development projects Swissgrid considers necessary over the next ten years in order to ensure security of supply and to prepare the grid for the future of energy. In general, fewer lines must be converted, expanded or built than originally planned in earlier grid planning. The investments required over the next ten years will total around CHF 2.5 billion. This is significantly less than previously estimated. Of this, CHF 1 billion is to be used for the replacement and maintenance of existing infrastructures.

At the moment, grid expansion projects in Switzerland are based on the «Strategic Grid 2015». This plan was established in 2009 by the Federal Council and remains valid. Technical, commercial, economic and political influencing factors have, however, changed significantly since then. With «Strategic Grid 2025», Swissgrid is now proposing a grid plan that takes these new framework conditions into account. Swissgrid's recommendation for the creation of the future extra-high-voltage grid was developed through a systematic and transparent analysis and assessment process. The report clearly shows which grid construction projects are necessary over the next 10 years for the development plotted out by specialists to ensure a safe and efficient supply of electricity for Switzerland.

New methodology

Swissgrid applied a new methodology to grid planning. For the first time, the grid projects are being planned from a point of view encompassing Switzerland as a whole and being assessed both quantitatively and qualitatively.

«Strategic Grid 2025» is based on various scenarios. For 2025, these include the two core «On Track» and «Slow Progress» scenarios. The «On Track» scenario is based on the energy strategy

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planned by the Federal Government with the development of renewable energies and the abandonment of nuclear energy as well as ENTSO-E's Ten Year Network Development Plan (TYNDP). The second scenario, «Slow Progress», assumes slower growth of renewable energies and a partial abandonment of nuclear energy and is generally based on the «continue doing as we have been» scenario for the energy outlook for 2050.

Both scenarios were calculated for 2025 as well as for the «back-up year» of 2035 in order to be able to confirm the robustness of the grid configuration. The marginal «Stagnancy» and «Sun» scenarios, the first assuming a long-term stagnant economic situation in Europe and the second developed together with the Umweltallianz, were also brought in for 2035. The latter of these scenarios foresees greater expansion of renewable sources of energy by 2035, primarily photovoltaic. The results for 2035 corroborate those for 2025. However, the «Sun» scenario for 2035 will require additional expansions.

Markets and the physical behaviour of the grids were simulated on the basis of these scenarios. This simulation included elements such as power plant usage, energy exchange, gas and coal prices in Europe and the prices for CO2 emissions. This resulted in a so-called project benefit for each project. The simulation tools used are also used by other transmission grid operators.

Optimise, amplify, expand

The necessary line projects are evaluated according to the so-called NOVA principle, in which grids are first optimised and then amplified. They are only extended when these possibilities are exhausted. Optimisation means converting the voltage from 220kV to 380kV on circuits already optimised for this voltage. A typical example for such an optimisation is the line over the Gemini Pass, which was insulated for 380kV in the 1960s but has since only operated at 220kV because the necessary 380kV feeds were never built. Amplification refers to the increase in voltage from

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220kV to 380kV on existing lines without leaving the route. Only expansion requires new lines on new routes.

Assessment using comprehensive criteria

A so-called multi-criteria cost-benefit analysis was carried out based on the results of the simulation. It assesses the benefit of each individual line project according to technical, economic and ecological criteria. Swissgrid doesn't just use quantitative criteria (i.e. investment costs) to assess grid construction projects, but also qualitative criteria (i.e. environmental impact), thereby achieving a comprehensive assessment of each individual project. Swissgrid is entering new ground with this project assessment, as is the first grid operator in Europe to use this methodology, which is recommended by the association of transmission grid operators ENTSO-E, to consistently calculate the net benefits.

