Report on the activities of ElCom 2019

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1 Foreword by the President

Carlo Schmid-Sutter
President of ElCom

In terms of supply security, the winter of 2018/2019 and the first half of the winter of 2019/2020 were relaxed. Precipitation, high river levels and warm temperatures have all contributed to a situation in which water levels in the reservoirs are higher than usual. The unscheduled load flows that are increasingly putting a strain on the Swiss network still remain a problem, however. A new scheme referred to as "trilateral redispatch" should be capable of mitigating this problem for Switzerland in the future. Under this scheme, Switzerland can request that Germany and France take coordinated steps to defuse the situation on the country's grid.

The supply situation in the winter of 2019/2020 was marked by the first final decommissioning of a nuclear power plant in Switzerland. Mühleberg went offline after 47 years of operation, mainly for financial reasons. As this translates to a loss of production capacity equivalent to around five percent of Switzerland's electricity requirements, it is regrettable from a regulatory perspective. Electricity imports will have to be increased to offset the loss of this energy. One positive short-term development is that Switzerland's remaining four nuclear power plants should be available as planned for the entirety of the upcoming winter.

The supply situation will be exacerbated as soon as all of Switzerland's nuclear power plants go offline, which, given their lifespans of 50 years, will be the case in 10 to 15 years. When that happens, Switzerland will need to import around 17 terawatt hours of electricity during the winter semester, which is equal to half of the country's electricity consumption during that period of time. This is a nearly insurmountable task for Swiss networks. It brings the winter of 2016/2017 to mind, Back then, the country only imported 10.3 terawatt hours, yet that load nearly pushed the Swiss network to its breaking point. Experience shows that planning a significantly higher import level than normal means operating the network at its limit, which is unacceptable for a critical infrastructure that works in real time. Plus, if largely coal-generated electricity is imported from neighbouring countries instead of CO2-free energy, the practice would be anything but environmentally friendly.

Added to that is the fact that, for financial reasons, many companies are now only investing in production plants in foreign countries, something which is hardly beneficial in terms of Switzerland's supply security. Electricity produced outside Switzerland is not Swiss electricity and is subject to the regulatory restrictions, export capability and export willingness of those foreign countries. More attractive framework conditions, such as shorter procedures and compensation for CO2 emissions on terms that are comparable with those of other countries, are needed to invigorate investments in new production capacities in Switzerland.

At the same time, efforts need to be stepped up to promote greater renewable energy capacities. If things continue to proceed at the current rate, it will take us more than 100 years to compensate for the amount of energy that the nuclear power plants being shut down would have been generated during the winter months. On top of that, efforts to add photovoltaic capacities are placing a burden on the network during the summer months. What Switzerland needs, therefore, are additional winter production capacities. The time factor also needs to be taken into consideration: planning, constructing and commissioning power plants takes years. Against that backdrop – and as already sketched out in the Federal Council's dispatch on its Energy Strategy 2050 – the construction and operation of combined cycle power plants, which have CO2 emissions per kilowatt hour of electricity generated that are only about half of those of

a combined cycle gas turbine plant, should be considered as a short-term interim solution.

Since this activity report is the last for which this author will be writing a forward, a personal retrospective on the origins of ElCom might be considered acceptable. Building a new government agency from the ground up and getting it established is always an extremely interesting undertaking for everybody involved. Organisational structures need to be created, staffing decisions made, administrative procedures defined and the necessary funding secured – all in a comparatively short period of time. Setting up a regulatory authority, on the other hand, poses a special challenge because while this agency might be appointed by the Federal Council, it is otherwise independent of all other administrative authorities and is also not subject to the directives of the Federal Council. Independent regulatory authorities are an anomaly in Swiss constitutional law, something imported from foreign legal traditions, and actually only understandable within the context of international developments. ElCom's creation in 2007 can be traced back to the efforts of the Swiss Confederation to conclude an electricity agreement with the EU, which required certain that certain EU institutions be adopted, one of which was a regulator independent of the national government. This put ElCom on shaky ground from day one, at least from a constitutional perspective, and the limits and stability of this new authority still had to be defined. ElCom does not have any political mandate to shape relations with foreign countries; it must respect the primacy of politics and ensure that the transmission network operators, as other players in foreign relations, also adhere to this rule and do not use technical means to create integration policy precedents that are actually the sole preserve of the federal authorities or the sovereign state.

ElCom's role does not include any mandate to shape domestic policy, either. It does not have the authority to define structural policy for the electricity industry nor energy policy; it must fulfil its legal mandate, which is to guarantee network access for those entitled to it and, above all, to monitor supply security. With respect to tariff supervision, it is responsible for enforcing the legal requirements of "cost-plus" regulation in the monopoly and basic supply sectors, which is a laborious and, above all, time-consuming undertaking for around 650 network operators, some of which are litigious and supported by law firms. This holds all the more true as, contrary to legal requirements, the courts invoked hardly ever decide on the matter themselves. Instead, they limit their role to obtaining decisions from ElCom and – unless they are protecting those decisions – referring them back to ElCom for a new decision.

The juridification of administrative activities is one of the major challenges faced by ElCom (and other authorities), since it can be abused as a way of blocking the administration, particularly given the fact that its human resources are geared toward "daily business". Neither the legislator nor the courts should tolerate or help anybody use legal proceedings to cripple regular administrative activities. The other challenge in the electricity sector is undoubtedly guaranteeing supply security between the Scylla of phasing out nuclear power and the Charybdis of CO2 neutrality. ElCom's job here will be to make the political authorities aware of how their decisions affect supply security and to remind them on occasion – and here, too, I'd like to mention combined cycle gas turbine plants again – that sometimes the only way to reach a goal is indirectly. At this point, I don't have any answer to the question of whether an electricity agreement with the EU will help us tackle the challenges up ahead.

I would like to take this opportunity to thank all former and current members of the Commission, the Director and the staff of the Technical Secretariat for the work they have done and continue to do with an extremely high level of professional expertise, a keen sense of intuition when it comes to new developments and incontrovertible independence in their efforts to uphold Swiss legislation governing the electricity supply, guided solely by their desire to act together as ElCom as a loyal servant of the state and a fair regulator for those subject to the law.

2 The Swiss electricity market

Swissgrid's network control centres in Aarau and Prilly form the core of the Swiss transmission net-work.

ElCom is celebrating over ten years of serving as the electricity market's supervisory authority: reason enough to take stock. Director Renato Tami reflects on the creation of the Federal Electricity Supply Act (StromVG), ElCom's development over the years and looks ahead to the challenges that will face the electricity market in the future.

Twelve years after the introduction of the Federal Electricity Supply Act: Which are the biggest changes with respect to court rulings?

Electricity prices rose by 10 to 20 percent when the Federal Electricity Supply Act entered into effect. This price hike triggered a flood of legal proceedings that mainly centred around clarifying questions regarding electricity prices and how those prices are calculated. During the initial phase there were still a lot of unanswered questions about how to interpret the statutory provisions. These controversial issues were fought out in court proceedings, which were often quite lengthy. Don't forget: The financial stakes are high in the electricity market. And because of that, it's only understandable that the electricity industry wants to have these legal questions answered by the highest courts. Nearly all of the legal issues have been cleared up in the meantime and everybody now knows how the law is to be applied. And even if ElCom ever raises an objection, legally binding decisions can be used as a basis in most cases. The number of proceedings has declined sharply.

How has ElCom's regulatory work changed over the years?

In the beginning, ElCom – out of necessity – was primarily responsible for supervising tariffs and regulating electricity prices. The focus has also propelled more strongly toward supply security: efforts to phase out nuclear energy and restructure the energy system to intensify the use of renewable energies have shifted the issue of supply security to the forefront. This development was significantly influenced by the critical bottlenecks and supply shortages experienced in the network in the winter semesters of 2015/2016 and 2016/2017.

Things have also been changing with respect to tariff supervision. Whereas we used to conduct a large number of individual audits, we are now increasingly basing our audit on the

"Sunshine Regulation", which means that we are now working with a benchmark. Incentives to boost efficiency are defined based on a variety of indicators – instead of being forcibly imposed through court rulings. Our goal is to optimise costs and benefits for both the energy supply companies and for us, as the regulator.

While many other countries are employing incentive-based regulation in the electricity sector, Switzerland has been using the cost-plus model. As the Director of ElCom, what do you think of these models?

I feel that the cost-plus approach we've used in the past has stood the test. Admittedly, it might not necessarily give rise to the most efficient electricity tariffs; an incentive-based model might be better in that regard. Cost-plus regulation also holds enormous potential for greater efficiency if that potential is exploited. The key term here is: WACC. Generally speaking, which model makes more sense depends on the specific circumstances. In Switzerland, we're currently in the process of restructuring our energy system to focus more strongly on renewable energies, moving away from a centralised supply and toward a decentralised system. That represents a major challenge for our networks, which have to be expanded, reinforced and fitted with smart control systems. That's why the regulatory model also has to guarantee that investments are being made in the network, and that's more likely to be the case under a cost-plus approach.

What are ElCom's biggest challenges going forward?

I think the biggest challenge over the next few years will be guaranteeing a secure electricity supply, particularly during the winter months. When the nuclear power plants are phased out over the course of the next few years, we'll lose a sizeable share of our domestic production. This has to be substituted by renewable energies, which will be enormously challenging since the loss of nuclear energy also means losing the base-load energy that is so important for ensuring supply security. We have to make sure that we prevent the energy strategy from slowly evolving into an import strategy because we failed to sufficiently expand the use of renewable energies. From a supply security perspective, it's important that a substantial portion of today's power production during the winter months remains in Switzerland.

Renato Tami
Head of the Technical Secretariat

« Going forward, it's essential that network regulation is still structured in such a way that guarantees the networks' financing »

In general, the complexity of our power supply has increased. With the advent of decentralised electricity production and intelligent control systems, new models are being developed that claim only to burden the lower network levels. As a result, there are calls for lower network remuneration or even full exemption from such remuneration. Operating the Swiss electricity networks costs around CHF 5.3 billion every year. This amount is a fixed cost item. What's important here is that these costs aren't shifted disproportionately and that the operation and maintenance of the networks is still guaranteed. Over the longer term, what we need is a new tariff model that not only establishes the right incentives for building smart networks and creating efficient supply models, but also ensures that network operators continue to receive enough money to operate the networks safely and efficiently.

2.1 Structure of network operators in Switzerland

The number of network operators in Switzerland dropped by nearly seven percent to 632 between 2014 and 2019. There has been a clear trend towards fewer network operators for some time now, a trend attributable in part to network takeovers and mergers between municipalities. According to Switzerland's official municipal register, the number of municipalities declined from 2,408 to 2,205 (nine percent) between 2013 and 2018. During this period, Switzerland's population grew by just over four percent. This resulted in an increase in the number of end consumers per network operator. However, a typical distribution network operator still remains small (Figure 1), and supplies just over 1,500 end consumers on average. Only 81 network operators supply more than 10,000 end consumers, while eleven of them supply more than 100,000 end consumers. Together, Swiss network operators supply more than 5.1 million customers with electricity.

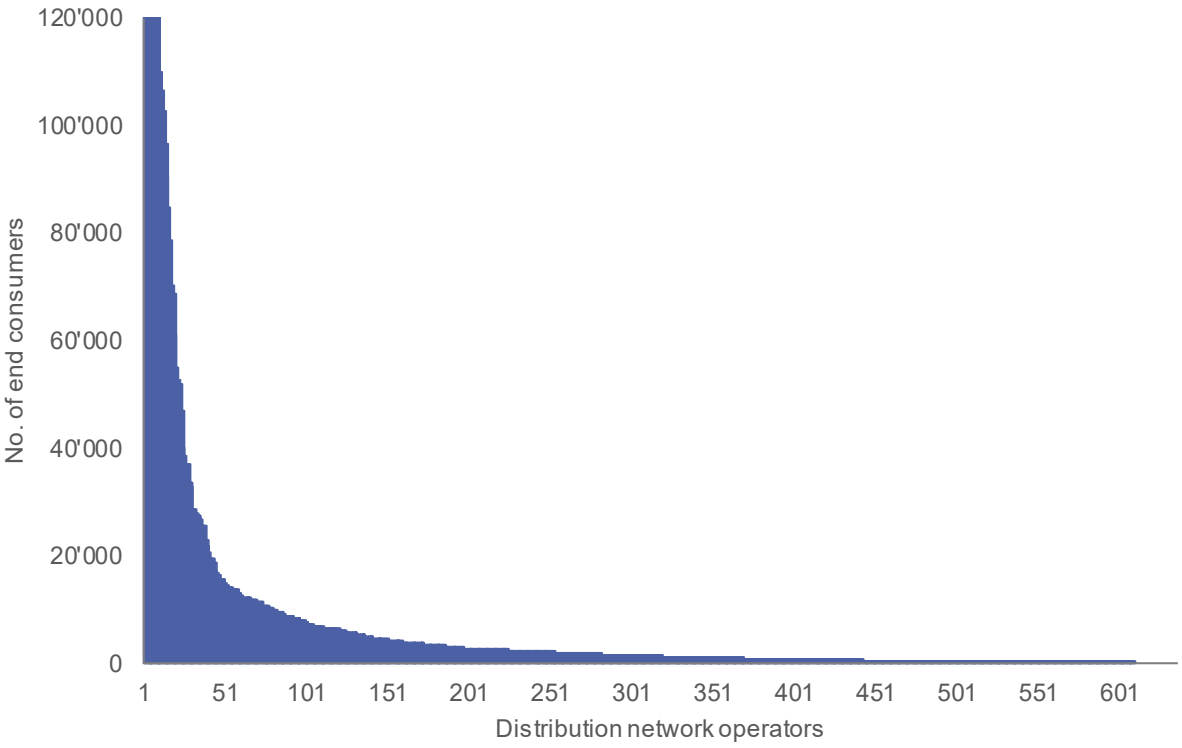


Figure 1: Number of end consumers per distribution network operator. For the sake of readability, the vertical scale has been cut off at 120,000 end consumers; the data cut off relates to eight distribution network operators.

2.2 Market access and switching rate

In this initial stage of liberalisation of the Swiss electricity market, only major consumers (those with an annual consumption of at least 100 MWh) may exercise their right to free market access, i.e. they have the right to freely choose their electricity supplier. They have until the end of October of each year to decide whether they want to switch from the basic supply. Once in the free market, a major consumer can no longer return to the regulated basic supply.

ElCom regularly conducts a survey of the largest distribution network operators in order to determine the number of potential and effective end consumers on the free market. This currently relates to 81 network operators, which supply electricity to a total of 3.9 million or almost 75 percent of end consumers in Switzerland. Of the 32,708 end consumers with the right to free market access (0.6 percent of all end consumers), 22,605 (69 percent) have exercised that right. End consumers in the supply regions of these network operators account for a total of 39.5 TWh (around 75 percent) of end consumption in Switzerland[1]. Just over half the supplied energy (21.8 TWh of a total of 39.5 TWh) is consumed by end consumers with a right to free market access. Those consumers who have chosen to access the market consume 17.6 TWh (or 81 percent) of the available energy. The right to freely choose an electricity supplier was exercised on a relatively small scale during the first few years after the market was liberalised (Figure 2). Due to falling market prices, the number of end consumers who exercised their rights increased sharply in the years that followed. In 2019, the share of end consumers on the free market fell slightly. This decrease is due to the fact that the number of consumers entitled to free market access has grown faster than the number of consumers who have actually opted for free market access. According to the latest figures, two-thirds of all consumers entitled to market access have exercised this right to date (orange curve). They consume four fifths as much energy as that consumed by customers with the right to free market access (blue curve). This means that the number of users who have not yet exercised their right to market access is relatively low.

1 Average end consumption in Switzerland was 53.7 TWh between 2009 and 2019 (Source: Swiss Federal Office of Energy).

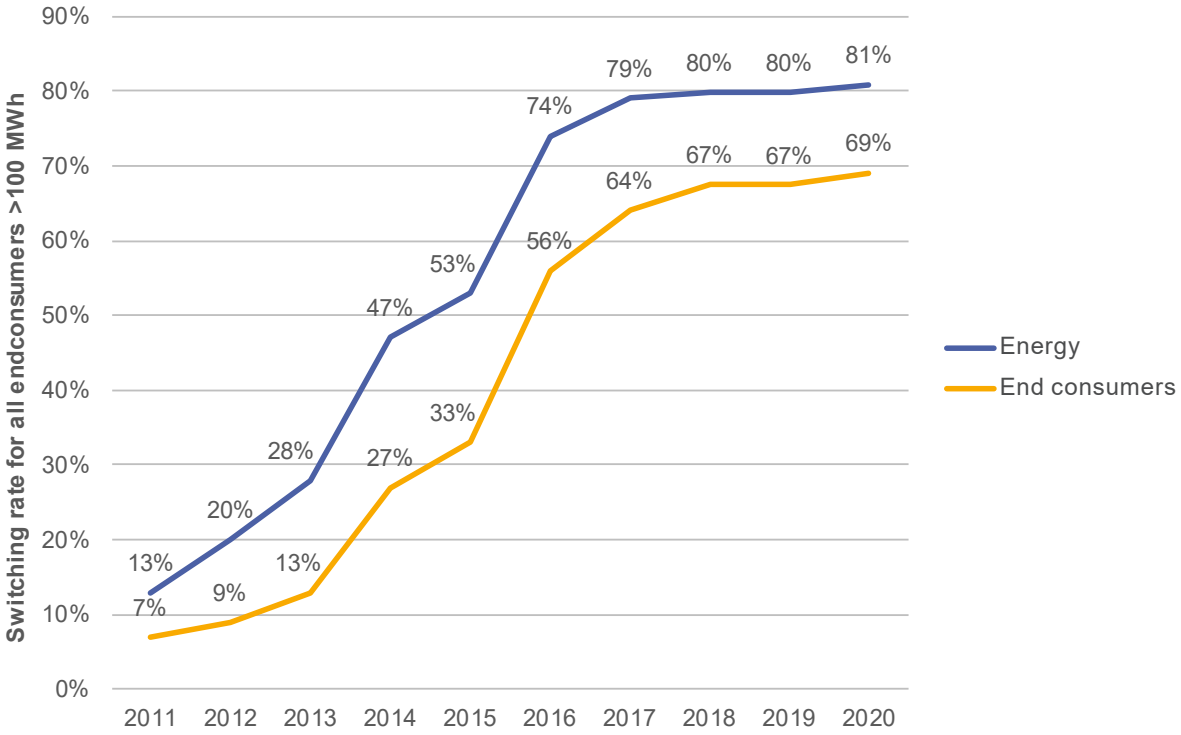


Figure 2: Switching to the free market

Figure 3 shows the distribution of the quantity of energy sold as a function of the size of the network operator. The largest ten network operators (dark blue) supply just under 42 percent of the energy sold to end consumers in the distribution network. If expanded to the 50 largest network operators, the share rises to over 70 percent of energy supplied. The next 50 largest network operators together supply one tenth, while the remaining network operators supply one sixth of the energy consumed by end consumers.

