

The Contribution of Switzerland to European Stability and Sustainability of Electricity

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Bern, 13.1.23

I. Recent Efforts in Building Swiss Self-Reliance

In the wake of the war in Ukraine, soaring energy prices in Europe, and increasing demands for electricity in the process of decarbonisation for production, heating and transportation, the main-stream focus of the political debate in Switzerland has been on further enhancing self-reliance and independence in electricity. The emphasis is on increasing hydropower and solar energy while reducing the need for imports of electrical energy, mainly in winter time when the Swiss annually have depended upon [annual imports](#) in the magnitude of approximately 30 -35 GW/h per day in recent years. In the fall of 2022, the Federal Parliament adopted an amendment to the [Energy Bill](#), allowing for rapid deployment and public funding of alpine solar plants of high performance by 2025. They will fully perform also in winter times, in altitudes well above foggy midlands. There are currently five major projects in the pipeline: Gondo, Grengols, Vispताल, Tujetsch and Scuol (NZZ, 23.11.22 p. 9). Other may follow suit in other parts of the Swiss Alps. Parliament also adopted in the same amendment substantial increases of barrage volumes and thus water battery reserves, in particular at Grimsel and the new project of the new Trift dam in the valley of Gadmen which will be linked to the Grimsel pump and storage system. The government introduced urgent measures and legislation to provide [safety measures](#) addressing potential financial illiquidity of large energy companies for up to 10 Billion SF in order to secure supplies. It introduced funding mechanism supporting [minimal water reserves](#) for up to 1000 GWatt/h to be auctioned to production companies and paid for by consumers, all in anticipation of winter shortages. At the same time, major efforts to bring about decarbonisation of heating and transportation are under way in response to the so-called [Glacier-Initiative](#). A referendum against the bill is likely to be held, induced by the national-conservative people's party SVP/UDC. At the same time, many efforts also are under way in Cantons and Communes to save energy, increase the share of solar energy and clean heating while efforts to install wind parks understandably continue to face resistance given the small size of the country and lack of wide open space, except in remote valleys and heights in the Alps.

In Swiss politics, imports of electricity are considered a necessary evil by main-stream thinking. It amounts to a mercantilist attitude, otherwise, and except in agriculture, strange to a country highly dependent upon open markets abroad for exported goods and services. Few

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think in terms of an overall continental system, the comparative advantage of large maritime wind parks in the North, and of solar plants in the south, all linked up by high-performing and fast High-Voltage-Direct-Current (HVDC) lines. Few take into account that the EU and four North Sea countries plan for impressive wind parks in the North Sea, contributing 150 GW by 2050 to the European Grid, five times Europe's and three times the world's current total amount produced (The Economist, January 7th, 2023, at 47). And few in Switzerland think about the specific contributions and the comparative advantage of enhanced alpine energy production throughout the year within an overall European system. Many entertain the ideal of self-reliance in electricity, without considering the costs of it for consumers and the competitiveness of the economy.

Efforts to close off the Swiss market and supplies – ideal to national-conservative ideology – avoiding all imports would take several years and the installation of transformers costing some 1 Billion Swiss Francs (NZZ, 21. October 2022). Austerity of energy supply will be costly, not only at the border. In addition, such a policy would require additional production for winter times or storage facilities for excess summer production. Moreover, such a policy would render maintenance and funding of existing barrages non-profitable and thus difficult to sustain. It is worth recalling that barrages faced difficulties in refunding in recent decades, and companies thus preferred to invest abroad. It will render the Swiss economy less competitive. Domestic prices for electricity will have to pay for all of the battery functions of barrages, and for their maintenance, without support from energy trading with consumers in the European Union. The stability of the grid, which is provided through primary reserve capacity contracted by Swissgrid, the Swiss TSO, would also be much more costly: As part of the Continental European Synchronous Area, Switzerland supplies only a fraction of the needed reserves and gets the rest from the whole Area (as do all other TSOs). A broader technical and financial basis than the national market is required to preserve and further develop these works for renewables in coming years and decades. They only are truly viable within a European system and only then can also discharge their stabilizing functions for Member States in a reliable manner.

For such reasons, austerity simply is not a viable option. Stability of flows, adequate supplies and maintaining a baseload depends upon close technical cooperation and levelling out of instabilities, avoiding shortages and blackouts in neighbouring countries. The systems are inherently intertwined. (“In electricity, Switzerland and the EU are forced partners” titled the NZZ (23.12.2021 p. 17). And Antony Patt, a leading climate scientist at ETH Zurich put it, stressing the need for partnership with the EU: “Autarky in energy is not a good idea” (Der Bund, April 5, 2022 p. 27).

II. The Swiss Need for Agreement

The concerns of adequate supply, security and sustainability are all legitimate. What a national-conservative approach fails to realise that these goals simply cannot be achieved in isolation. Instead, they urgently depend upon cooperation with neighbouring countries and the European Union, also for regulatory reasons.