The result: 13 projects planned and 8 discarded

The current transmission grid must be amplified by 2025 in order to deal with existing and future structural bottlenecks and to ensure long-term security of supply. The simulations, calculations and assessments have resulted in a total of 13 grid expansion and modernisation projects for «Strategic Grid 2025». Nine of these are projects that are necessary and economically-sensible for Switzerland's security of supply. These do away with the current bottlenecks, enable the exchange of energy between Switzerland and adjoining countries that will be necessary in the future and ensure the transmission of electricity generated by the hydro power plants currently in place, under construction or being planned in the Alps. These nine technically and economically-required projects are complemented by four legally justified ones. Swissgrid has a legal obligation for the construction of these projects, which include, above all, distribution grid connections in 2025..

Eight of the originally planned «Strategic Grid 2015» projects have not been confirmed by Swissgrid and will be removed from the procedures, some of which have already been started. .

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These projects are no longer required due to changes in the generation and grid structure in Europe and Switzerland.

In addition to the projects that primarily affect Switzerland, there are three projects of common interest between Switzerland and its European partners. The projects are not necessary in relation to Swiss security of supply by 2025. However, these projects could not just be assessed from a Swiss point of view since European interests also apply. Swissgrid will therefore discuss and evaluate these projects further in a European context. If there is a benefit to Europe overall and there is a sensible solution for Switzerland - including a settlement of the costs - the projects will continue to be included in grid planning.

Investments in the transmission grid are important

The current proposal takes ecological, land use planning and financial aspects into consideration to a significant degree. However, this optimised grid is essential in order to ensure security of supply, and it must be built on time. Swissgrid does not build any grid as a reserve. To Swissgrid's knowledge, «Strategic Grid 2025» will presumably have around as many kilometres of lines as the current grid and fewer than planned in «Strategic Grid 2015». The modernisation of the transmission grid is and remains a key factor for a sustainable energy future in Switzerland and Europe. The investments in the «Strategic Grid 2015» total around 2.5 billion francs, of which around CHF 1 billion will be needed for replacement and maintenance and CHF 1.5 billion for expansion.

The report refers to the high voltage grid, whereby the grid level directly beneath this was likewise incorporated into the considerations. Swissgrid will in the near future be seeking dialogue with the distribution system operators in order to evaluate the impact on their grid levels.

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Box 1

What will be built

What will be built are nine line projects considered operationally necessary in Swissgrid's forecasts. Other than two new projects - the «Mettlen - Innertkirchen» and «Magadino» sections - all of them are already included in the core programmes, specifically the lines between Chamoson and Chippis in Goms, between Pradella and la Punt in Engadin and those between Metteln and Beznau in the Reuss valley.

A line always consists of two circuits, each of which consists of three conductors. The earthing cable at the tip of the pylon contains fibreglass cables used by Swissgrid and various telecommunications companies. A line kilometre therefore always means two circuit kilometres. In the context of «Strategic Grid 2025», a total of 192 line kilometres are to be optimised, 87 are to be amplified and 245 are to be expanded. To this are added 125 kilometres of expansion on the basis of the connection requests of distribution grid operators as so-called legal projects. «Strategic Grid 2015» still planned for 1000 kilometres of grid enhancement and 200 kilometres of expansion. Because lines are always combined in new construction projects where possible, the «Grid 2025» report also plans to do away with unused routes for transmission and distribution grids of an overall length of 385 kilometres. In comparison with «Strategic Grid 2015», «Strategic Grid 2025» foresees three additional sections totalling 62 kilometres: the Metteln - Innertkirchen section from the «Metteln - Ulrichen» project, the Magadino project and the route laying in Balzers. Because the line there would have lain within the target area for the artillery in the Fläscherberg Fortress, it was laid through the territory of Liechtenstein. Now the easement is running out and Swiss expropriation rights no longer apply in Liechtenstein. For this reason the line must be moved.