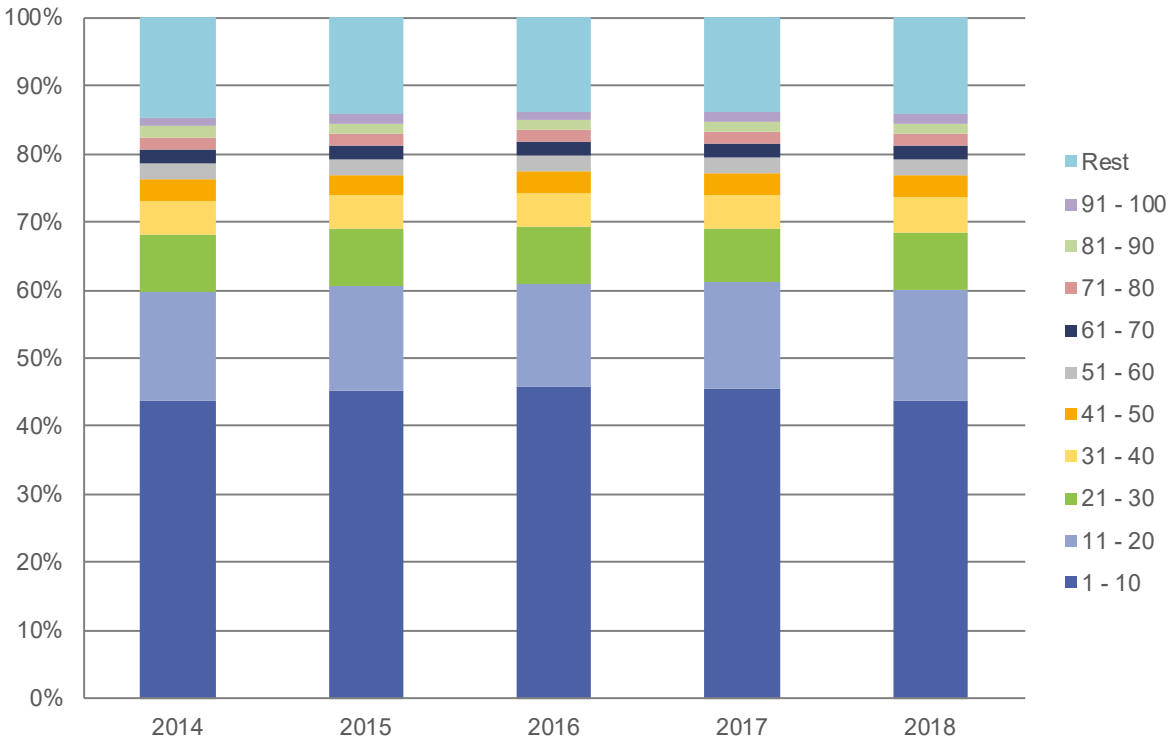


Figure 3: Proportion of energy supplied via the distribution network, by company size

2.3 Transmission network tariffs

As we can see from the overview in Table 1, the tariffs for the use of the transmission network remain subject to considerable fluctuations. The system services tariff will be reduced by another 33 percent in 2020 compared to 2019. The share attributable to the rectification of coverage differentials not only resulted in lower costs for the provision of balancing power but also reduced tariffs. There was another year-on-year reduction in the network use tariffs, which are regulated by Article 15 paragraph 3 of the Federal Electricity Supply Ordinance (30 percent working tariff, 60 percent power tariff, 10 percent basic tariff), due to the fact that fewer shortfalls had to be rectified. On the other hand, the tariff charged for active power losses was raised from 0.14 to 0.25 cents per kWh (also see Section 4.6 System Services).

	2016	2017	2018	2019	2020
Network use					
Working tariff [cents per kWh]	0.25	0.25	0.23	0.19	0.18
Power tariff [Swiss francs per MW]	41,000	41,000	38,200	31,100	28,800
Fixed basic tariff per exit point	387,700	387,700	365,300	288,000	269,400
General system services tariff [cents per kWh]	0.45	0.40	0.32	0.24	0.16
Individual AS tariff					
Active power losses [cents per kWh]	0.11	0.08	0.08	0.14	0.25

Table 1: Trend in transmission network tariffs for network use and general system services for distribution network operators and end consumers (source: Swissgrid AG).

In order to compare the tariffs of the various network operators, ElCom converts the tariff components (working, power and basic tariff) into cents per kWh. If the individual tariff components of the transmission network are summarised in cents per kilowatt hour, this results in a figure of 0.97 cents per kWh for 2019 and 0.91 cents per kWh for 2020. On average, a typical household with an annual consumption of 4,500 kWh (category H4: 5-room apartment with electric cooker and tumble dryer, but without an electric boiler), pays network use remuneration of 9.1 cents per kWh for the transport and distribution of energy (see Figure 4 in the next section). With respect to the 2020 tariffs, the share represented by the transmission network in the tariffed network costs for these households is around 10 percent.

2.4 Distribution network tariffs

General tariff structure

Amendments to the Federal Electricity Supply Act of 23 March 2007 and the Federal Electricity Supply Ordinance of 14 March 2008 entered into force on 1 June 2019 as part of the "Electricity Networks Strategy". ElCom answered many questions in connection with these amendments, a few of which have been published in the amended communication entitled "Fragen und Antworten zur Energiestrategie 2050" (Questions and answers on Energy Strategy 2050). With respect to tariffs, the main change was made to the criterion used for assigning customers to the basic customer group for network use tariffs. Here, ElCom decided that the new criterion is to be applied from 2020 onward. ElCom also found itself confronted with many different models for virtual storage systems in which prosumers are able to purchase electricity fed into the network by distribution network operators at special tariffs. ElCom has decided that such special tariffs (for network usage or for the energy) are not permissible under current law and has supplemented its Communication entitled "Fragen und Antworten zu neuartigen und dynamischen Netznutzungs- und Energieliefertarifen (Frequently Asked Questions on Novel and Dynamic Network Use and Energy Supply Tariffs)" accordingly.

In 2020, the median electricity price for a household with consumer profile H4 was 21 cents / kWh (Figure 4). Projected over one year, this corresponds to an electricity bill of CHF 945 for a consumption of 4,500 kWh. The electricity price is made up of four elements: the network use remuneration, the energy price, the fees paid to the state and the federal charges for the promotion of domestic renewable energy. The network operators must publish the first three components by the end of August before the respective tariff year at the latest. The price of electricity in 2020 has thus risen slightly over the previous year, however the changes are more or less pronounced with respect to each of the individual tariff components: While network tariffs rose by 0.1 cent / kWh, energy tariffs climbed by 0.5 cents / kWh. Charges for renewable energies and the fees paid to the state remained constant. Network operators have declared both the cheapest and their standard products since 2018. The latter is charged to end consumers if they do not actively select another electricity product. This relates exclusively to energy. As a result, comparisons between the tariffs for the distribution network with previous years are only possible to a limited extent from 2018 onwards.

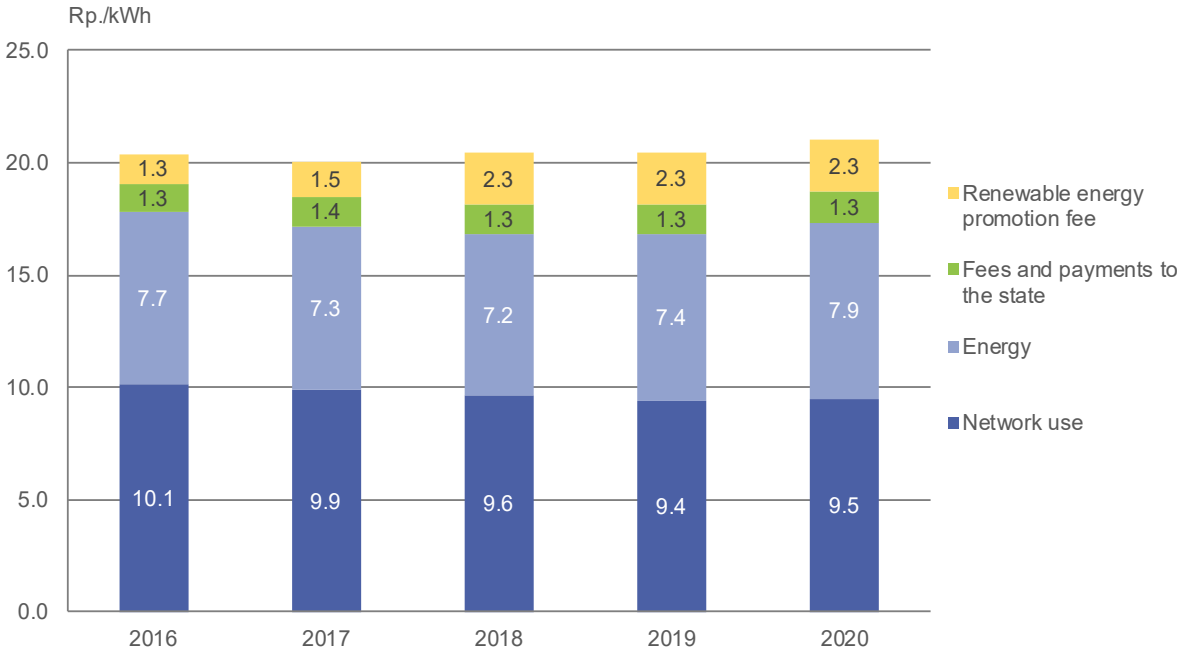


Figure 4: Cost components of the average overall electricity tariff for consumer profile H4 (excluding VAT)

The tariffs in Figure 4 refer to national medians. Considerable differences in tariffs often exist at the cantonal and municipal levels. Detailed information about the tariffs of each municipality can be found on the ElCom website (www.elcom.admin.ch), together with an interactive map, by clicking on the link to the overview of electricity tariffs ("Electricity Price – Overview"). The median cantonal tariffs for 2020 are shown in Figures 5 to 8. The methodology used for presenting these tariffs has been adapted since the 2018 activity report and year-on-year comparisons are no longer provided. The further away the cantonal tariffs are from the Swiss median, the deeper red (higher tariff) or green (lower tariff) the colouring. The changes in colour therefore depict the development of the cantonal tariffs in relation to the comparable national level. The canton of Basel-Stadt, for example, had relatively high network tariffs in 2020 (orange), while the canton of Geneva, on the other hand, had relatively low network tariffs (light green).

The maps show the situation in 2020. Network and Energy are the only tariff components that can be directly influenced by network operators and are controlled by ElCom. The median network use remuneration for 2020 is 9.4 cents / kWh and the median energy tariff is 7.9 cents / kWh.

Network use

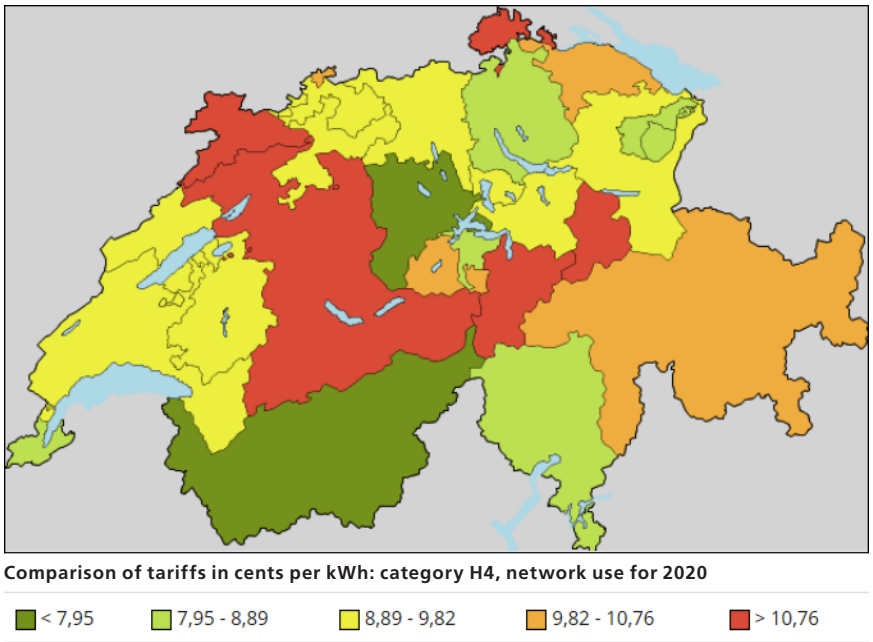


Figure 5: Median cantonal tariffs for network use for the H4 consumer profile in 2020

Energy

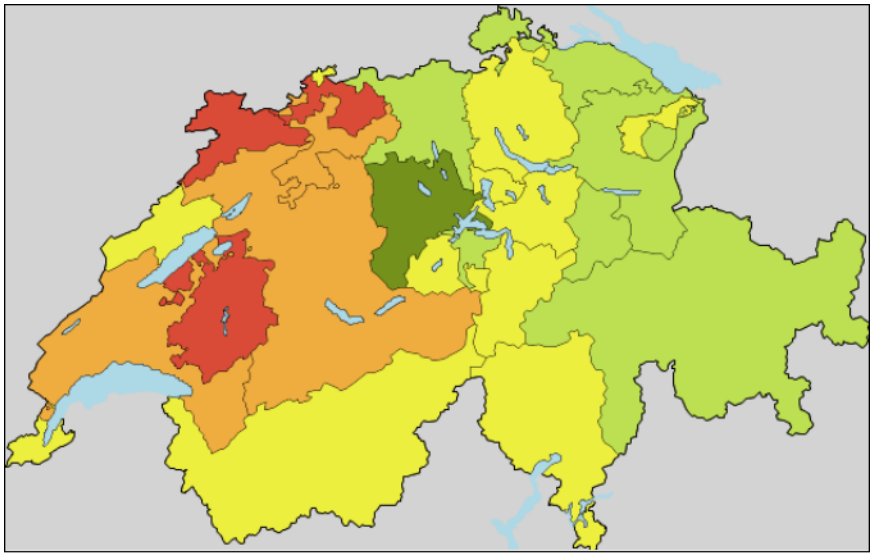
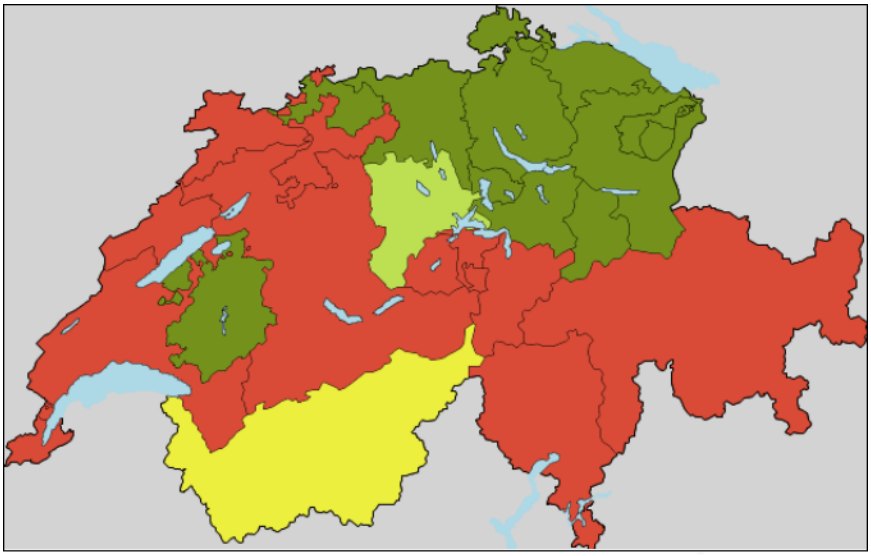


Figure 6: Median cantonal tariffs for energy for the H4 consumer profile in 2020

Fees and payments to the state

Figure 7 shows the median cantonal and municipal fees and payments to the state. It does not take into account the uniform Swiss-wide federal fee for the promotion of renewable energy[2]. Fees and payments to the state are not controlled by ElCom; they are determined in local political decision-making processes. The median value of fees and charges for 2020 is 0.8 cents / kWh. It is noticeable that there are often high and low, but rarely medium amounts (coloured yellow).

2 Since the network surcharge is uniform throughout Switzerland, it is not shown here. However, the total is depicted in Figure 8.

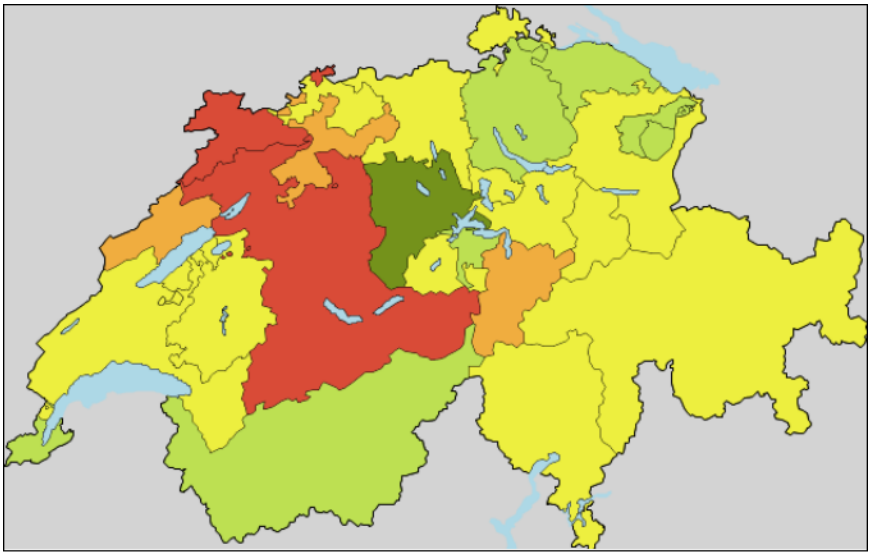


Comparison of tariffs in cents per kWh: category H4, fees and payments to the state, 2020

< 0,71 | 0,71 - 0,79 | 0,79 - 0,87 | 0,87 - 0,96 | > 0,96

Figure 7: Median cantonal tariffs for cantonal and municipal fees and payments to the state for consumer profile H4 in 2020

Overall electricity tariff



Comparison of tariffs in cents per kWh: category H4, overall electricity price, 2020

< 17,60 | 17,60 - 19,67 | 19,67 - 21,75 | 21,75 - 23,82 | > 23,82

Figure 8: Median cantonal tariffs for the overall electricity tariff for the H4 consumer profile in 2020

The total tariff also includes the network surcharge for the promotion of renewable energy. This was successively doubled from 1.3 cents / kWh to 2.3 cents / kWh between 2016 and 2020. The share of the electricity tariff accounted for by network surcharges and fees paid to the state amounts to 15 percent in 2020.