[Regulation 2019/943 of the European Parliament and the Council of June 5, 2019 on the internal market of electricity](#) requires Member States in Articles 18(8)(a) and Article 15(2) to set aside at least 70% of their transmission capacity for serving and stabilising the internal market by the end of 2025. The regulation does not explicitly address trade with third countries; yet it

implies considerable restrictions which may not only affect traded volumes of electricity, but also impair grid stability and successfully combating congestions. It is reported that irregular flows occur in Europe every second day (NZZ, December 21, 2021 p 13). The regulation seems to assume that safe congestion management in the Union, in particular in the triangle of Austria, Germany, France and Italy, can be secured without including Switzerland. Under Regulation 2019/493, Swissgrid, the grid operator of the country, is neither able to fully forecast transit flows, nor are Swiss companies entitled to participate in day-ahead and intraday trading in accordance with Article 8 of Regulation 2019/943. They all lack essential information on electricity flows. (NZZ, November 14, 2022 p. 8).

It will be interesting to ask whether these limitations are compatible with WTO law and the 1972 Free Trade Agreement. Both entail a prohibition of quantitative restriction which includes electricity defined as a good in international economic law. Whether or not the limitation can be justified under exception clauses depends upon whether or not they are able to secure the system within the EU without involving Switzerland geographically at the heart of Europe. Experts would need to demonstrate that the measures taken are suitable and capable to preserve energy security within the Union while excluding Switzerland and the restrictions imposed on Switzerland are necessary. They would need to be able to show that grid stability can be achieved with Switzerland facing unscheduled flows through the country which may need balancing and intervention to sustain grid security. This proof of necessity of keeping the Swiss out may be difficult to demonstrate on the background that EU law itself recognizes that exclusion of Switzerland may actually not only not be necessary but even detrimental to EU's own network stability (see Commission Regulation 2017/2195, Art. 1.6 and 1.7, opening the theoretical possibility for Switzerland to join balancing cooperation if its exclusion may create the a risk that “unscheduled physical power flows via Switzerland endanger the system security of the region”. These issues are likely to be controversial but are best resolved by means of an intergovernmental agreement, rather than taking recourse to legal uncertainty and legal dispute settlement between Swissgrid, the EU Commission and the ACER Board of Appeal before the General Court and the European Court of Justice.

The need for an energy or electricity agreement of Switzerland with the EU is uncontroversial to avoid shortages of capacities and imports once the bulk of transport capacities and thus electricity will be reserved to the internal market of the EU. Yet, this need currently is merely recognised from the point of view of Swiss interests. It is mainly discussed as a Swiss request to negotiations which, unfortunately, has been suspended by the EU Commission upon breaking up institutional negotiations by the Swiss Government in May 2021. It has not been advanced by the EU to complete the puzzle.

III. The Missing Piece in the European Puzzle

The point is, given the uncertainties, that an agreement with Switzerland is of equal importance from the angle of European energy security. The debate in the EU fails to recognise the contributions Switzerland has been making, and continues to make, to European grid stability and supply of electricity. It fails to recognise that the European system cannot properly and safely work without including Switzerland. Without it, the jigsaw puzzle remains incomplete and potentially dysfunctional.

Ever since the “Star of Laufenburg” was created in 1958 under the *Union pour la coordination de la production et du transport de l'électricité* (UCPTE, founded 1951) and the center of

dispatching electricity and monitoring stability was placed at the heart of Europe, Switzerland has played an important role in transnational energy supplies. Today, the Swiss grid is connected at no less than 41 points of entry within the [ENTSO-E](#) network. Physically, it is fully part of Europe, and the European grid is fully connected with Switzerland.

With the gradual creation of an internal market for electricity, Switzerland as a non-Member of the Union and the EEA was increasingly squeezed out from the regulatory system of dispatch and control, while physical interdependence has fully remained unaltered. The gap between physical flows and market regulation and supervision creates the fact and risk of inadequate information flows also in the EU in preventing and remedying shortages which amounts to major risk of member States and stable supplies. The exclusion of Switzerland is to the detriment of the Member States of the EU and energy supplies. Importantly, Swiss reserves will play an increasing role in a system based upon renewable energy depending upon climate conditions and seasons.

Switzerland operates more than 200 [major artificial barrages or dams](#) and more than 1000 smaller reservoirs. It is where 27.5% of all electricity originates (27.7 % fluvial energy, 33.8 % nuclear energy, and the rest 11 % by pump stations, solar and wind, NZZ July 15, 2022 p. 21). The total of water reserves amounts to 10 Mio m³. [16 installations](#) of these are combinations of at least two lakes of different altitude which in the future allow for refilling the upper reservoir with excess capacities, in particular produced in the EU by excess solar and wind capacity throughout the year, and by alpine solar energy in particular in winter times. The most recent one is [Nant de Drance](#) in Valais. It was opened in 2022.

The major reservoirs, firstly, are of great importance for short term interventions to stabilise the grid. Secondly, they are of equal importance as batteries to store energy and turbine water in times of low solar or wind production. The future combination of alpine solar plants and the barrages furthermore allows to use existing grid infrastructure, build upon it. Alpine solar power in winter can be used to further spare and save precious water supplies and the battery function of the lakes even without the need for pumping installations. It gradually replaces melting glaciers due to climate change and global warming and which, therefore, lose their function as natural water reservoirs frozen in ice. The combination of alpine solar plants and hydroplants with and without pump stations overall strongly increases important battery function.