Operationally-required projects:

- 1 Chamoson - Chippis (Unterwallis, transmission of electricity from new power plants)
- 2 Chippis - Bickigen (line over the Gemini Pass, built for 380kV in the 1960s but only ever operated at 220kV, must be adapted to new regulations)

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- 3 Pradella – La Punt (Engadin, alleviation of congestion)
- 4 Chippis – Lavorgo (Gommer line, transmission of electricity from the power plants of the Valais, NEAT electricity supply)
- 5 Beznau – Mettlen (Reuss Valley line, alleviation of congestion)
- 6 Bassecourt – Mühleberg
- 7 Magadino (Ticino)
- 8 Génissiat FR – Foretaille (Canton of Geneva)
- 9 Mettlen – Ulrichen (Grimsel line, transmission of electricity from the Grimsel region and the Valais)

Distribution grid connections and legally required projects:

- J1: Method – Mühleberg (distribution grid connection)
- J2: Froloo – Flumenthal (distribution grid connection)
- J3: Obfelden - Samstagern (distribution grid connection)
- J4: Laying of Balzers line (the line went through Liechtenstein for military reasons and must be relaid due to the expiry of the easement in 2021).

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Box II

What is not being built

Eight of the projects from «Strategic Network 2015» should, in Swissgrid's opinion, not be pursued any further. The «Boucle Sud», the line south of Lake Neuchâtel that has been planned for decades, will for example no longer be built. Also no longer required are the expansion of the Wattenwil - Mühleberg line or the project from Lavorgo to Morbegno, Italy, which no longer makes sense in light of transmission technology.

These are the projects that Swissgrid will no longer pursue:

1. Lavorgo – Morbegno (connection to Italy, no longer sensible)
2. Wattenwil – Mühleberg (other measures have been taken to supply the Greater Bern area)
3. Ova Spin connection (the connection of the power plant directly next to the national park uses 110kV)
4. Auwiesen – Fällanden (the connection will remain at 150kV)
5. Obfelden – Thalwil – Grynau (no expansion because other measures have been taken)
6. Mettlen – Airolo (project depends on further development of the cross-border line via the St Giacomo Pass to Italy)
7. Riddes - Chamoson (the amplification of the existing 220kV line is no longer necessary)
8. «Boucle Sud» Method - Galmiz (the 380kV line south of Lake Neuchâtel is not necessary for the period up to 2025 according to current simulations)

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Box III

«Projects of Common Interest» with Europe

In addition to the projects that only affect Switzerland, there are three EU-defined projects of common interest, which affect Switzerland. The largest of these, previously being carried out by private companies under the name «Greenconnector», is the conversion of a section of the decommissioned «Oleodetto del Reno» oil pipeline which originally stretched from Genoa to Ingolstadt. A high-power direct current line is to be built within the old pipeline between Sils i. D. and Verderio, in Italy. The EU considers the line to be important for Europe's grid stability, although neither the legal nor the financial requirements for this have been clarified thus far. For Switzerland itself, the project is neither technically necessary nor economically sensible for the period until 2035.

Much like the «Greenconnector», the project over the St. Giacomo Pass is intended to provide greater transport capacity between Switzerland and Italy. The necessary infrastructure is almost entirely in place on the Swiss side. Current capacity is, however, sufficient at the moment.

The third project of common interest is the Lake Constance interconnector, intended to increase the cross-border capacity towards Germany and Austria. On the Swiss side, only the connection to the Rüthi substation, currently under construction, is planned at the 220kV level. A subsequent conversion to 380kV is, however, possible.

The projects of common interest are:

- EU1: «Greenconnector» (direct current line in a decommissioned oil pipeline between Sils i. D and Verderio IT)
- EU2: «St. Giacomo» (380kV overhead line between Airolo and Pallanzano IT)
- EU3: «Lake Constance interconnector» (increased capacity to Germany and Austria, initially limited to a connection to the new Rüthi substation)