2.5 Examination of tariffs

In the year under review and in line with its past practice, ElCom examined the conformity of tariffs in four different ways:

- Each network operator is required to submit its cost accounting by the end of August, which forms the basis for the network and energy tariffs for the following year. ElCom uses around 180 tests in order to check the cost accounts for errors, inconsistencies and implausible figures, and returns its evaluations to the network operators for adjustment or explanations where necessary. A total of more than 9,000 comments were sent to the network operators. The 626 network operators, who submitted their cost accounts on time or after the first reminder, received ElCom's evaluation in the year under review together with a request to check any required changes and either implement them or substantiate the original figures.

- ElCom conducts targeted audits on network operators who have unlawful or implausible figures in their cost accounting even after adjustment. In the year under review and the year before, ElCom particularly reprimanded the inadmissible calculation of coverage differentials from the previous years and excessively high profits from the implementation of the CHF 95 Rule. With respect to coverage differentials, this involves the calculation of coverage differentials in one year and the amount carried forward to the following year. By contrast, the CHF 95 Rule concerns the costs and profits relating to the distribution of energy among end consumers of the basic supply. One major issue in 2019 was the ongoing increase in shortfalls, which accounted for a total of CHF 1,528,691,847 in 2019 (Network and Energy). These shortfalls – like all coverage differentials – must generally be eliminated over a three-year period in accordance with Directive 2/2019.

- In 2019, the Swiss Federal Audit Office (SFAO) reviewed ElCom's work with respect to prices and tariffs. SFAO came to the conclusion that ElCom's duty to supervise the tariffs charged by the power companies is being executed correctly and in accordance with the law. SFAO's report is scheduled to be published in February 2020.

- After around ten years of regulatory activity, ElCom decided to reorganise its regulatory concept. This project will result in a reorganisation of the way tests and other feedback to the network operators is handled based on an analysis of their data.

Network evaluation:
Here, the focus was on the same problems as in previous years. In the year under review, ElCom again identified installations for which the synthetic values were not derived correctly, were inadequately documented or were calculated on the basis of a very low number of historically valued installations. Synthetic values must be derived in a transparent and comprehensible manner in the distribution network based on the acquisition and production costs of a sufficient number of similar installations. Otherwise, there is a risk that they could exceed the value of a similar installation and thus infringe Article 13 paragraph 4 of the Federal Electricity Supply Ordinance. This does not apply with respect to the cost of properties, the value of which must be established historically. Land registry documents can be obtained from the land registry office due to their unlimited statutory retention obligation. Synthetic valuations for installations became impermissible as of 1999 and, since that point, the value of installations must be established historically on the basis of annual financial statements and investment documents. Even when reviewing the historical valuations, ElCom found costs that could not be documented. In addition, since the Federal Electricity Supply Act entered into force on 1 April 2008, additions to installations may no longer be charged both as operating costs and additionally included in fixed assets, as the costs have already been factored into the tariffs (see the final letter from IWB dated 9 September 2013, which can be accessed at: www.elcom.admin.ch > Documentation > Directives > Tariffs).

Several different companies only perform write-offs for the first time in the year after their facility was put into operation instead of in its first year of operation, or only after the definitive booking has been made in the system. This is contrary to Article 13 paragraph 2 of the Federal Electricity Supply Ordinance, which stipulates that facilities must be written off on a straight-line basis to a residual value of zero over their entire useful life. Delayed write-offs increase the residual value of the facility, and thus the imputed interest costs, in an unlawful manner.

Questions surrounding the correct valuation of the network infrastructure were a key audit issue in ElCom proceedings in 2019, as well. A decision had to be reached in one case, in particular, which arose through a merger between municipalities: ElCom's audit prompted an adjustment in the value of the merged regulatory assets, which had not yet been made. By focusing specifically on construction projects and types of construction performed in the period prior to 1998, ElCom has made major adjustments to the standard values used in some cases.

In addition, recoverable internal services also had to be reduced to the calculation permitted in compliance with Federal Electricity Supply Act (Article 15 paragraph 1 of the Federal Electricity Supply Act). During the audits, this prompted reductions of up to 48 percent compared to the hourly rates originally applied, because internal settlements have to be carried out without a profit mark-up and may not be done in accordance with VSEI (Association of Swiss Electrical Installation Companies; Zurich, Switzerland), KBOB (Coordination Conference for Public Sector Construction and Property Services) or other management approaches.

With regard to the right of access to documents, ElCom additionally decided that information from cost accounting, network cost calculations and shifting does not constitute a business secret, as the distribution network is a natural monopoly. This does not apply to third-party data.

Operating costs:

As in previous years, the majority of adjustments imposed by ElCom concerned recoverability and the distribution of costs by segment.

In accordance with Article 15 paragraph 1 of the Federal Electricity Supply Act, the costs of a secure, high-performance and efficient network are defined as recoverable costs. This means that other costs that do not fall under this definition are non-recoverable. These include costs incurred for marketing and sponsorships, for example, as well as various non-network-related activities such as public lighting or administrative activities for other business areas.

With respect to the distribution of costs by segment, remuneration for network use was often charged on the basis of inflated overhead costs. Furthermore, in some cases network operators apply factors that are not proportionate, appropriate or comprehensible, which contravenes Article 7 paragraph 5 of the Federal Electricity Supply Ordinance.

Energy costs:

With respect to energy provided to basic supply end consumers, the main focal points in the year under review were the average price method and the CHF 95 Rule.

Average price method:
With its final vote on 15 December 2017, Parliament maintained adherence to Article 6 paragraph 5 of the Federal Electricity Supply Act and ElCom's average price method. The latter concerns the question of how the costs of electricity procurement are to be shared between end consumers caught in the monopoly (universal service) and free market customers.

On the basis of the cost accounting data submitted to ElCom, several network operators were identified who had charged their fixed end consumers disproportionately high energy costs in recent years and had therefore possibly not applied the average price method in accordance with the practice mandated by the courts and ElCom.

Specifically, thirteen network operators were originally asked to review their cost accounts and adjust them in line with regulatory requirements. Five had complied with this request by the end of 2018, and two additional network operators adjusted their cost accounts accordingly during the year under review.

Of the remaining six cases, one has been suspended until the conclusion of older pending proceedings. Four network operators fundamentally dispute the legality of the initiation of proceedings for part or all of the period under review (2013 to 2018); appeals have been lodged with the Federal Administrative Court (see Section 2.6) against ElCom's interim rulings. In terms of content, all or some of the following issues are controversial in all ongoing proceedings: Definition of the quantity and cost of energy to be used when calculating the average price method, implementation of ElCom Directive 3/2018 on WACC production, interest on energy coverage differentials and differentiation between network operators within a group of companies.

CHF 95 Rule:
ElCom has once again focused on the CHF 95 Rule and requested that various network operators make adjustments. The CHF 95 Rule was developed by ElCom in order to facilitate an assessment of the reasonable administrative and distribution costs and profits of network operators relating to the distribution of energy to end consumers of the universal service. In 2018, ElCom had also conducted an in-depth analysis of the cost and profit situation with regard to energy sales. Based on this analysis, ElCom set new thresholds of CHF 75 and CHF 120 from 1 January 2020 for reviewing the energy tariffs of universal service end customers. These lower values were used to calculate the tariffs set for 2020. The appropriateness of the thresholds will be re-evaluated in 2020. ElCom set out the detailed application of the CHF 75 Rule in Directive 5/2018.

2.6 Judicial practice

In its ruling A-321/2017 of 20 February 2019, the Federal Administrative Court addressed the issue of ElCom's authority to audit fees and payments to the state as well as energy products with added environmental value. It stated that the federal regulations governing fees and payments to the state intended to leave the cantons and municipalities with a certain amount of autonomy and while ElCom does have wide-ranging supervisory powers, this autonomy must be preserved. According to the Federal Administrative Court, ElCom's audit powers with respect to universal service also cover so-called green power products. In this context, the Federal Administrative Court confirmed ElCom's interpretation that any fees due to the state that were unlawfully levied by a municipal utility through energy tariffs as well as the excessive profit margins on energy tariffs with added environmental value must be refunded to end consumers by means of coverage differentials. The Federal Administrative Court also clarified that the revenue-based breakdown of overhead costs is not compliant with the law and that costs for demolition and temporary solutions are operating costs and may not be capitalised. Finally, the Federal Administrative Court considered the average price method for energy costs used by ElCom in its ongoing practice to be applicable, also in this specific case.

In Ruling A-699 / 2017 of 26 August 2019, the Federal Administrative Court addressed the recoverable energy costs of another municipal utility. In particular, it confirmed the applicability of the average price method, the CHF 95 Rule and the coverage differential mechanism. The Federal Administrative Court also stated that the energy tariffs for universal service must be determined on a cost basis.

Appeals against both rulings were lodged with the Federal Supreme Court. The appeals process was still pending during the year under review.

In interim ruling 211-00300 of 7 February 2019, ElCom dismissed a request to discontinue the audit procedure relating to the years 2013 to 2015 on the grounds that the provision of automated cost accounting feedback is neither equivalent to nor does it constitute an obstacle to a tariff audit. An appeal was lodged against this ruling, which was partially upheld by the Federal Administrative Court in ruling A-1360/2019 of 9 December 2019. The Federal Administrative Court stated that, in this specific case, a tariff audit could no longer be performed for two of the three years being contested for reasons related to the protection of legitimate expectations. The Federal Department of the Environment, Transport, Energy and Communications (DETEC) and the parties concerned have lodged an appeal against this ruling.

2.7 Sunshine Regulation

The "Sunshine Regulation" uses a transparent and standardised process to compare the quality, costs and efficiency of different network operators. It makes deviations more visible. This type of regulation supplements the tariff auditing procedures, which can be extremely resource-intense in some cases. Here, selected indicators relating to quality of supply and services, as well as to costs and tariffs, measure the quality, costs and efficiency of the provision of services by the individual suppliers. In addition, compliance indicators demonstrate adherence with the legally stipulated deadlines and regulatory requirements. This direct comparison of network operators is intended to create incentives to eliminate any identified weaknesses without the need for intervention on the part of the regulator. For comparison purposes, network operators with similar structures are grouped together.

To calculate the indicators, ElCom essentially uses data that are submitted each year by the network operators within the framework of cost accounting and supply quality surveys. ElCom also uses data from the Federal Statistical Office (FSO) that are publicly accessible. This means that there are practically no additional administrative costs for network operators associated with the Sunshine Regulation.

ElCom was involved in activities relating to the Sunshine Regulation throughout the entire year under review. As in the previous year, the creation of a legal basis within the framework of the revision of the Federal Electricity Supply Act was again an important topic. The aim is to publish the results of the individual network operators. The Federal Office of Energy (SFOE) is responsible for preparing any legislation related to energy. ElCom will contribute to the proceedings within the scope of agency consultations and consultation procedures.

In the second half of the year under review, the focus was on the formation of groups for comparison purposes and on the calculation of the various indicators. ElCom divided the approximately 630 network operators into a total of eight groups based on topographic criteria, population density and the quantity of energy supplied to end consumers (energy density). It also calculated the necessary indicators for the fifth round. The individual results of the comparisons were successively submitted to the operators in autumn 2019, grouped by national language. As in the previous years, the results of the comparisons were only sent to the network operators to whom they applied. The indicators calculated remained unchanged for the year under review. During the current year, the situation is to be reviewed to determine whether any new indicators should be incorporated into the calculations.

As in past years, ElCom published many explanatory documents and results on the Sunshine Regulation on its website. These publications are aimed primarily at the network operators concerned, but also at interested members of the public.

2.8 Issues relating to measurement services

In a notification dated 29 May 2019, ElCom announced changes in its measurement services which entered into effect on 1 June 2019 within the scope of the Electricity Networks Strategy. Since then, network operators are no longer allowed to bill individual measurement costs to customers based on the load output measurements used before 2018; instead, these costs must be charged to the network. As a result, end consumers with network access will therefore be paying any costs incurred in connection with their load output measurement by means of the network use tariff of their customer group. Producers of electricity will no longer be responsible for paying any measurement-related costs.

In June 2019, ElCom approved an application made by one network operator that required access to private property in order to install a smart meter against the network consumer's will.

During the second half of the year, ElCom addressed the transitional provisions for the rollout of smart meters, which network operators are required to complete for 80 percent of measurement points by the end of 2027. If a network operator initiated the procurement of a smart measurement system before 2019 but the system does not yet meet all the requirements of the Federal Electricity Supply Ordinance, the metering equipment that forms a part of this measurement system may still be counted towards the required 80 percent. According to ElCom's clarification in Newsletter 9/2019, a procurement is deemed to have been initiated if evidence can be presented that a binding agreement was entered into (such as a purchase agreement). If offers have been obtained or negotiations regarding a purchase are still underway, on the other hand, procurement is not deemed to have been initiated. From 2019 onward, existing smart measurement systems may only be supplemented using elements that meet the requirements of the Federal Electricity Supply Ordinance in full.

2.9 Unbundling

The statutory provisions on the separation of network operation from the other areas (unbundling) are becoming increasingly important due to the fact that network operators are stepping up their participation in competitive areas of the market. ElCom therefore paid particular attention to the accounting unbundling of network operations, the prohibition of cross-subsidisation and the prevention of the use of information advantages from the network sector in the year under review. It responded to numerous inquiries and both informed and sensitised network operators on a variety of topics at appropriate events. The Swiss Federal Office of Energy (SFOE) is responsible for prosecution of criminal violations of the regulations on unbundling.

2.10 Feed-in remuneration at cost, merger for own consumption, non-recurring remuneration and competitive tenders

The promotion of electricity generation from renewable energy was fundamentally restructured as of 1 January 2018. Since that date, it has no longer been ElCom's task to assess Pronovo AG's decisions in this field. Under the transitional legislation, however, it remains responsible for pending cases. In the year under review, ElCom pronounced a total of eleven rulings relating to non-recurring remuneration, feed-in remuneration at cost and competitive tenders.

In two proceedings, ElCom implemented the judgement of the Federal Administrative Court (for example, cf. rulings A-84/2015 dated 8 December 2015 and A-195/2016 dated 5 June 2017 by the Federal Administrative Court) and determined that the photovoltaic systems in question were visually integrated. It therefore considers these installations to be attached and, in the interests of legitimate expectations, has awarded a one-off compensation, which covers the actual costs incurred for visual integration when adapting the installation to the requirements of an earlier SFOE directive that is incompatible with the Energy Ordinance. ElCom issued three rulings regarding refusal to authorise extension of time limits for project progress reports. Appeals were dismissed in three cases since the planning work carried out by the projects' initiator fell short of professional standards. To be more specific, several circumstances that can potentially occur in any planning context (withdrawal of a partner, etc.) had not been taken into account. The Federal Administrative Court stated in its judgement that there is no entitlement ensuring that a positive ruling regarding feed-in remuneration at cost will be transferred to a project on the waiting list and that, in this specific case, the delayed submission of the project progress report was attributable to the appellant's lack of professionalism with respect to how the project was prepared and planned.

Another case related to the repayment of subsidies that had been granted in connection with a competitive tender. In the wake of a judgement issued by the Federal Administrative Court, ElCom was required to award attorney's fees to an appellant who had withdrawn its appeal after the SFOE had agreed to the appellant's contingent proposals, even though ElCom had issued a simple notification informing the appellant that the proceedings had been discontinued in the absence of any grounds for a case.

ElCom issued one ruling on non-recurring remuneration and awarded the remuneration not to the applicant at Swissgrid AG, but

to the current operator of the PV system at the time of payment in accordance with the judgement of the Federal Administrative Court. As a result, an appeal was filed against this ruling with the Federal Administrative Court, which then dismissed it.

Furthermore, ElCom has reopened a case that had been dismissed by the Federal Administrative Court for re-evaluation. At issue was the question of whether or not a significantly expanded or upgraded system met the investment criterion with respect to previous electricity production. ElCom came to the conclusion that, when assessing "past production" in accordance with Article 3a (a) of the old Energy Ordinance (version dated 1 January 2009), production shall be determined on the basis of the electricity produced during the two full years of operation prior to 1 January 2006. An appeal has been filed against this ruling with the Federal Administrative Court and the proceedings are pending.

In its newsletter from 9/2019, ElCom provided specifications on how to design "practice models" in which the distribution network operator offers a self consumption arrangement shared with tenants as an alternative to a merger for own consumption. On this matter, it declared that the tenants concerned must consent to the self consumption arrangement and then must only pay network use remuneration on electricity obtained from the distribution network and that this must be clearly indicated on the bill.

In its capacity as an appellate body, ElCom issued rulings on two appeals lodged against rulings issued by the SFOE concerning competitive tenders. In both cases, the SFOE ordered the recovery of subsidies that had been wrongly paid out. In one of these cases, it also dismissed an application requesting the payment of additional subsidies. ElCom dismissed the appeal against the recovery of such subsidies since it lacked any sufficiently specific legal basis, both in energy legislation as well as in other federal legislation – in particular the Subsidies Act – and it violated the principle of legality enshrined in Article 5 of the Swiss Federal Constitution as a result. With regard to the application requesting the payment of additional subsidies, ElCom dismissed the appeal as the conditions for a subsidy were not met.

3 Networks

Switzerland's high-voltage network is a little over 6,600 km long. The photo shows an overhead line technician above Lake Walen.

3.1 Facts and figures relating to Switzerland's electricity networks

The Swiss electricity network extends over a total length of 204,882 kilometres, which is around five times the circumference of the Earth. Of this, the local distribution networks (network level 7) account for 71 percent, while Swissgrid's national transmission network accounts for just over three percent. As part of regular cost accounting reporting, ElCom surveys the Swiss electricity networks according to various equipment classes each year. The number of network operators in Table 2 refers to the network operators that have provided information on the equipment classes. In recent years, there has been a slight increase in the quantity of installations at the plants in most categories. As expected, the number of overhead lines and mast transformer stations has fallen, while the number of cables and transformer stations increased as a result of progress in cabling. The electricity network grew by three percent between 2014 and 2018. In 2018, there were just under 5.6 million end consumer measurement points and just over 5.3 invoice recipients. According to the Federal Statistical Office (FSO), there were just over 0.6 million companies in Switzerland (2018) and the population of Switzerland was just under 8.5 million (2018). Population growth between 2014 and 2018 was just under four percent.