In comparison, [Germany](#) (ten times the size of Switzerland) actively operates 29 pump stations. There are 6 in [France](#), and 5 in [Italy](#). [Austria](#) operates 13 stations. Additional works in planning and construction in the EU, but it seems likely that the 15 plants in Switzerland and the 200 barrages and reservoirs in the country, make an important contribution to stability of the grid and to supplies of renewable energy in neighbouring countries and beyond. Frequent interventions to stabilise the European grid make the point. The [2022 Report on System Adequacy of Switzerland](#) in the electricity sector finds that future integration in the European system in a perspective of 2040 not only provides for stable supplies, but also plays an important role in stabilizing the European system: “Finally, current simulations show the importance of Swiss hydropower not only for Switzerland, but also for Europe. Swiss hydropower is used in addressing critical situations of the overall system. It serves in particular to reduce peaks of demand in other European countries. Overall, Switzerland is an important trouble-shooter within the European electricity system” (at p. 80, translated). It will be a matter of detailed examination which is important also for designing the future transnational grid.

Due to the political and regulatory isolation of Switzerland, new high voltage performance European grids are essentially planned circumventing the barrages and pump stations in the country. Major north-south linkages crossing the Alps are planned in Austria, France and Italy. Switzerland, it would seem, is not part of the High-Voltage-Direct-Current (HVDC) [European super grid](#) and other schemes. Obviously, Swiss barrages and pump stations and alpine solar plants can only serve their European wide functions of supply and stabilization, if properly connected to the European grid. To the extent only that this is realised can excess energy produced in the EU also be used to aliment the alpine batteries for winter storage of energy. Circumvention of Switzerland may be of short term interest to neighbouring countries, trading companies and grid operators. It is not in the interest of overall net stability of the EU. Finally, Switzerland also makes an important contribution in gas transit. The pipeline linking Italy and Germany may tomorrow play an important role in transporting hydrogen in appropriate form gained from excess solar energy in the south or excess wind energy in the north. Again, there is no interest to circumventions but rather to use existing expensive transalpine infrastructure.

IV. Changing the Game

All this requires a different mind-set. Prevailing views must be abandoned. On the part of the Swiss, the view that imports are mere necessary evils and should be kept as low as possible, must be left behind as a mercantilist concept. Rather, Switzerland needs to design its system with a view to integrate in the European internal market from the outset. Within the European Union, the view that Switzerland does not play an important role in designing European wide networks and supply and can be ignored must equally be left behind. The European Union should actively factor in actual and potential contribution in particular of Swiss Alpine reservoirs, pump station and future alpine solar plants in designing calibration and a transcontinental European grid based upon renewable energy supplies. In consequence, it should actively seek an agreement now, framing these contributions in law.

Today is a suitable moment for change. The 2019 Regulation 2019/943 and Directive 2019/944 did not anticipate the repercussions of the war in Ukraine and embargo measures imposed against Russia. The current system in EU law is entirely market based. The war tells that markets alone do not provide adequate energy security in times of crisis. A new market design taking into account times of short supplies and emergencies will need to be developed beyond the current price controls. Consumers will only regain confidence if market prices for electricity remain stable within a defined range of pricing. Whether or not this entails a partial return to monopoly structures or not remains to be examined. The new challenges offer the possibility to bridge the refusal of Swiss voters to fully liberalise electricity so far – a major obstacle to find agreement under the 2019 market design of the EU.

Obligations to adopt full liberalization in an agreement between the EU and Switzerland should therefore be placed under a moratorium until a new and acceptable market design emerges within the EU. Such a moratorium allows fully addressing the issues of grid stability and stabilization of the base load and international trade without losing further precious time. It can be readily linked to institutional principles developed in the 2018 draft institutional framework agreement which, according to current plans, should be integrated in the various bilateral agreements.

A Swiss-EU Agreement on electricity, for the reasons stated, is of vital importance. It needs to be completed and entered into force by the end of 2025. In a recent interview, the CEO of Alpiq, a major Swiss energy corporation, Ms Antje Kanngiesser rightly so stressed that institutional negotiations with the EU need to be conducted much more in light of the energy problem Switzerland is facing with the impending export restrictions to 30% of EU States to third countries by the end of 2025 (Der Bund, December 23, 2022 p. 2/3).

Securing the vital supply of electricity after 2025 therefore amounts to the most urgent and pressing matter and file in Swiss EU relations, affecting the interests of both sides. It is a game-changer, shadowing and removing ideological obstacles and resistance in Switzerland against institutional arrangements which so long have stalled negotiations between the EU and Switzerland for political reasons and particular protectionist interests. The risk and real threat to face shortages of supply of electricity as of winter 2026 in Switzerland and the risk of unstable supplies in the EU because an important piece in the puzzle is lacking in the supply of stable renewable energy places tremendous pressure on achieving agreement – not only on Switzerland, but also the European Union. Other than what many politicians think, an agreement is not simply nice to have. It is vital to prosperity of Switzerland and neighbouring Members of the Union alike.