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Map 1

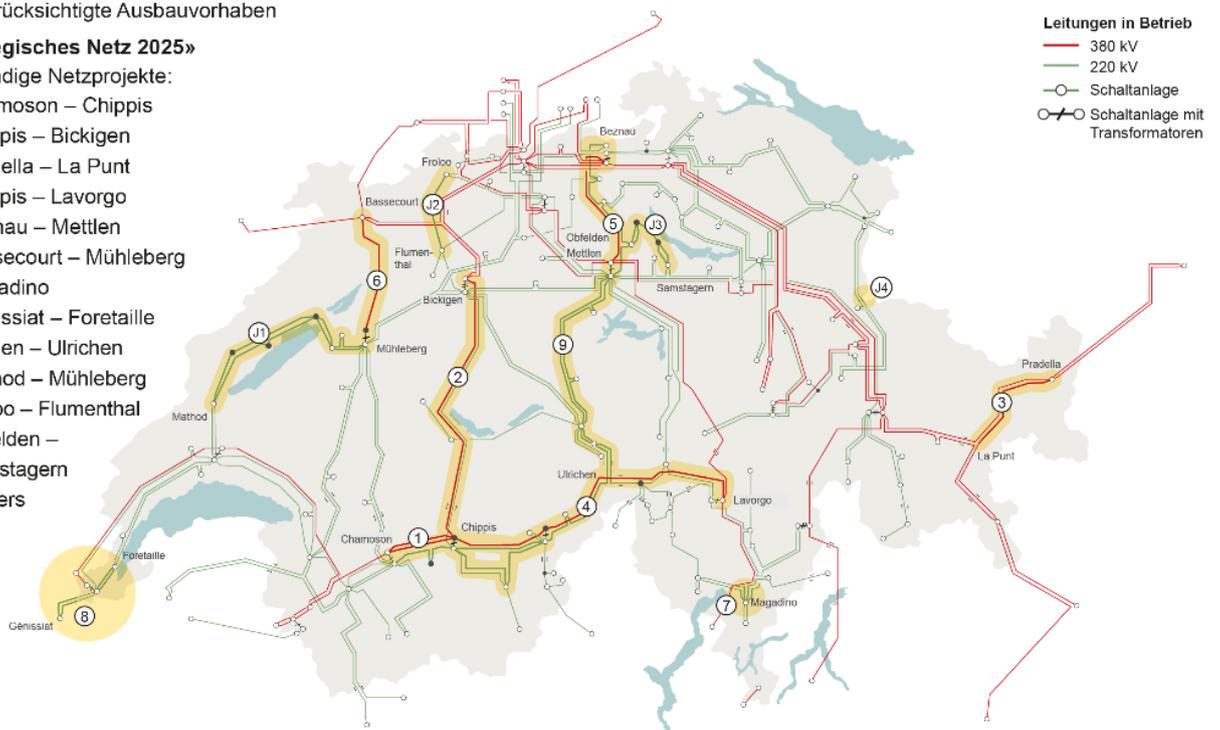
Strategic Grid 2025

berücksichtigte Ausbautvorhaben

«Strategisches Netz 2025»

Notwendige Netzprojekte:

- ① Chamoson – Chippis
- ② Chippis – Bickigen
- ③ Pradella – La Punt
- ④ Chippis – Lavorgo
- ⑤ Beznau – Mettlen
- ⑥ Bassecourt – Mühleberg
- ⑦ Magadino
- ⑧ Génissiat – Foretaille
- ⑨ Mettlen – Ulrichen
- ⑪ Method – Mühleberg
- ⑫ Froloo – Flumenthal
- ⑬ Obfelden – Samstagern
- ⑭ Balzers



Leitungen in Betrieb
— 380 kV
— 220 kV
○ Schaltanlage
○/○ Schaltanlage mit Transformatoren

Berücksichtigte Ausbautvorhaben	Expansion projects taken into consideration
Strategisches Netz 2025	Strategic Grid 2025
Notwendige Netzprojekte:	Necessary grid projects:
Leitungen in Betrieb	Lines in operation
380 kV	380 kV
220 kV	220 kV
Schaltanlage	Switching station
Schaltanlage mit Transformatoren	Switching station with transformer