Type of installation	2014	2015	2016	2017	2018	Unit
Pipe system, high voltage (NL 3), medium voltage (NL 5) and low voltage (NL 7)	116,477	119,621	119,277	120,509	122,616	km
Cable, high voltage (NL 3)	2,031	1,911	1,924	1,992	1,906	km
Cable, medium voltage (NL 5)	33,544	33,870	34,044	34,675	35,307	km
Cable, low voltage (NL 7)	76,311	77,590	78,011	79,269	80,029	km
Cable, connection to household (NL 7)	52,569	53,931	54,240	55,011	57,091	km
Supply line and cable (NL 1)	6,750	6,750	6,629	6,590	6,652	Line-km
Overhead line, high voltage (NL 3)	7,158	6,904	6,738	6,791	6,777	Line-km
Overhead line, medium voltage (NL 5)	10,914	10,590	10,061	9,784	9,458	Line-km
Overhead line, low voltage (NL 7)	9,719	10,653	11,621	8,150	7,663	Line-km
Substation, NL 2, NL 3, NL 4 and NL 5	1,314	963	893	1,056	819	Quantity
Transformer, NL 2	152	146	148	151	145	Quantity
Switching field, NL 2[1]	177	165	159	164	167	Quantity
Transformer, NL 3[2]	81	78	79	77	76	Quantity
Switching field, NL 3[1]	2,545	2,606	2,577	2,600	2,586	Quantity
Transformer, NL 4	1,145	1,143	1,142	1,150	1,143	Quantity
Switching field, NL 4[1]	2,110	2,078	2,011	2,078	2,163	Quantity
Transformer NL5[2]	317	190	75	72	73	Quantity
Switching field, NL 5[1]	26,727	28,226	30,836	29,934	30,685	Quantity
Transformer station, NL 6	52,425	53,405	53,024	53,144	53,730	Quantity
Mast transformer station, NL 6	5,685	5,748	5,402	5,457	5,265	Quantity
Cable distribution box, low voltage (NL 7)	171,712	174,897	174,377	174,917	177,430	Quantity
Measurement points (all consumers)	5,393,370	5,452,650	5,512,743	5,573,672	5,635,760	Quantity
No. of network operators	659	649	643	636	630	

1) Switching fields encompass the upper and lower field at the respective network level, except in the case of network level 2, for which the upper switching field is allocated to network level 1 in accordance with Article 2, paragraph 2 of the Electricity Supply Ordinance.
2) Transformers at network levels 3 and 5 handle different voltage series within the network level (e.g. at network level 3, 110 and 50 kV).

Table 2: Installations in the Swiss electricity networks

The total value of the Swiss electricity network is just under CHF 21.5 billion. Around 90 percent of this is attributable to the distribution network. The residual value of the installations in the distribution network has increased slightly by around CHF 0.5 billion compared to the previous year, while at the same time the revenue from end consumers for the use of the distribution network (excluding fees and payments to the state and charges for renewable energy) rose by around 3 percent to just over CHF 3.5 billion.

The following figures show for the distribution network how ownership and network use revenues are divided according to the size of the companies. In both figures, the 100 largest network operators are divided into groups of ten, and all the remaining operators are grouped together in a separate category (Rest). The ten largest companies (dark blue) therefore own 43 percent of all declared assets (Figure 9). This is about the same as the next 90 companies. The approximately 530 small network operators (Rest – shown in light blue) have a share of 15 percent, roughly on a par with five years earlier.

A similar distribution can be seen in network use remuneration (Figure 10). The ten largest (dark blue) received 44 percent of all proceeds, roughly on a par with five years earlier. The share of the remaining group of small network operators (light blue) is slightly declining and stands at 14 percent.

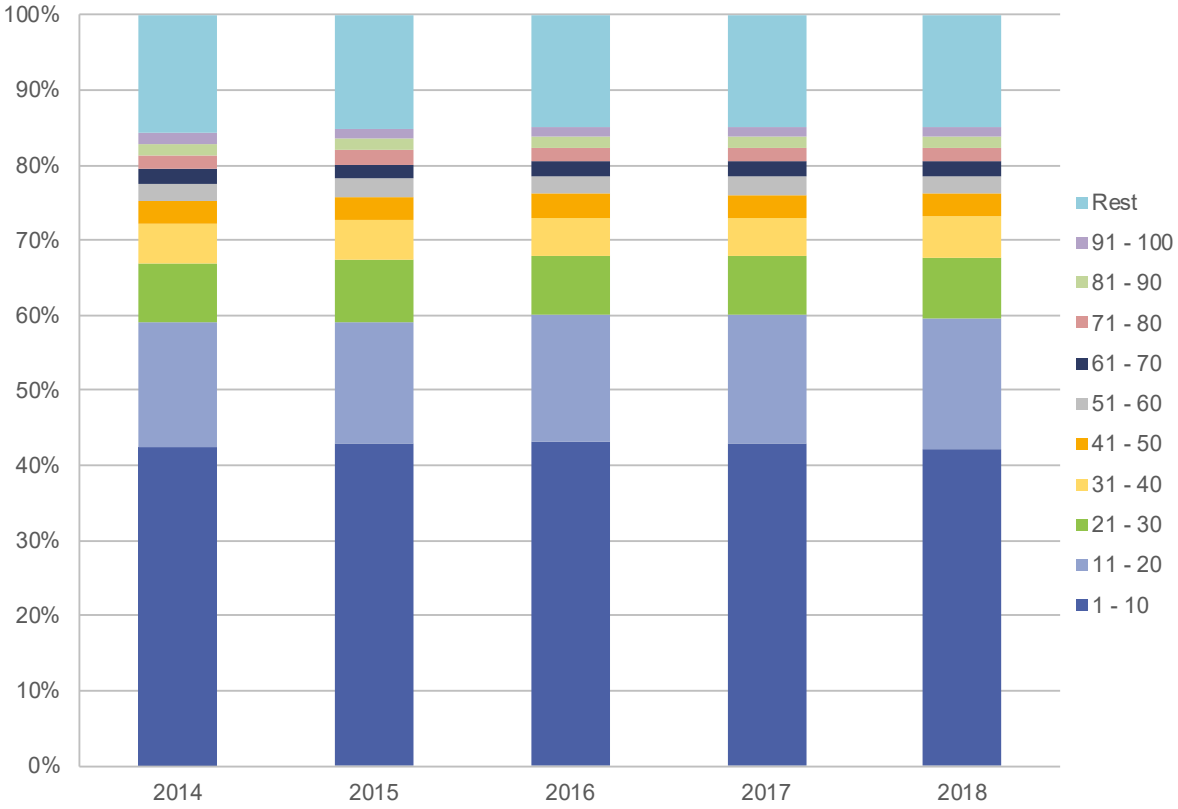


Figure 9: Proportional holdings in the distribution network by company size

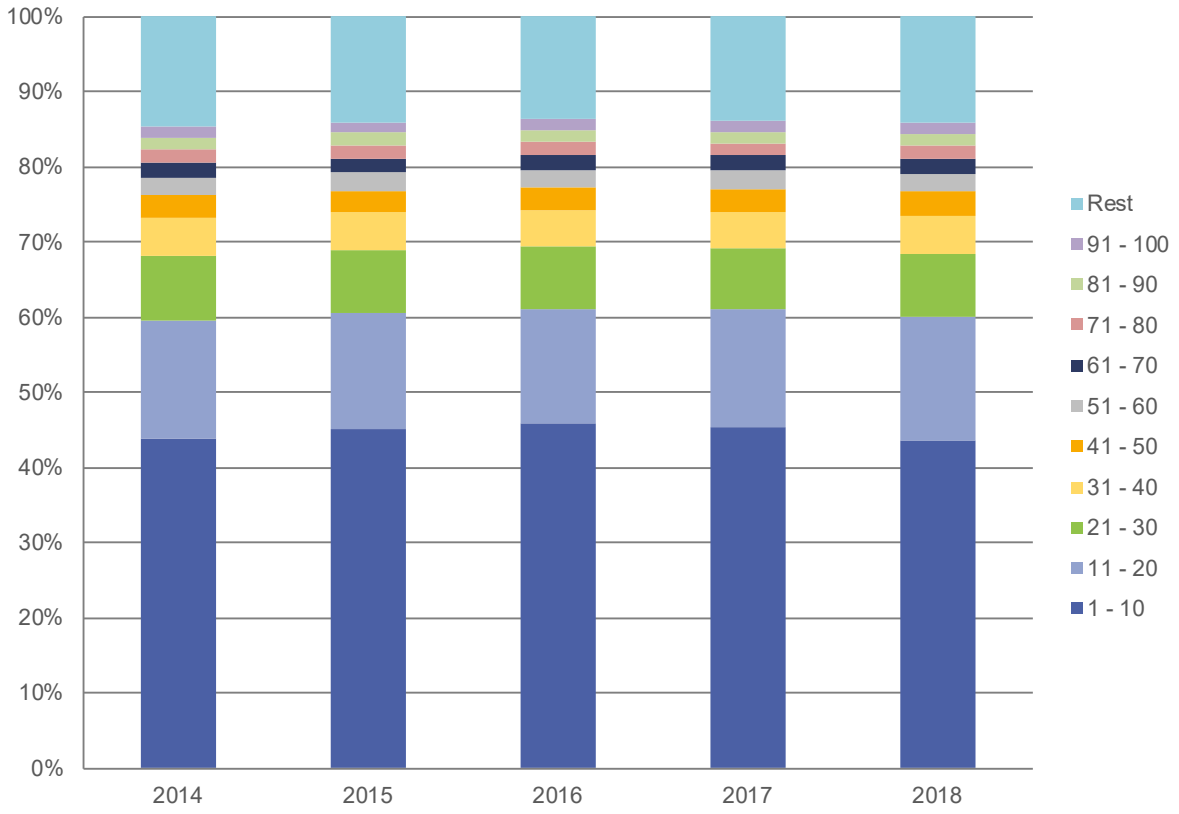


Figure 10: Proportion of network utilisation revenue (distribution network) by company size

The distribution network operators declared total network costs (including fees and charges as well as surcharges on the transmission network) of just over CHF 5.1 billion for 2018. These are based on the operating and capital costs of a "secure, high-performance and efficient network", plus tax expenditure and fees and payments to the state (including surcharges on the transmission network). The largest component of distribution network costs is operating and capital costs, which account for 68 percent of the total, or CHF 3.4 billion (Figure 11). If this amount is added to the direct taxes and compared with the network use remuneration mentioned above, the shortfall amounted to around CHF 48 million for 2018. The share of fees and charges has risen by 15 percentage points to 31 percent over the last five years. This group includes fees and charges demanded by cantons and municipalities, as well as national legally required charges for renewable energies. The increase can be primarily explained by the gradual increase in the national legally required charges for renewable energies from 2014. However, the municipalities and cantons have also increased their fees and charges.

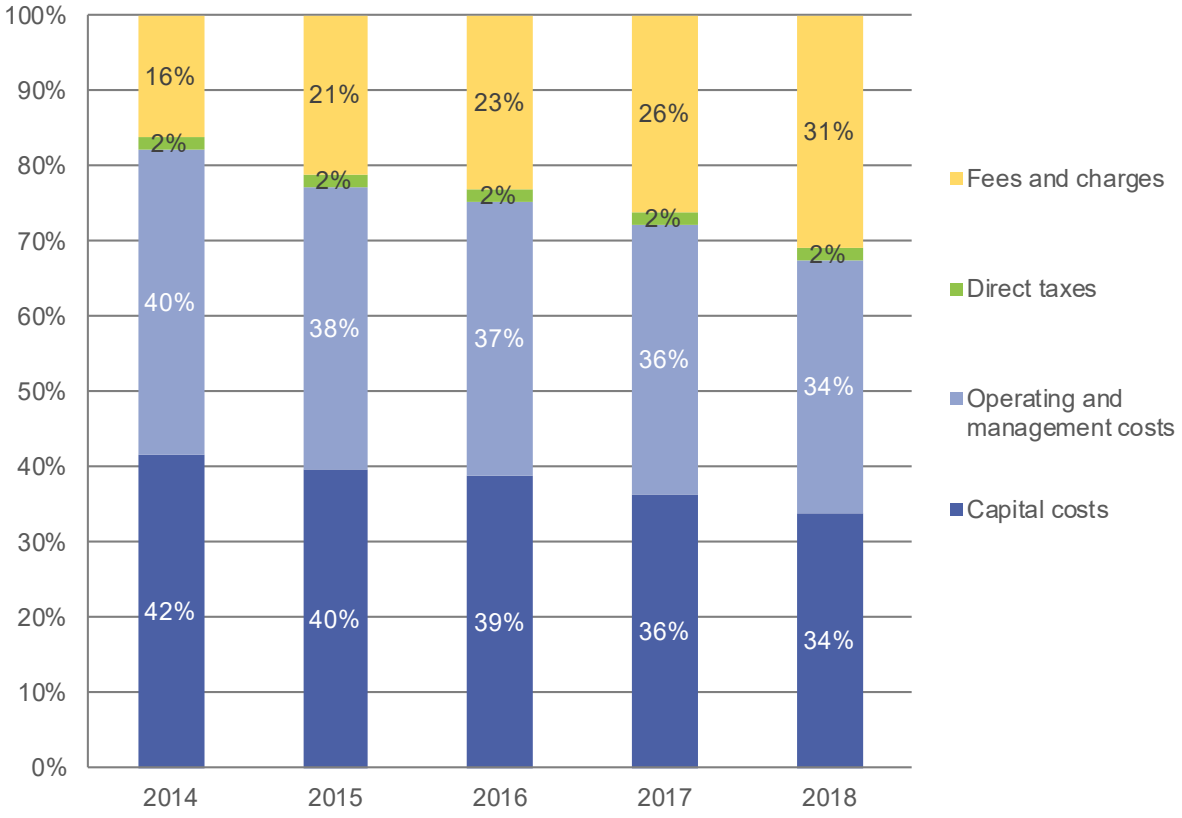


Figure 11: Breakdown of distribution network costs

In its 2018 Annual Report, Swissgrid reported network use costs of CHF 403 million and system services costs of CHF 166 million. If these accumulated costs of just over CHF 0.6 billion for the transmission network are added to the distribution network costs amounting to just over CHF 5.1 billion, this results in total costs of just under CHF 5.7 billion for the Swiss electricity network. Figure 12a shows how these are distributed among the individual network levels (NL). The local distribution network (NL 7) is by far the most costly, accounting for more than half of the total. Another fifth of the costs are incurred on NL 5. By comparison, the shares of costs at the transformation levels (NL 2, NL 4 and NL 6), which form the links between the various transmission levels, were low. The share of costs of the high-voltage network operated by Swissgrid (NL 1, including system services) was twelve percent. Figure 12b shows the distribution of network costs excluding fees and charges. There, it is clearly visible that the costs in Swiss francs and their share in total costs are significantly reduced on NL 7 compared to Figure 12a. This is because fees and charges are primarily on NL 7 and to a lesser extent on NL 5 and NL 3.

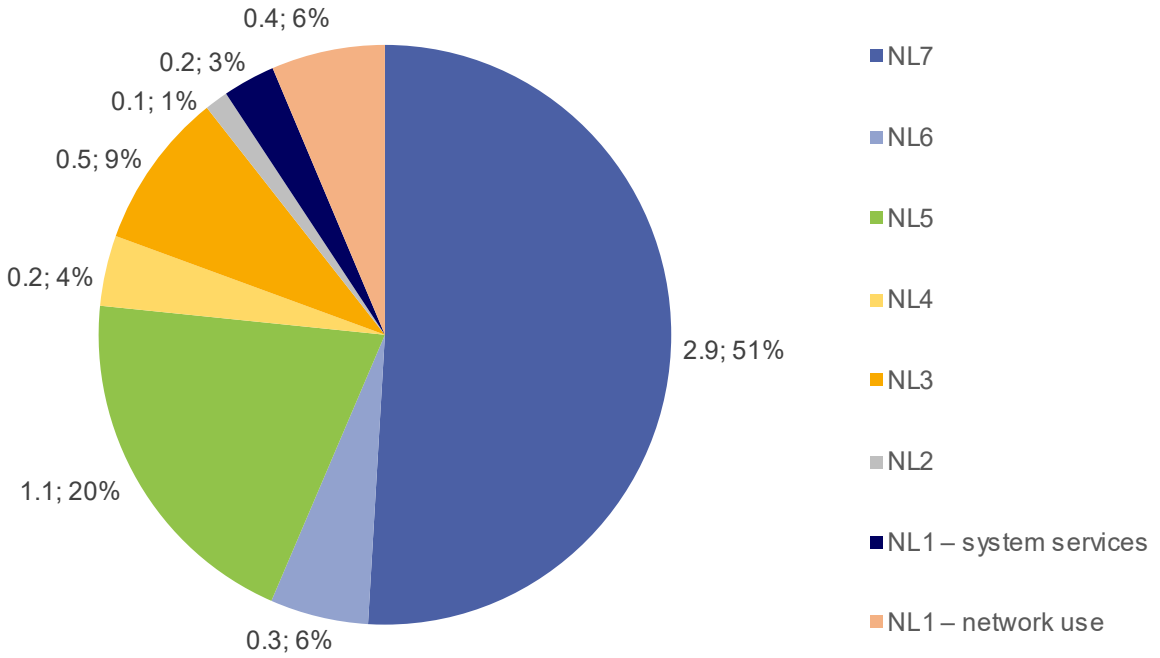


Figure 12a: Costs in billion CHF and breakdown of the shares of costs of the Swiss electricity network (including fees and charges as well as surcharges on the transmission network) by transmission network (NL 1) and distribution network (NL 2 to NL 7) in 2018

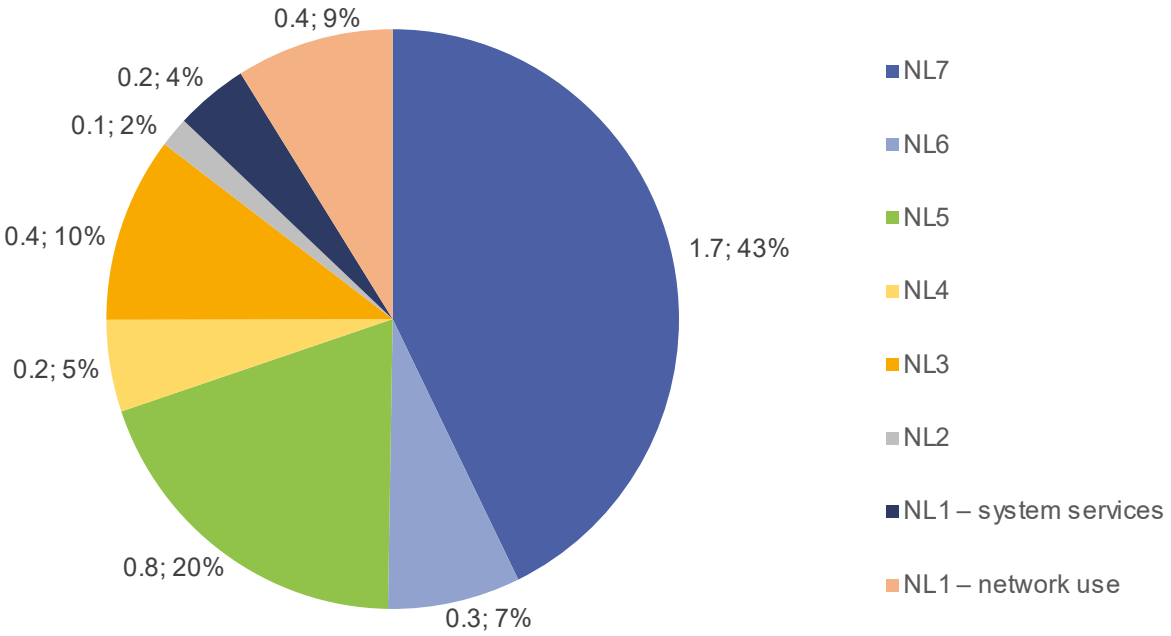


Figure 12b: Costs in billion CHF and breakdown of the shares of costs of the Swiss electricity network (excluding fees and charges as well as surcharges on the transmission network) by transmission network (NL 1) and distribution network (NL 2 to NL 7) in 2018

3.2 Network expansion and planning

3.2.1 Long-term planning of the transmission network

In accordance with Article 9a of the Federal Electricity Supply Act, which entered into force on 1 June 2019, the Federal Office of Energy (SFOE) develops scenarios that lay the basis for transmission and distribution network planning. These must take the federal government's energy policy objectives, general macroeconomic data and the international environment into account. When developing these scenarios, the SFOE consults with the cantons, the national grid operator, the other network operators and other involved parties as needed. Article 5a of the Federal Electricity Supply Ordinance states that scenarios must be reviewed every four years and updated where necessary. According to the SFOE, the first scenarios are expected to be ready in 2021.

Article 9d will enter into force on 1 June 2021; this article stipulates that the national grid operator must submit its long-term plan to ElCom for review within nine months of the Federal Council's approval of the most recent scenarios. The content of long-term planning is described in Article 6a of the Federal Electricity Supply Ordinance, which will also enter into force on 1 June 2021.

Since no scenarios are available at the present time, Swissgrid's long-term planning is based on the Strategic Grid 2025 report, which was completed in early 2015. With this report, the long-term planning of the transmission network has now been coordinated across Switzerland, and this essentially meets the requirements specified in Article 8 paragraph 2 and Article 20 paragraph 2a of the Federal Electricity Supply Act. From ElCom's perspective, the Strategic Grid 2025 report not only represents a significant milestone in the planning of the entire Swiss transmission network, but it can also contribute towards improving cross-border coordination in the areas of financing and use of the grid. The magnitude of the investments for the expansion and maintenance of the grid appears to be plausible. The preservation of the value of the transmission network can be assured on the basis of the defined planning.

The Strategic Grid 2025 report takes due account of the requirement for balanced investments as specified in Article 22 paragraph 3 of the Federal Electricity Supply Act. However, the uncertainty with respect to efficiency is probably considerably greater than the comprehensive, exact calculations regarding the indicated net benefit might suggest. For further discussion within the scope of long-term planning and the evaluation options in the sectoral plan and planning approval procedures, the uncertainties need to be quantified with the aid of sensitivity analyses. This will increase the meaningfulness of the cost / benefit analysis. With respect to cross-border financing, discussions concerning the methodology need to be intensified between Swissgrid and ElCom, as well as within all relevant bodies. Based on the report released by Swissgrid, it is now possible to assess the previously difficult-to-evaluate criterion of efficiency using a method that is as objective as possible and based on transparent assumptions. While this should be welcomed, the uncertainties with respect to evaluation of the benefits are also reflected in the criterion of efficiency. In view of this, the same sensitivity deliberations have to be applied here as those regarding the uncertainties relating to the benefits.

3.2.2 Long-term planning of the distribution networks

Since 1 June 2019, Article 9b of the Federal Electricity Supply Act stipulates that each network operator must specify which principles are to be applied for network planning. When specifying these principles, they must specifically take account of the fact that, as a general rule, the network may only be expanded if measures to optimise the network or increase its capacity are insufficient for guaranteeing a secure, high-performance and efficient network for the entire planning horizon. Paragraph 3 states that ElCom may define minimum requirements in this regard. According to Paragraph 4, the Federal Council may require the network operators to publish these principles.

Furthermore, Article 9c of the Federal Electricity Supply Act establishes network operators' obligation to collaborate for the purpose of expansion planning. This also includes the obligation to provide one another with any information required for this purpose at no charge. To this end, they must include the cantons affected and any other parties concerned in the planning process where appropriate.

Article 9d will enter into force on 1 June 2021; this article stipulates that the network operators must prepare a ten-year development plan (long-term plan) based on the scenarios and in accordance with further requirements for their network area for any of their networks with a nominal voltage higher than 36 kV. The long-term plan must describe the projects envisaged and explain the extent to which they would be effective and appropriate from both an economic and technical standpoint. Additionally, they must indicate which network development measures are envisaged beyond that ten-year timeframe. Article 6d paragraph 2 of the Federal Electricity Supply Ordinance, which also enters into force on 1 June 2021, states that the long-term plans for distribution networks with a nominal voltage higher than 36 kV must be drawn up within nine months of the Federal Council's approval of the most recent scenarios.

In accordance with Article 8 paragraph 2 of the Federal Electricity Supply Act, network operators are obliged to carry out long-term planning in order to maintain secure, high-performance and efficient network operation. This obligation applies to networks with a voltage of 36 kV or higher. In the view of ElCom, there is no need for action with regard to the fundamental method of preparing long-term planning. Nevertheless, ElCom will address this topic again as soon as the legal framework relating to "intelligent electricity supply networks" has been more clearly defined. For the time being, ElCom recommends that network operators should use the document entitled "Long-term planning for NL 2 and NL 3" published by the Association of Swiss Electricity Companies (VSE) as a reference tool and contact the Technical Secretariat of ElCom if they have any questions regarding the recoverability of the costs associated with the various expansion options.

3.2.3 Participation in the sectoral plan and planning approval procedures

In the procedures for the Electricity Transmission Lines sectoral plan and the planning approval procedure, ElCom checks compliance with the criteria set out in the Federal Electricity Supply Act ("a secure, high-performance and efficient network"). DETEC reaches decisions on any differences that arise between ElCom, the SFOE and ESTI based on the agreement from 2018.

In 2019, ElCom was included in the support group for the Niederwil-Obfelden electricity transmission lines sectoral plan procedure (SÜL 611) as part of its official duties and voted in favour of the overhead line version in the interest of efficiency. On 2 December 2019, following a decision by the department, a public cooperation procedure was launched with a partially cabled version. ElCom was also included in the support group for the Maggia Valley electricity transmission lines sectoral plan procedure (SÜL 109). At the distribution network level, ElCom commented on several projects concerning voltage increases as part of the planning approval process.

3.3 Investments in the grid infrastructure

As part of its monitoring tasks, ElCom monitors whether sufficient investments are being made to ensure that the electricity network remains in good condition.

3.3.1 Investments in the transmission network

Taking into account the past annual results, the bottom-up budget of CHF 226.9 million was reduced by CHF 53.7 million to CHF 173.3 million in the form of a realisation discount. Changes to planned investments in the 2018 realisation period were in line with expectations and delays arose in particular in three major transmission line projects in Valais for a variety of reasons. Actual investments for the 2018 network projects amounted to CHF 168.6 million.

3.3.2 Investments in the distribution network

Between 2014 and 2018, the distribution network operators invested around CHF 1.4 billion annually (Figure 13). During this period, write-offs increased from just over CHF 891 million to over CHF 940 million. As a result, the investment surplus fell from around CHF 510 million to just under CHF 460 million. Since the reliability of Switzerland's electricity networks is very high, also by international comparison, and was greatly improved during the period under review (cf. Section 4.5), ElCom still considers the investments in the distribution network to be sufficient.

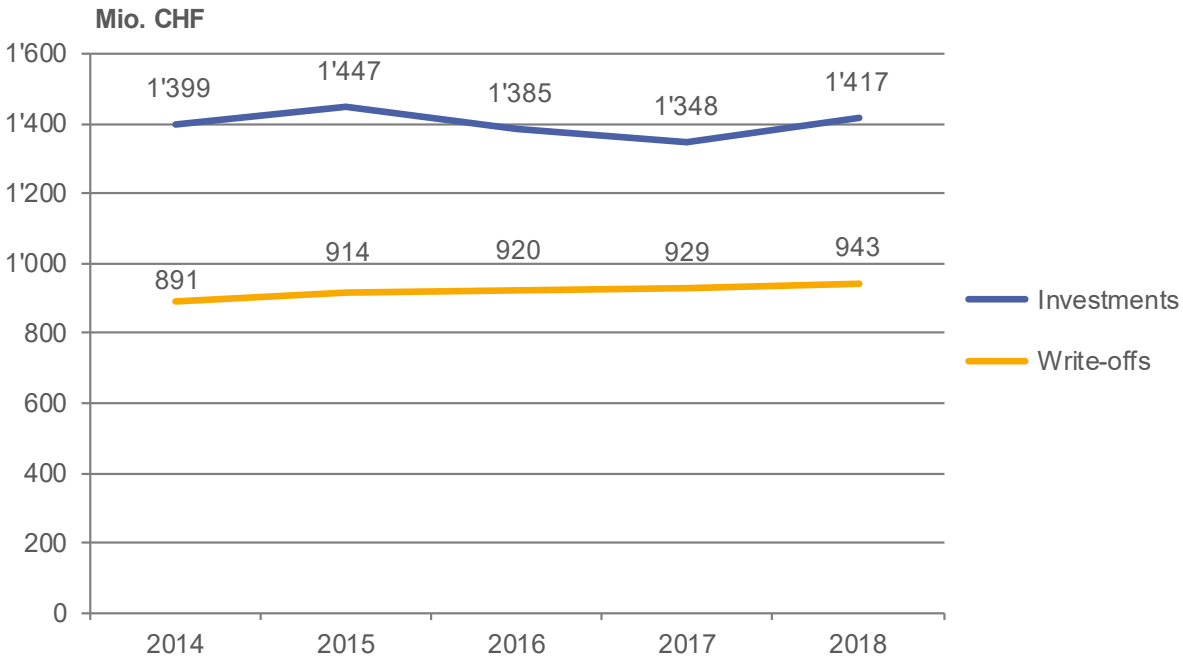


Figure 13: Trend in investments and write-offs in the distribution network

3.4 Increases in network capacity

Additional network capacity may become necessary in order to connect producers of electricity from renewable energy to the distribution network. Swissgrid refunds the associated costs by incorporating them into its calculation of the system services tariff. This form of remuneration therefore requires the approval of ElCom, which relies on a directive that serves as a guideline for network operators when submitting applications. This directive also specifies the criteria for the assessment of such applications. In the year under review, ElCom evaluated 123 applications for the remuneration of costs associated with increases in network capacity. ElCom dismissed one application since the entitlement to a refund had expired. In the past ten years, ElCom has issued a total of 932 rulings of this nature (cf. Figure 14).

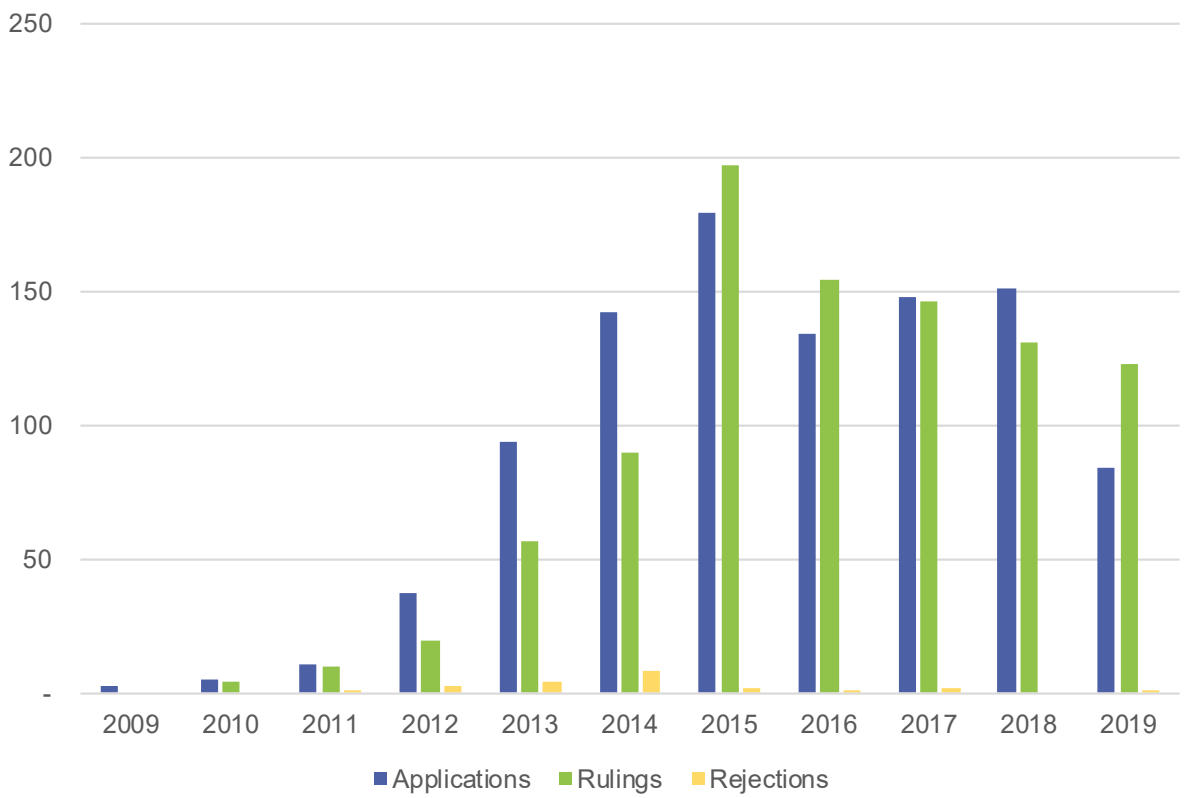


Figure 14: Trend in the number of rulings on network capacity increases

As of the end of 2019, the total costs for network capacity increases reached CHF 104.3 million, with a total power plant output of 343.2 MW. Table 3 presents an overview of the key data relating to network capacity increases in the period from 2009 to 2019.

	Total	PV	Wind	Other[1]
No. of rulings	932	885	5	42
Minimum generator output [kW][2]		4	3,000	22
Maximum generator output [kW][2]		8,303	16,000	74,000
Total generator output [kW]	343,196	149,685	30,000	163,511
Minimum costs [CHF][2]		3,500	1,805,003	16,697
Maximum costs [CHF][2]		746,912	9,262,389	2,599,730
Total costs [CHF]	104,279,850	67,634,847	19,853,343	16,791,661
Average costs [CHF][3]	112,857	77,121	3,970,699	399,801

	Total	PV	Wind	Other[1]
Minimum relative costs [CHF/kW][4]		3	346	3
Maximum relative costs [CHF/kW][4]		9,719	819	3,498
Average relative costs [CHF/kW][4]	293	454	532	82

1) For example, biomass, small hydropower plants, applications involving different types of installations
2) Per application / ruling
3) Corresponds to the average value of approved costs of network capacity increases per ruling
4) Relative costs = ratio of costs to installed capacity

Table 3: Figures relating to rulings on network capacity increases pronounced between 2009 and 2018

3.5 National grid operator

The former owners of the transmission network were required by law to transfer the entire network to the national grid operator, Swissgrid. The transfer of further transmission grid facilities to Swissgrid continued in 2019. This in turn resulted in an increase in the share capital of the national grid operator.

3.6 Rulings and decisions relating to networks

In its ruling of 21 November 2019, ElCom refrained from vindicating an application in which the applicants sought a declaratory statement that balance energy had been wrongly invoiced following an intervention by the grid operator in its power plant operations, due to a lack of interest in a declaratory statement. ElCom had already made a statement on the obligation to pay a network use tariff in Ruling 212-00276 of 13 September 2018. The applicant took the view that the energy purchased from third parties and flowing through its network was not exempt from the payment of network use remuneration. The respondents took the view that they were purchasing concession energy and therefore did not have to pay network use remuneration on the basis of Article 14 paragraph 5 of the Federal Electricity Supply Act. In its preliminary interpretation of the concessions (cf. ElCom Ruling 212-00276 of 11 April 2017 concerning ElCom's competence to assess concessions), ElCom came to the conclusion that, in particular, the wording of the concessions argues that, in this specific case, energy import is not exempt from the payment of a network use remuneration as defined by Article 14 paragraph 5 of the Federal Electricity Supply Act. An appeal was lodged against this ruling and was dismissed by the Federal Administrative Court in ruling A-5904/2018 of 4 December 2019.

4 Supply security

The Mühleberg nuclear power plant went offline on schedule in 2019, making it the first in Switzerland to be shut down. Mühleberg had covered some five percent of Switzerland's annual demand for electricity.

4.1 Introduction

The SFOE conducted a round table discussion in 2019 on the roles and responsibilities of supply security. No need for legislative action was identified, as the roles and responsibilities are generally clearly defined: Distribution network operators are responsible by law for ensuring the provision of universal service to end consumers. With respect to end customers with free market access, supply is regulated under private law via supply contracts. Swissgrid is responsible for guaranteeing the availability of a secure, high-performance and efficient transmission network. Swissgrid is not responsible for providing supply energy, however.