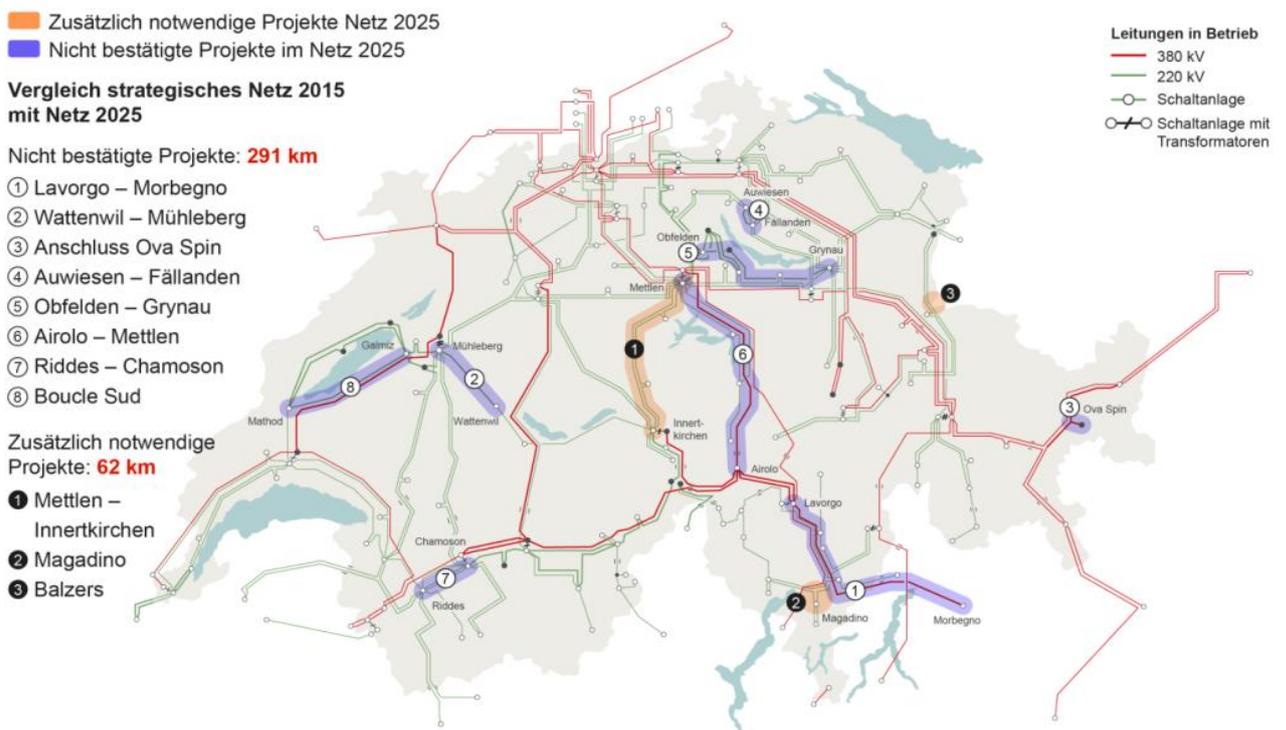
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Map II:

Strategic Grid 2025, what has been added and what has been discarded



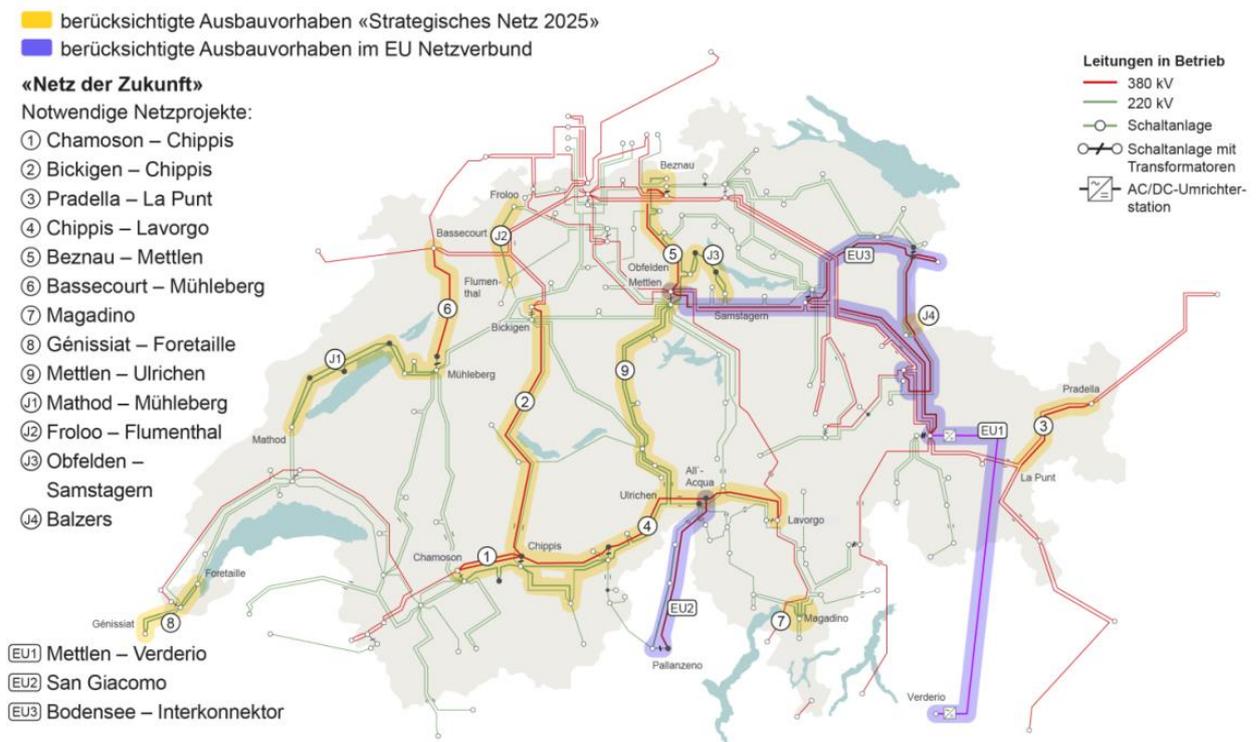
Zusätzlich notwendig Projekte Netz 2025	Additionally required projects for Grid 2025
Nicht bestätigte Projekte im Netz 2025	Unconfirmed projects for Grid 2025
Vergleich strategisches Netz 2015 mit Netz 2025	Comparison of Strategic Grid 2015 with Grid 2025
Nicht bestätigte Projekte: 291 km	Unconfirmed projects: 291 km
Anschluss Ova Spin	Ova Spin connection
Zusätzlich notwendige Projekte 62 km	Additionally required projects 62 km
Leitungen in Betrieb	Lines in operation
380 kV	380 kV
220 kV	220 kV
Schaltanlage	Switching station
Schaltanlage mit Transformatoren	Switching station with transformers

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Map III: Projects of common interest with the European Union



berücksichtigte Ausbauprojekte „Strategisches Netz 2025“	«Strategic Grid 2025» expansion projects taken into consideration
berücksichtigte Ausbauprojekte im EU Netzverbund	Expansion projects for the EU grid network taken into consideration
„Netz der Zukunft“	«Grid of the future»
Bodensee – Interkonnektor	Lake Constance interconnector
Leitungen in Betrieb 380 kV 220 kV Schaltanlage Schaltanlage mit Transformatoren AC/DC-Umrichterstation	Lines in operation 380 kV 220 kV Switching station Switching station with transformers AC/DC conversion stations

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Powering the future – Swissgrid is the National Grid Company. As the owner of the Swiss extra-high-voltage grid, it is responsible for operating the grid safely and without discrimination and for maintaining, modernising and expanding the extra-high-voltage grid efficiently and with respect for the environment. Swissgrid employs over 430 highly skilled persons from 22 countries at its sites in Frick, Laufenburg, Uznach, Landquart, Ostermundigen, Prilly and Castione. As a member of the European Network of Transmission System Operators for Electricity (ENTSO-E), it is also responsible for grid planning, system management and market formation in the cross-border exchange of electricity in Europe. Multiple Swiss electricity companies jointly hold the entire share capital of Swissgrid.