In accordance with Article 22, paragraphs 3 and 4, of the Federal Electricity Supply Act, ElCom is responsible for monitoring supply security. If there are signs of a significant threat to the domestic supply in the medium or long term, Article 9 of the above act stipulates that ElCom must propose suitable measures to the Federal Council. These may take the form of efficient electricity use, the procurement of electricity or strengthening and expanding the electricity networks. Supply security is assured if the desired quantity of energy is available at the necessary level of quality and at reasonable prices across the entire electricity network at all times.

4.2 Supply security: review and outlook

In order to fulfil this monitoring mandate, ElCom employs comprehensive monitoring methods to observe medium- to long-term supply security. Significant results from these monitoring activities for the year under review are presented in the following sections.

4.2.1 Review of winter 2018 / 2019

Winter 2018/2019 started with very mild temperatures and high levels in the reservoirs despite the initially persistent dry spell. The production availability of the French nuclear power plants was normal and all Swiss nuclear power plants were also connected to the grid. At the end of October, a 380 kV transmission line on the Albula Pass was damaged by the storm Vaia. This reduced the transit flow capacity to Italy by 900 MW until it went back online at the end of July 2019. No threat of any seriously negative effects on supply security in Switzerland could be identified.

Despite an initial announcement that the electricity supply could experience some temporary disruptions, supply security was upheld in Belgium with the assistance of neighbouring countries.

4.2.2 Situation in winter 2019 / 2020

The winter began with mild temperatures and above-average water levels in the reservoirs. The production availability of the French nuclear power plants was normal and all five nuclear power plants in Switzerland were also connected to the grid.

In mid-November, unscheduled unavailabilities of power plants in southern France led to high scheduled and unscheduled flows in Switzerland for several days. This had an impact on Swiss network operations and also made it necessary to reduce NTC imports. The newly available solution, trilateral redispatch, could not be used in this situation because power plants in France were unable increase their production to the required level at that point in time. Against this backdrop, the scheduled decommissioning of the Mühleberg nuclear power plant took place at the end of December. Due to the generally tense situation and the shutdown of the Mühleberg nuclear power plant, Switzerland took an additional, temporary step by agreeing a minimum level of production with hydropower storage plants in western Switzerland; this was unproblematic due to the high level of available stored energy.

For the most part, Switzerland's supply situation for the rest of the winter seems relaxed from today's perspective. No major disruptive factors are identifiable on the energy side and the water levels in the reservoirs are still at record highs. With respect to the network, there is still a problem with unscheduled load flows however the new solution, trilateral redispatch, puts Switzerland in a better position to take corrective action if the situation gets tight.

4.2.3 Other incidents over the course of the year

A large frequency deviation occurred across Europe in January 2019[3]. This was attributable to both an incorrect measurement as well as frequency deviations at the turn of the hour, a problem which has been known for some time already. A comprehensive report compiled by ENTSO-E on the incident triggered the initiation and implementation of a diverse range of improvement projects.

On 20 May 2019 and thereafter over longer periods of time during the summer, it became necessary to impose strict export restrictions from Switzerland to neighbouring countries. This move was prompted by a combination of several different factors related to production, network planning and operation as well as scheduled flows due to flow-based market coupling in Europe. Swissgrid is preparing measures to optimise the availability of cross-border capacities.

In June 2019, a new price-setting procedure was introduced for the reserve power supply in Germany, which resulted in a significant shortfall in reserve power supply on several days[4]. Immediate intervention by transmission network operators, good support from European partners and downstream corrective measures made to market rules by the German Federal Network Agency enabled the problem to be resolved without any disruptions.

3 To read the ENTSO-E report, please go to: https://www.entsoe.eu/news/2019/05/28/entso-e-technical-report-on-the-january-2019-significant-frequency-deviations-in-continental-europe/

4 See also: https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2019/20190717_Bilanzkreistreue.html

4.3 Unscheduled flows

In an interconnected network, the actual flow of electricity never corresponds exactly to the traded and scheduled flows. The deviation between physical and trade flows through the transmission network as an unscheduled flow, e.g. up to 30 percent of the quantity traded from Germany to France physically flows through Switzerland.

The introduction of flow-based market coupling in the Central Western Europe region, excluding Switzerland, significantly increased trading capacities from Germany to France, which in turn causes some bottlenecks in the Swiss network, particularly in winter.

Long-standing efforts on the part of Swissgrid and ElCom are slowly starting to bear fruit. The problem is now also being acknowledged by Switzerland's neighbouring countries. An interim solution was found in early February 2019 for the rest of the 2018 / 2019 winter, which involved restricting imports by France from Central Western Europe in the event of very high unscheduled flows through Switzerland. The transmission network

operators and regulators of France, Germany and Switzerland then developed a solution for the winter of 2019 / 2020 that calls for a trilateral redispatch. Under this solution, if unscheduled flows cause an overload, Swissgrid can simultaneously instruct France and Germany to increase or reduce their production in order to relieve the bottleneck in Switzerland. This instrument has been available to Swissgrid since December 2019.

At the same time, work is being done to devise a permanent solution that not only targets the symptoms. To this end, Swissgrid and ElCom are in contact with the committees of the CORE capacity calculation region and the EU. The goal is ensure that flows in the various countries be factored into the capacity calculations in a balanced way so that unscheduled flows of this nature only cause bottlenecks in exceptional circumstances.

4.4 Cyber security

Electricity networks are increasingly controlled and monitored using intelligent information and communications technology. These systems offer the network operator more control options and enable more efficient system operation as well as the provision of new services. However, this increasing networking of information technology increases threats such as the risk of hackers penetrating the electricity network and compromising the availability , integrity and confidentiality of data or damaging technical equipment. Such an incident could lead to considerable financial damage and above all to reputational damage on the part of the network operator concerned. In extreme cases, a large-scale power outage according to the scenarios of the Federal Office for Civil Protection (FOCP) could lead to injuries or even deaths as well as environmental damage. This makes cyber security a key issue in ensuring supply security.

According to Article 22 paragraph 3 of the Federal Electricity Supply Act, ElCom is responsible for monitoring the electricity markets with a view to ensuring secure and affordable supply in all parts of Switzerland. This implicitly includes information technology risks and therefore also regular monitoring of the state of network operators' cyber security.

For this reason, ElCom decided in 2018 to provide an overview of the status of organisational and technical cyber security measures at the 92 largest network operators. ElCom summarised the results of this survey in its "Cyber Security 2019" report and formulated recommendations on the basis of this report. It does not examine the status of the entirety of their cyber security measures. Instead, it focuses on risk management, raising employee awareness and dealing with external service providers, as well as fundamental issues relating to

network architecture and the detection of cyber incidents. The recommendations therefore only apply to the topics examined. The following comments and recommendations therefore only apply to the subject areas examined, which ElCom based on existing standards and industry documents.

Ongoing networking means that cyber security is continuing to grow in importance. ElCom welcomes the efficient, risk-based implementation of the Association of Swiss Electricity Companies (VSE) industry documents ICT Continuity, Handbuch Grundschutz für Operational Technology in der Stromversorgung (Handbook on Basic Protection for Operational Technology in Electricity Supply) and Richtlinien für die Datensicherheit von intelligenten Messsystemen (Guidelines for the Data Security of Intelligent Measurement Systems) in accordance with the FOCP's CIP guidelines. ElCom also requires that these be implemented. Based on the results of the survey, ElCom considers the improvement of organisational measures, in particular the development of guidelines and training programmes, and the protection of OT as well as guaranteeing supply through a redundant system to be of central importance. ElCom welcomes the efforts to establish a CERT sector in the sense of subsidiarity.

5 Availability means that the systems and data to be protected can be accessed and used by an authorised entity upon request.

6 Integrity means the correctness and completeness of the processed data and the correct functioning of the systems.

7 Confidentiality refers to the protection of systems and data against unauthorised access by persons or processes.

4.5 Quality of supply

4.5.1 Network availability

The quality of supply is to some extent defined by the degree of network availability. In Switzerland, the development of network availability has been closely monitored since 2010. For this purpose, ElCom uses the two internationally recognised indices, SAIDI (System Average Interruption Duration Index) and SAIFI (System Average Interruption Frequency Index). SAIDI quantifies the average duration of interruptions per end consumer, while SAIFI indicates the average frequency of interruptions per end consumer. Figures concerning all unscheduled interruptions that last longer than three minutes and occur as the result of natural phenomena, human error, operational problems or external influences, are integrated into the calculations for both indices.

For the purpose of monitoring network availability, ElCom evaluates interruptions to supply from the 95 largest Swiss network operators, which account for 88 percent of the country's energy turnover via their networks. In 2018, the 95 largest network operators experienced 6,495 unscheduled interruptions (cf. Table 4), a slight increase compared to the previous year. However, the number of interruptions on its own is not sufficient to make reliable conclusions regarding network availability. It is only when this figure is combined with the duration of interruptions and the number of end consumers that are affected that such an evaluation can be made.

	2015	2016	2017	2018	2019[1]	Unit
Interruptions	4,401	4,328	4,814	6,495		Number of unscheduled interruptions
SAIDI	11	9	10	14		Minutes per end consumer
SAIFI	0.23	0.20	0.21	0.27		Interruptions per end consumer

1 The data relating to supply security in 2018 will be published in June 2019 on ElCom's website.

Table 4: Development of supply quality in Switzerland from 2014 to 2018 (unscheduled interruptions only)

In 2018, the average duration of unscheduled interruptions per end consumer was fourteen minutes. This figure represents a nationwide improvement of four minutes compared to the previous year. The average frequency of unscheduled interruptions per end consumer in 2018 was 0.27, which was higher than in the previous year. Network availability remains extremely good in Switzerland. The higher SAIDI and SAIFI figures in 2018 are primarily attributable to extraordinary natural phenomena (storm Burglind). The high quality of supply in Switzerland is also confirmed in international comparisons. According to the "CEER Benchmarking Report 6.1 on the Quality of Electricity and Gas Supply", Switzerland is among those countries with the highest quality of electricity supply in Europe.

4.5.2 Import capacity

Alongside network availability, the available import capacity is also a key factor for Switzerland's electricity supply security. ElCom therefore monitors the development of available cross-border net transfer capacity, which comprises import NTC and export NTC.

NTC indicates the level of cross-border transport capacity that can be used by traders in neighbouring countries for commercial exchanges, both for imports and exports, without infringing the safety standards. Swissgrid defines the level for the four Swiss borders together with the operators of the neighbouring transmission networks. The proportion of the import and export capacity of the Principality of Liechtenstein, which belongs to control zone Switzerland, is included in the calculation of the import and export capacity from Austria.

Table 5 presents an overview of the trend in available import capacities, including for all borders as a group, for the neighbours to the north, as well as for each of the individual borders between Switzerland its neighbouring countries. Looked at on an hourly basis, the NTC can be more volatile than reflected by average import and export figures shown for the year.

IMPORT NTC (MW)	2015	2016	2017	2018	2019
Total	**6,947**	**6,962**	**6,987**	**6,756**	**6,657**
Neighbours to the north (AT, DE, FR)	5,225	5,245	5,265	5,034	4,936
France	3,073	2,974	3,007	2,772	2,678
Germany	1,373	1,468	1,501	1,396	1,343
Austria	779	803	757	866	915
Italy	1,722	1,717	1,722	1,722	1,721

Table 5: Available import capacity (NTC) for Switzerland, 2015 to 2019 (average of hourly NTC for the year)

Because the exchange of energy with the neighbouring countries primarily takes place via the 380 kV network, but imported electricity is supplied to end customers in Swiss distribution networks via the 220 kV network, it is the available capacity of the coupling transformers (380 / 220 kV) above all that determines the maximum possible import capacity. It is also influenced by unscheduled physical flows. In part due to this uptick in unscheduled flows, average NTC for the countries to the north of Switzerland has been trending downward since 2018. Along Switzerland's northern border, import capacity from France and Germany continued to decline on average in 2019, however this could be offset to a certain extent by import capacity from Austria, where the wholesale market has been decoupled from the German market since October 2018. Conversely, import capacity from Italy remained relatively stable between 2015 and 2019. So far, this region has been less relevant in terms of Switzerland's supply security under normal circumstances than import capacities of countries along the northern border. However, as the markets become more volatile and Germany phases out its nuclear and coal-fired power plants, imports from Italy will become more important as well.

4.5.3 Export capacity

In view of the high transit flows through Switzerland (from north to south) and its neighbouring countries, the available export capacity, particularly to Italy and France, is also an important factor for Switzerland's supply security (see Table 6). Moreover, the extent of this export capacity to Italy has a major impact on the utilisation of Switzerland's import capacity on the borders to France, Germany and Austria.

EXPORT NTC (MW)	2015	2016	2017	2018	2019
Total	**9,321**	**9,262**	**9,129**	**8,769**	**7,933**
Neighbours to the north (AT, DE, FR)	6,373	6,276	6,207	6,115	5,415
France	1,188	1,125	1,180	1,184	1,163
Germany	4,000	4,000	4,000	3,888	3,491
Austria	1,185	1,151	1,027	1,043	761
Italy	2,948	2,986	2,922	2,654	2,518

Table 6: Trend in Switzerland's export capacity (NTC) to Italy and France, 2015 to 2019 (average of hourly NTC for the year)

The two 380 kV lines over the Albula Pass (GR; Filisur-Robbia and Pradella-Robbia-Sils), which were damaged by the storm Vaia at the end of October 2018, have been back in operation since 29 July 2019. Nevertheless, export capacity to Italy continued to decrease in 2019 for several different reasons (including frequent capacity reductions ordered by Italy's TSO to ensure stability on Italy's domestic network, especially during periods of low consumption in Italy, e.g. during Easter or summer holidays). Overall, export NTC to Italy from January to August 2019 was lower than that of 2018, however it rose again in September and in the last quarter of 2019.

In addition, the export NTC to Germany and Austria was considerably smaller in 2019 than in 2018. In summer 2019, export capacity to Germany was temporarily reduced to a level below the regular agreed static NTC value of 4,000 MW, since there was an increase in severe overloads during times when both Swiss production and export levels were high. Much like the approach used for imports to Switzerland, load flow-based scenarios should in future make it possible to perform a more detailed assessment of the situation at any given time. This will make it possible to determine and and grant the maximum NTC value for the period D-1 on a daily basis in accordance with the grid elements available. Load-flow scenarios factor in remedial actions that do not incur any costs in order to optimise the network and the associated NTC values.

4.5.4 Total import and export capacity

Overall, total import capacity has decreased somewhat in 2018 and 2019; while Switzerland's total export capacity of has been declining since 2015, this trend became even more pronounced in 2019. It decreased both along the northern border and along the border to Italy.

Taken together (import and export NTC), the average overall exchange capacity between Switzerland and its neighbouring countries was 16,268 MW in 2015. By 2019, this amount had declined by nearly 1,700 MW to just 14,590 MW. During this period of time, exchange capacity for all three borders along the northern border declined by a total of around 1,250 MW and by more than 400 MW on the border to Italy. This reduction can be explained by the greater risk of violations of the (N-1) security criterion in the Swiss network, delayed network investments (e.g. complaints lodged against the voltage increase on the Bassecourt-Mühleberg ultra-high voltage line), unscheduled flows from neighbouring countries and Switzerland's inadequate integration into European capacity calculations.

4.5.5 Retrofitting decentralised energy generation plants

Many of the photovoltaic systems (PV systems) installed in the Swiss control zone and in the entire interconnected European network are configured so that they switch off completely if the frequency reaches 50.2 Hz. This suddenly eliminates a relevant amount of electricity generation from the grid and behaviour such as this could endanger the system. In order to contain this problem, steps must be taken throughout Europe (including the Swiss control zone) to ensure that no further systems are connected to the grid unless they comply with the necessary protection settings.

ElCom therefore issued Directive 1/2018 on 6 March 2018 and published it on its website. Additionally, a retrofit programme was initiated in a letter sent to distribution network operators on 15 June 2018, which addresses the issue of existing PV systems shutting down in response to over-frequency. This was initially limited to PV systems with a connected capacity of ≥ 100 kVA (Retrofit 1), since this approach would achieve a great impact quickly but with relatively little effort.

Responses received from distribution network operators in early 2019 have shown that the percentage of non-compliant PV systems among older systems is considerable, whereas the share of non-compliant systems decreases among newer systems, as expected. A projection of the compliance rates determined within the scope of Retrofit 1 (on an annual basis) to those PV systems with < 100 kVA installed until the end of 2017 has shown that non-compliant PV systems with an installed capacity of at least 347 MVA will remain online in Switzerland after completion of Retrofit 1. The number of non-compliant PV systems must be limited to less than 200 MVA within a reasonable period of time in the interest of preserving network stability.

ElCom has therefore decided to extend the retrofit programme to PV systems < 100 kVA

(Retrofit 2). Once again, ElCom's main concern was to keep things in proportion and to achieve the required level of compliance at the lowest possible cost. Based on this principle and the projections made, all PV systems > 30 kVA installed after 31 December 2010 will have to be checked by the end of 2022 and retrofitted if necessary as part of Retrofit 2. In an information sheet published in June as a communication, ElCom explained the rights and obligations of the operators of decentralised energy generation plants connected to the distribution network under the Retrofit programme.

4.6 System services

In order to guarantee supply security, sufficient capacities have to be available for the production of electricity, and there have to be adequately dimensioned transmission and distribution networks for supplying energy to end customers. Since electricity cannot be stored in the network, the quantity of energy fed into the grid always has to be equal to the quantity that is taken out of it. Despite the high-quality production and consumption forecasts provided by energy suppliers, precise planning for this purpose is not possible. This means that even minor deviations from the targeted quantities have to be balanced on an ongoing basis.

As a rule, this balancing process is performed by adjusting the production of electricity to the current level of consumption. This constant balancing of production and consumption calls for power plants whose production can be efficiently regulated. The balancing power provided by these power plants is purchased in a market-based procedure, and the associated costs have to be passed on to end customers via the system services tariff, which is used for charging for other services that are required for the safe operation of the network, including balance management, self-contained start and independent operation capability, voltage stability and compensating active power losses. However, balancing power represents the most important segment of system services in financial terms. In the year under review, the costs for balancing power amounted to around CHF 61 million and were thus lower than they have ever been before. Figure 15 shows the development of prices for balancing power over the past five years. The increase in 2016 was attributable to the tense supply situation in Switzerland during the winter. A comparison over a period of several years indicates that the prices for balancing power have generally stabilised with the exception of 2016.

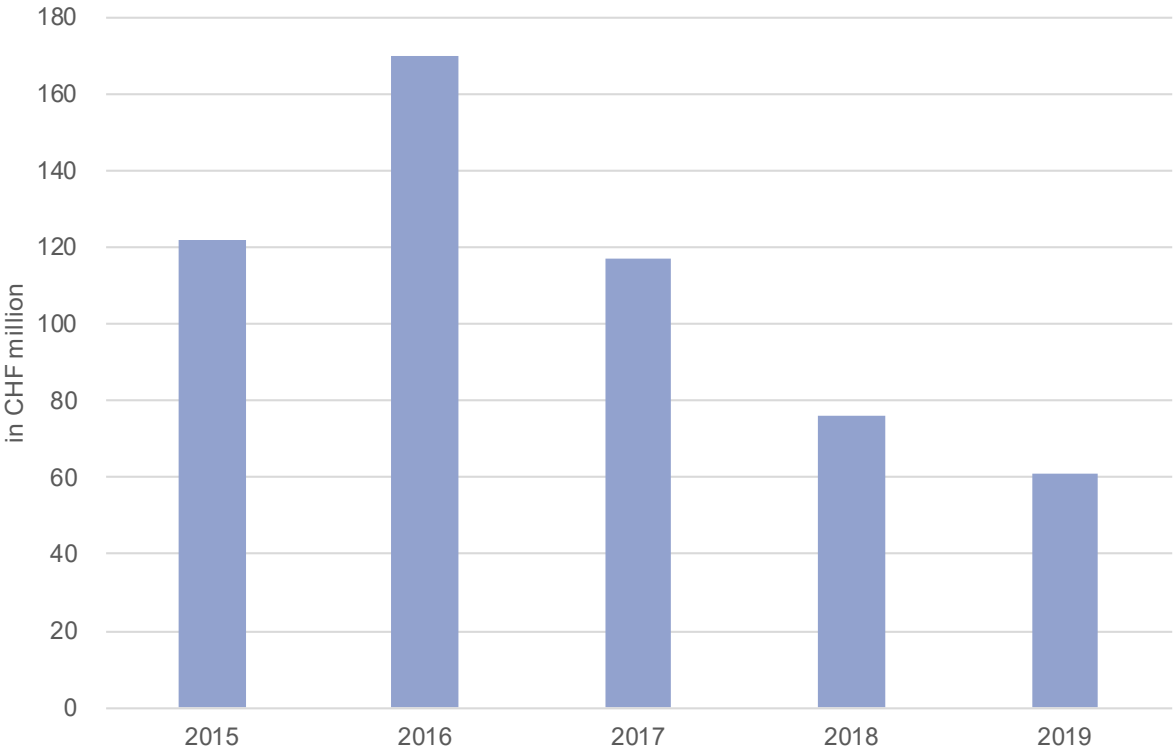


Figure 15: Development of the price of balancing power from 2015 to 2019

Since 2016, Swissgrid has been procuring a portion of the balancing power for the spring in advance. This assures the availability of water reserves while also increasing planning security for the operators of storage power plants. Advance procurement is important for risk management and for the players involved to gain a better understanding of their specific roles. In the year under review, costs related to advance procurement amounted to around CHF 16 million, thus putting them on a par with the corresponding costs incurred in 2018 of around CHF 15 million.

Swissgrid also changed how it procures secondary balancing power during the year under review in an effort to increase liquidity. Secondary balancing power had been purchased as a symmetrical product until mid-2018, meaning that the provider had to offer the same amount of positive and negative secondary balancing power. The switch to an asymmetrical product now makes it possible for providers to only offer positive or only negative secondary balancing power. This also enables Swissgrid to make more targeted purchases of the quantities needed.

5 Market Surveillance

Wholesale electricity trading in Switzerland is monitored by ElCom. The main focus of supervision is on the detection of market manipulation and insider trading.

5.1 Market transparency in wholesale electricity trading

With respect to market transparency and market surveillance, ElCom's efforts in 2019 once again focused on monitoring Switzerland's wholesale electricity market and analysing the activities of Swiss market participants in the European Union. ElCom received eleven Suspicious Trading and Order Reports (STORs) over the course of 2019. These STORs are sent to ElCom by the Trading Surveillance Offices of organised marketplaces if any irregularities arise that concern Swiss market participants. Next, the information contained in the STORs is examined in detail and, if appropriate, analysed in conjunction with information available at ElCom. Depending on the outcome of these analyses, market participants are contacted directly to clarify any questions that arise. Additionally, due to the low level of liquidity on the Swiss Intraday Market since XBID was first rolled out, several ad-hoc analyses have been performed, primarily with a focus on possible capacity hoarding at the Swiss borders and on trading with very small volumes.

Algorithmic trading is becoming increasingly important in the energy industry. The growth in fluctuating, hard-to-predict feed-in power from renewable energy is increasingly forcing market participants to constantly readjust their electricity position on the intraday market. Di-

gitalisation is creating new options as well. This situation prompted ElCom to conduct a survey on the matter in August 2019. It focused both on the use of algorithms on the Swiss electricity market and their use by Swiss market participants on wholesale electricity markets in the EU. The survey was aimed at obtaining an overview of the presence of trading algorithms on Switzerland's wholesale electricity market. The evaluation of the survey will be made available to the companies that participated in the survey in early 2020. ElCom will publish a communication on the topic of algorithmic trading based on these findings.

A workshop on market surveillance was held for the fifth time in May 2019. This year's workshop focused on the different aspects of market surveillance in the energy industry in both Switzerland and Europe. The workshop featured several analyses presented by Market Surveillance and presentations in which representatives from German and Danish regulatory authorities granted insights into some of their current cases.

ElCom presented its first Market Transparency Report at the workshop, after which it was published on ElCom's website. This report provides an overview of the main activities of ElCom's Market Surveillance section and explains its analysis-based monitoring of the wholesale electricity market. A review takes a look at the trend in spot and futures market prices over the course of the year while electricity production in Switzerland, Germany and France is presented by type of production, among other things. This evaluation was based on the weekly spot and futures market report that ElCom has been publishing since 2018.

Since market surveillance and market integrity are still new topics for energy regulators, it is extremely important that they have an opportunity to exchange information on the topic with the market surveillance authorities of other regulators. In this context, coordination meeting were held in 2019 with some of the market surveillance authorities of neighbouring countries. Since market surveillance has a longer history in the financial industry, two meetings were also held with FINMA to share experience about methods used.

The international activities of Market Surveillance within the scope of the CEER Market Integrity and Transparency Working Group (CMIT) were continued in 2019. A comprehensive analysis was performed jointly on the implementation and extent of members' market surveillance activities. The results of the CEER survey on the implementation of market transparency and integrity requirements at the national level confirm that, overall, the application of market transparency and integrity requirements is progressing in most member states but is more or less pronounced depending on the regulatory authority.

5.2 Market Surveillance: facts and figures for 2019

At the end of 2019, 66 market participants were registered with ElCom. They used seven Registered Reporting Mechanisms (RRM) connected to the ElCom database to transmit information about energy trading transactions they conducted on EU markets. ElCom received the fundamental data and publications on insider information through its own interfaces with ENTSO-E and the EEX transparency platform, which were created specifically for this purpose.

The upward trend in the amount of data reported to ElCom since this reporting first began continued in 2019. A total of nearly 39 million transactions (bids and concluded contracts) were reported, nearly 70 percent more than in the previous year. This significant year-on-year change is largely attributable to the increase in the number of reports related to intraday trading. For intraday trading alone, the number of reports more than doubled. While around ten million transactions were counted in 2018, nearly 22 million were reported in 2019. Two million of these additional reports are attributable to the back-loading of data on cross-border capacity reserves in intraday trading, which was carried out in 2019. A third reason for the sharp spike in the number of data reports submitted is the greater use of algorithms in intraday trading.

A significant portion of the reports on transaction data, around 85 percent, related to standard contracts. Here, there was a slight change in the ratio between bids and concluded contracts, namely from 2.5:1 to 3:1. As in the previous year, the spot market accounted for nearly 90 percent of the standard contracts, meaning that futures and forwards represented less than ten percent of the total.The number of non-standard contracts concluded has only changed slightly year on year and exhibits a downward trend from 3,200 reports in 2018 to 3,002 in 2019.

The fundamental data fed into ElCom's database showed a slightly upward trend. With a total of 4.7 million reports logged in 2019, this was a half million more than in 2018. Fundamental data mainly comprise the feed-in of electricity from power plants of all types and energy generation from renewable sources. Monitoring activities also cover import and export capacities at the country's borders and scheduled and unscheduled outages of power plants.

Since the efficiency and significance of the results of monitoring activities hinges not only on good data quality but also a comprehensive overall view, additional data will also be included to establish a broader basis for the analyses performed. Some examples of this data include EEX settlement prices, data from MeteoSchweiz, information about reservoir water levels and other case-specific data. Sound monitoring of the electricity market is made possible by incorporating all this information and assessing how it interacts.

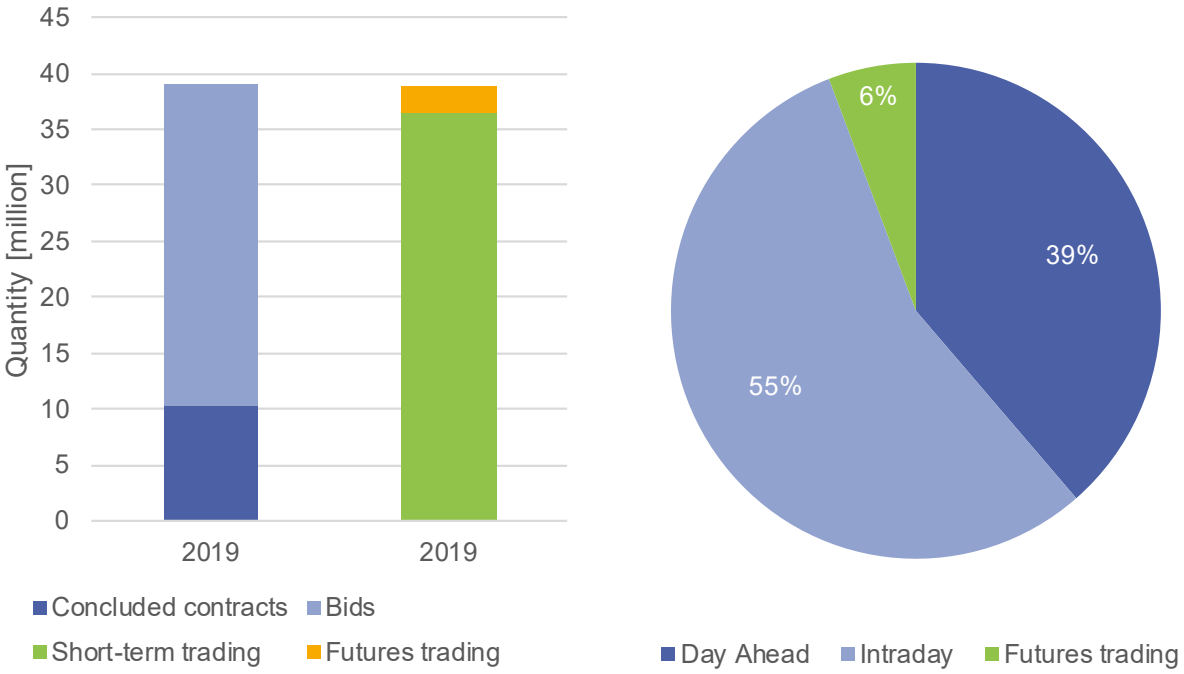


Figure 16: Standard contracts reported for 2019. Left: Distribution of bids / concluded contracts and intraday / futures trading in 2019. Right: Distribution of day ahead / intraday / futures trading in 2019

5.3 Case of user error on the Day-Ahead market

Suspicious transactions were conducted on the Swiss Day-Ahead market in July 2019. On one particular day, a market participant traded quantities of energy that were far larger than usual for this specific market participant. The anomaly was investigated for suspected price manipulation by ElCom within the scope of its market surveillance activities.

At 11:00 a.m., the market participant sold energy for the following day at the Swiss Day-Ahead auction on the EPEX exchange. At 12:00 noon, the market participant bought back the same amount of energy at a loss on the German-Austrian Day-Ahead auction. An analysis of the bidding curves from the Swiss auction revealed that the quantity trade had a price-reducing effect.

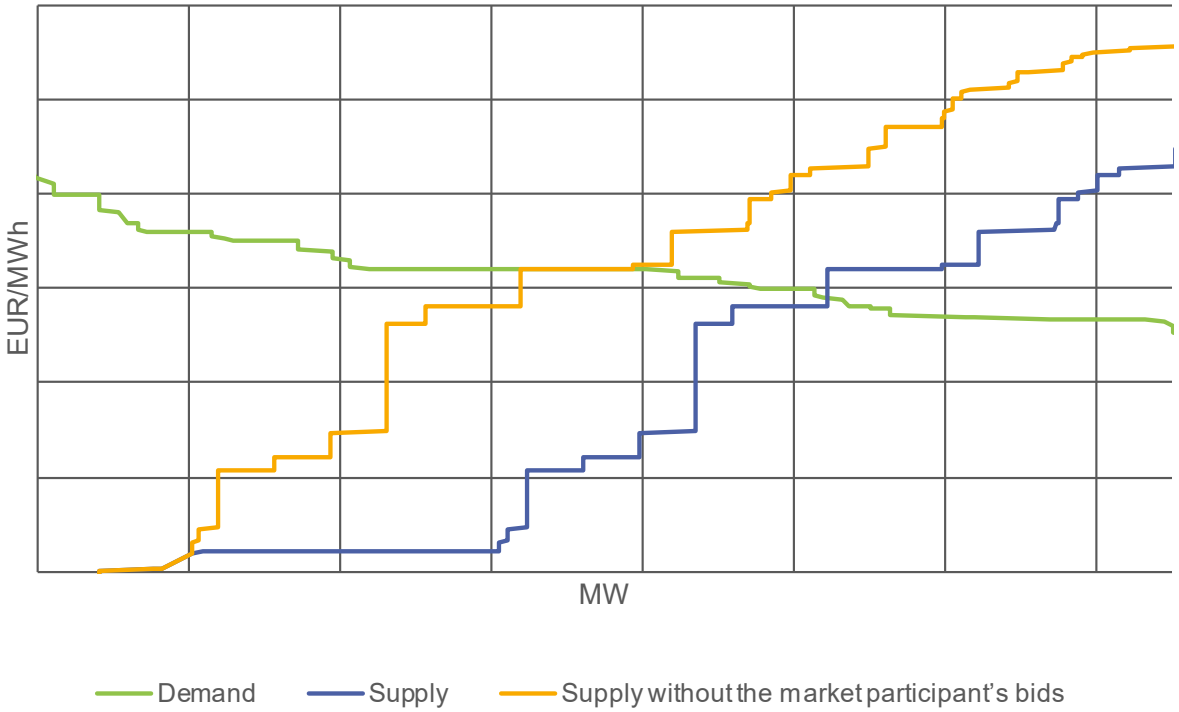


Figure 17: Supply and demand curve for a one-hour period of the day in question. The bids placed by the market participant shifted the supply curve to the right and therefore had a price-reducing effect.

As part of the analysis carried out, the market participant was asked about its behaviour. It was able to credibly explain that an incorrect entry in its trading systems had caused an unintentional bid to be placed in the Swiss Day-Ahead market. The bid should have been placed at another auction also offered by the EPEX exchange but for a different country. Since the bid forms for both of these markets look very similar, the mistake is understandable. According to ElCom's assessment, price manipulation did occur in this case. It happened inadvertently, however, and caused the market participant in question to sustain a loss. The market participant has taken steps to prevent this type of mistake from happening again in the future. ElCom will continue to monitor suspicious bids.

5.4 Case involving the Swiss Intraday Market Index

The Swiss Intraday Market Index (IDM CH) is considered to be the reference price for Switzerland's intraday market. It is calculated as a volume-weighted price derived on the basis of all transactions that take place on this market for the corresponding hour. In the absence of transactions, the IDM CH index considered to be equal to the day-ahead market price (hourly reference price established for the corresponding hour in the day-ahead auction on the previous day). Since no threshold is applied with respect to the transaction volume on the intraday market when calculating the index, it is entirely possible that a single transaction could define the Swiss Intraday Market Index.

Trading volumes on the Swiss Intraday Market have dropped sharply since XBID was introduced in June 2018. Illiquid markets are more susceptible to potential price manipulation, since substantial price effects can be achieved with very few resources. Prices on the continuous intraday market in Switzerland deviated quite significantly from day-ahead market prices on certain days. On these, hourly intraday market prices in Switzerland also differed greatly from the intraday market prices seen in surrounding countries.

An analysis revealed that in 2019 (total of 8,760 hours), the index for 1,505 hours (17 percent of the year's total number of hours) was calculated on the basis of an intraday transaction volume of between 0 MWh and 5 MWh. Table 7 shows the frequency distribution of the absolute percentage price deviation between the Swiss Intraday Market Index and the Swiss Day-Ahead market (measured based on the day-ahead market index) for these 1,505 hours. This reveals that significant price differences can be observed in intraday trading, even when extremely small quantities are traded.

Class	Frequency	Qumulative %
0%	70	4.65%
5%	442	34.02%
10%	246	50.37%
30%	497	83.39%
50%	127	91.83%
100%	95	98.14%
250%	18	99.34%
500%	6	99.73%
and greater	4	100.00%

Table 7: Frequency distribution of the absolute percentage price deviation between the Swiss Intraday Market Index versus the Swiss Day-Ahead market (measured based on the day-ahead market index), for hours during which the intraday transaction volume was below 20 MWh, but at least one transaction took place.

In some cases, the prices also seemed to have plateaued on the Swiss Intraday Market. This price trend is rather unusual for this market. A more precise analysis of the transactions revealed that, during times of extremely low liquidity, certain market participants executed extremely low-volume orders (0.1 MWh) on the Swiss Intraday Market at prices that were considerably higher than the reference price for the day-ahead market.

An examination of the detailed fundamental data such as power plant outages, possible load changes, deviations attributable to renewable sources of energy or rivers along the border did not reveal any striking changes on the days in question that could have explained the discrepancy between the Swiss day-ahead and intraday market price or the price difference compared to the surrounding countries.

Individual market participants confirmed the existence of contracts with distribution customers that are indexed to the Swiss Intraday Market. This could certainly provide some incentive to influence the intraday market index to move in a certain direction.

Nevertheless, market participants are sometimes forced to balance out even extremely small distribution and production positions. In an illiquid market, this is then done at the price available at that particular moment, which could deviate considerably from the last price traded or most recent reference price for this hour.

In light of the circumstances, ElCom sought a dialogue with the appropriate market participants and also advised EPEX Spot that, to calculate the Swiss Intraday Market Index, it should introduce a transaction volume threshold when determining the volume-weighted average price. Only once this threshold volume has been reached should the Swiss Intraday Market Index be calculated. Otherwise, it should be deemed the same as the day-ahead market index. Doing so should ensure that the Swiss Intraday Market Index returns to a fair value that reflects trading activity on the Swiss intraday market and protects it from being exposed to severe fluctuations triggered by extremely small-volume, non-market transactions.

6 International activities

Whether an electricity agreement can be concluded is still uncertain. An agreement would be advantageous to Switzerland, both with respect to market problems as well as cooperation between Switzerland and the EU.

To an even greater degree than in previous years, the entire international scene is affected by the fact that EU directives and network codes from the EU's Third Internal Energy Market Package of 2009 continue to be implemented in the EU as well as the fact that its Clean Energy Package (CEP) contains new laws specific to the electricity sector, which were published in summer 2019. Not only do these new laws simply replace the Third Internal Energy Market Package, rather they consolidate its intended purpose of opening up the market even further to benefit consumers and renewable energies. The main effects of these laws will be felt in 2020 and in the years that follow. Together with the EU directives and network codes, these will comprehensively restructure the energy markets and influence nearly every aspect of the cross-border exchange of electricity. Because of Switzerland's strong links with neighbouring European countries, the changes are highly significant for Switzerland, both economically and in terms of supply security.

6.1 Congestion management

The Swiss transmission network is connected to the networks of neighbouring countries via 41 cross-border transmission lines. These connecting lines are indispensable for supply and network security as well as for Swiss exporters.

Since the available import and export capacities are limited, they are allocated in accordance with Article 17 paragraph 1 of the Federal Electricity Supply Act in line with market-based procedures. However, there are

two exceptions: the first relates to supplies under long-term contracts concluded before 31 October 2002 (in particular some contracts still in force with France). The second exception is that priority is given to supplies from hydroelectric power plants on the border.

That means the lion's share of the capacities of cross-border lines is allocated within the framework of explicit auctions. In contrast to implicit auctions, in which the transport right is automatically granted to the highest bidder when electricity is sold on the market, explicit auctions award the transport right separately from the energy transaction.

In recent years, the EU has gradually harmonised the rules for the management of connecting lines and congestion management. This led to significant changes compared to the practices previously used by transmission network operators, such as the change introduced by the recent second expansion of Single Intraday Coupling (SIDC) from 7 to 14 EU countries (and Norway) in November 2019. A third expansion into additional countries is planned at the end of 2020. Switzerland has thus far been excluded from projects such as thisr, even despite the fact that ElCom and Swissgrid are involved in some of the discussions concerning the management and congestion management of Italy's northern border.

Implicit auctions, also known as market coupling, have become more efficient and have become the rule throughout most of the EU. The position of implicit auctions will be further strengthened by the gradual introduction of flow-based market coupling. This process identifies bottlenecks within networks so that they can be remedied by appropriate investment. Limiting cross-border capacity between countries and price zones is also the best way of preventing these bottlenecks from shifting to the border.

The EU and ACER will seek to enhance export and import opportunities, thereby boosting competition and supply security. This presupposes avoidance of any distortion of trade flows between price zones and countries in favour of purely internal or domestic flows, whereby international trade flows are generally diverted from the cheapest to the most expensive price zone due to price differences on the market.

To that end, the new EU Regulation 2019 / 943 on the internal market for electricity of 5 June 2019 stipulates that at least 70 percent of the capacity of all lines must be released for cross-zonal trading.

For this, unscheduled load flows must be reduced: As the physical flows do not necessarily correspond to the scheduled trade flows, they limit the options for exchange at borders and often require costly interventions to reduce the risks to network stability (re-dispatch, etc.).

For these reasons, the price zone which included Germany (which must expand its national network), Austria and Luxembourg was divided into two zones as of 1 October 2018. This led to a price increase in Austria as well as a legal dispute that the European Court of Justice settled on 24 October 2019 by denying ACER's competence for this allocation on the basis of procedural arguments. The consequences of this ruling are still not clear.

Following the failure of the first bidding zone review in 2018, the CEP calls for a new review

to be launched. According to the CEP, this new review should have short deadlines and would grant ACER and the European Commission greater decision-making authority. According to the new EU regulations, a formal proposal to change current assignments to bidding zones, which could only take place in 2021 at the earliest, is based on structural bottlenecks and a minimum cross-border capacity of 70 percent. With respect to these aspects of the regulations, the EU only allows exceptions until 2025 and only under strict conductions. ACER's supervisory report on the 2018 electricity market (October 2019) stresses factors including the need to improve the calculation of cross-border capacity in order to improve market integration and supply security on a pan-European level, while reducing the negative effects of unscheduled load flows.

The report also discusses certain developments in Switzerland, including the significantly smaller economic loss that Switzerland incurred with the EU in connection with the use of its cross-border capacities as compared with 2017 and previous years (around €40 million instead of €80 – 120 million as in previous years). This loss is mainly due to the fact that Switzerland is excluded from the market coupling mechanisms established in the EU as long as no bilateral electricity agreement is concluded. The reduction seen in 2018 is attributable to a new calculation method applied by ACER, that examines the presumed impact of higher cross-border capacities in favour of lower wholesale prices as a result of market coupling.

Even despite some positive aspects, the development of EU regulations, only some of which apply to Switzerland, is likely to lead to increased bottlenecks in the Swiss network. They influence both trade and physical flows inside and outside the EU, which is causing increasingly frequent overloading on Swissgrid's network in turn. Wherever possible, ElCom and Swissgrid work together with the transmission network operators and authorities of other countries to optimise cross-border capacities. It cannot be ruled out, however, that Swissgrid will have to temporarily restrict export and import capacities in order to ensure the stability of the Swiss network.

6.2 Border power plants

There are 30 hydropower plants along Switzerland's borders that produce electricity from watercourses adjacent to neighbouring countries. The distribution of electricity is often regulated by long-standing treaties between Switzerland and the respective neighbouring country in the case of these border power plants. For some of these border power plants, the contractually agreed quantity of electricity is distributed to the neighbouring country via the cross-border transmission network. Capacities in the cross-border transmission network are allocated through auctions. Swiss law grants priority to some of the border power plants in the allocation of cross-border transmission capacities, meaning that capacities are allocated outside the auction procedure at no cost.

Until the end of 2014, a cooperation agreement existed between Swissgrid and the owners of the German transmission networks,

which included the priorities in the cross-border transmission network provided for in the applicable Swiss legislation. This agreement was terminated by Germany's transmission network operators with effect at the end of 2014. The new cooperation agreement that entered into force on 1 January 2015 does not include any clauses governing priorities. In the view of the German transmission network operators and authorities, the granting of priorities runs contrary to both European and German law. Against this backdrop, the Federal Supreme Court concluded in two ground-breaking rulings that these priorities could not be granted without the cooperation of the German transmission network operators. However, the Federal Supreme Court believed that Swissgrid would only be liable to pay compensation if it could be held jointly responsible for the refusal by the German transmission network operators to conclude an agreement that respects the right to grant priorities. In five proceedings that are pending in the year under review, ElCom must assess the financial consequences of the fact that priority can no longer be granted.

A new provision has been in force since 1 October 2017, which gives priority to border power plants. Three applications requesting that priority be granted under the new provision were pending during the year under review. As part of this process, ElCom will have to decide how to deal with the priorities provided for under Swiss law but which cannot be physically implemented at the German border as a result of the terminated cooperation agreement.

6.3 Merchant Lines

Merchant lines are cross-border transmission lines. In the event of an exemption, there is no requirement to grant network access to third parties on electricity transmission lines such as these. While the transmission capacity is managed by the network operators, its utilisation is reserved for the investors. These exemptions are limited to a specific time frame, upon expiry of which the line is transferred to the ownership of the national grid operator. Switzerland had two merchant lines at the Italian border during the year under review. The exemption period for one merchant line expired on 26 September 2019, however, and a ruling by the Federal Administrative Court on the amount of capacity exempted from non-discriminatory third-party access is still pending.

6.4 Auction proceeds

Swissgrid allocates limited cross-border transmission network capacities via auctions. The proceeds of these auctions are shared equally for each border between Swissgrid and the respective foreign transmission network operator. Auction proceeds may be used to cover the costs of cross-border electricity supplies, to cover the recoverable costs of the transmission network or for the maintenance and expansion of the transmission network (Article 17, paragraph 5, Federal Electricity Supply Act). Swissgrid submits a request to ElCom

detailing how it intends to use the proceeds from the auction and ElCom ultimately decides how they are to be used (Article 22 paragraph 5c of the Federal Electricity Supply Act). In the period from 2009 to 2012, around CHF 40 million were used for reducing the recoverable costs of the transmission network. The majority of the 2013 auction proceeds were to be used for the maintenance and expansion of the transmission network. Since, in the previous years, investments in the transmission network were not carried out to the extent originally planned, and given the costs associated with court rulings, Swissgrid applied to ElCom for the proceeds from 2013 to 2018 to be used exclusively for reducing the network tariffs. In accordance with the ratio agreed in 2018 for the use of auction proceeds, Swissgrid submitted a proposal in 2018 to use 35 percent of the auction proceeds in 2019 for the maintenance and expansion of the transmission network and 65 percent for reducing recoverable costs.

Swissgrid submitted a proposal in the year under review regarding the use of auction proceeds from 2020 in which Swissgrid complied with the agreed ratio of 45 percent for the maintenance and expansion of the transmission network and 55 percent for reducing the recoverable costs of the transmission network. ElCom decided in favour of the requested use of the auction proceeds.

Figure 18 shows how the auction proceeds generated at Switzerland's borders were allocated between 2015 and 2019. The figures for 2019 are still provisional because the definitive calculations were not available at the time of going to press.

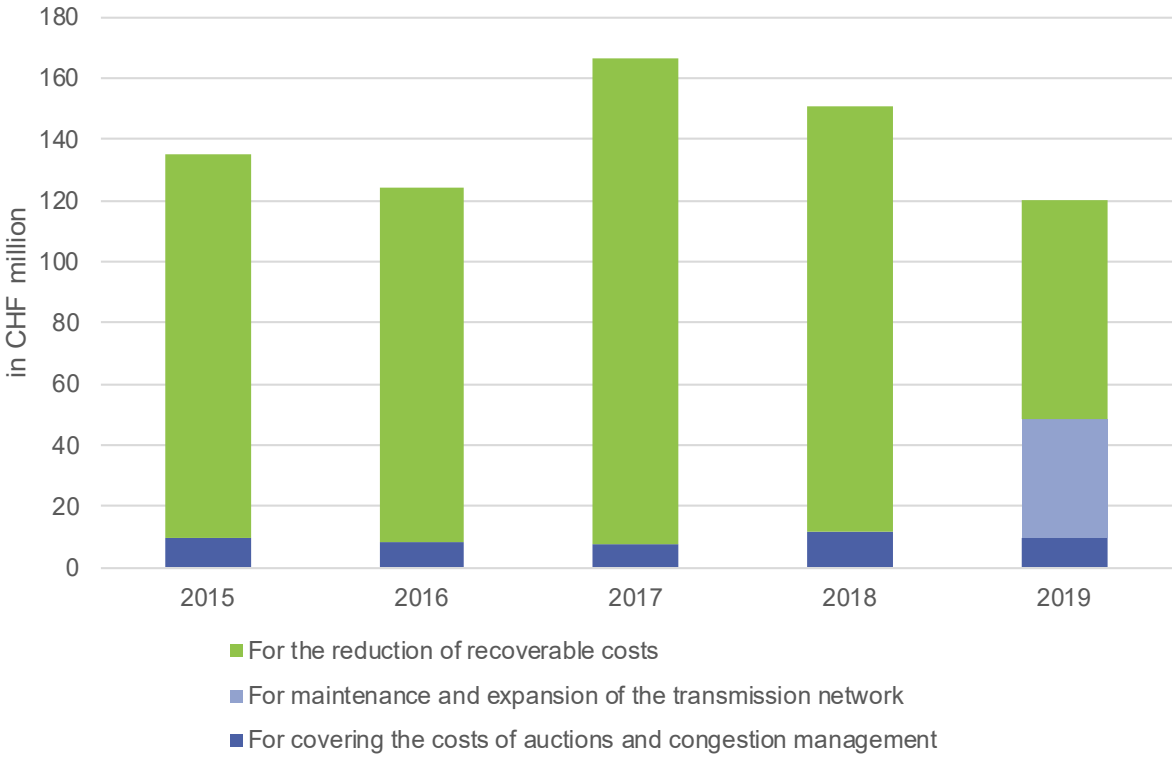


Figure 18: Use of the auction proceeds, 2015 to 2019

6.5 International platforms for the reserve power supply

The reserve power supply must balance out sudden fluctuations in electricity consumption and generation, making it a central component of electricity supply security. The EU's Third Market Package systematically extends the procurement and use of the reserve power supply beyond national borders. Considerable price advantages in procurement (and ultimately for the consumer) and better protection against possible shortages are expected in some cases.

To this end, IT trading platforms will be established between some or all of the countries concerned. Switzerland is involved in all the platforms either as a member or an observer. The platforms for the exchange of primary balancing power (frequency containment reserves [FCR]) and imbalance netting (IN) are already active and certain aspects of them will be adapted. The platform for tertiary balancing power (RR / TERRE) has been operational since 6 January 2020. The two remaining platforms for the exchange of secondary balancing power (aFRR, mFRR) are still at an early stage of development.

On 27 June 2019, the FCR (frequency containment reserve) cooperation between transmission network operators in Switzerland, Belgium, Germany, France, Austria and the Netherlands took its first successful step toward restructuring the market by introducing daily D-2 auctions for FCR. The FCR Cooperation is the first regional cooperative arrangement to harmonise the market using the method specified by the Electricity Balancing Guideline (EBGL). ElCom as well as other regulators and lobbyists were involved. This cooperative arrangement serves to procure primary balancing power with the aim of procuring almost half of the FCR capacities in Europe's synchronous 50 hertz area in order to cut procurement costs and create entry incentives for new balancing power providers and technologies.

Within this framework, a complex allocation algorithm was developed that takes into account various price zones and other constraints, calculates a marginal pricing system and shortens the product length from one week to one day. Four-hour product time slices are even expected to be introduced in July 2020. In the future, the closing time for the market will be even closer to the real time.

Switzerland's participation in the latter three platforms for RR / TERRE, aFRR and mFRR is subject to a proviso on the part of the EU, according to which the EU Commission decides on participation on the basis of statements by the ENTSO-E association and the European agency ACER. ENTSO-E issued a positive opinion in 2017, while ACER did so in 2018. The European Commission's statement is still pending and is undoubtedly being influenced by the discussions on the Brexit modalities and the EU-Switzerland framework agreement.

ElCom aims to participate in the platforms, as it sees considerable risks from non-participation. These specifically consist of the very short-term occurrence of unscheduled, unannounced large electricity flows via the Swiss network, which can lead to congestion and outages. The heavily interconnected network means that such local failures can also directly affect the entire region around Switzerland.

6.6 International bodies

The European Union completed an update of its policy framework entitled "Clean Energy for All Europeans" at the end of 2016; influenced by the Paris Agreement, this package primarily aims to continue efforts to integrate and strengthen the EU's internal electricity market from 2020 – 2030 / 2035 and the new acts have since been completed and entered into force.

This Clean Energy Package (CEP) put together by the EU is designed to benefit consumers, the energy transformation and supply security. It influences how the electricity market is organised. This applies in particular for the new regulation (EU) No 2019 / 943 (formerly No 714 / 2009), which was published in June 2019 and entered into effect on 1 January 2020, regulation 2019 / 944 (formerly 2009 / 72) on the internal market for electricity and the new regulations (EU) No 2019 / 942 (formerly No 713 / 2009) on the Agency for the Cooperation of Energy Regulators (ACER) and No 2019 / 941 on Risk Prevention in the Electricity Sector (formerly Regulation 2005 / 89 / EC).

2009 brought an intensification of efforts to integrate the internal market for electricity and the EU's new laws will strengthen these efforts even further. Regional Coordination Centres (RCC) will be upgraded as well. These must be implemented by July 2022. These centres need to support a secure, reliable and efficient electrical power system and perform both capacity calculations and security analyses. They will replace the regional security coordinators (RSC) currently mandated by TSCNet Services, of which Swissgrid is a member. Details on the transition from RSC to RCC will follow in 2020.

Directive (EU) 2018 / 2001 on the Promotion and Use of Energy from Renewable Sources will also replace the currently valid Directive 2009 / 28 as of 1 July 2021. It is a cornerstone of the European strategy to maintain the EU's competitiveness in the global energy market and reduce CO2 emissions by 2030 and on until 2050.

All these laws, which began to be implemented in the EU in 2019, provide for relatively brief transition periods in order to ensure that they trigger the desired stimulus between 2020 and 2021. They also have the potential to affect the possible conclusion of a bilateral electricity agreement between Switzerland and the EU, which was still on hold in 2019. The EU is encouraging both its own Member States and third countries to accelerate environmental transformation and energy turnaround, in part by reforming the relevant markets.

Since the European elections of May 2019, the long-term transformation of Europe's economy and society has become even more pivotal and urgent than ever. The new European Parliament, Council of Europe and European Commission, under the leadership of Ursula von der Leyen, want to promote the effectiveness of the EU's climate and energy policy. To that end, a European Green Deal was presented in December 2019, which is considered to be a

growth strategy for climate neutrality for the EU (time horizon: 2050) and will support further political and legislative developments in 2020. At the same time, EU countries are required to submit energy and climate plans with coherent reforms for their own domestic energy markets. Otherwise, statutory and regulatory initiatives are expected to optimise the coupling of the gas and electricity sectors and as well as their potential synergies.

The term of Alberto Pototschnig, who served as Director of the European Agency for the Cooperation of Energy Regulators since it was first founded, ended on 31 December 2019. He will be succeeded by Christian Zinglersen, who will begin his five-year mandate on 1 January 2020. ElCom has observer status in the ACER Electricity Working Group and its subgroups. It coordinates and represents Switzerland's interests in these bodies and in the regional groups that implement the EU network codes to the best of its ability, even though it is not involved in projects like Single Intraday Coupling (SIDC). This cooperation is particularly important from the point of view of the security of the Swiss network.

ElCom has had observer status at the Council of European Energy Regulators (CEER) since 2012. CEER and ACER aim to strengthen the role of regulators while also providing support for the implementation of EU legislation for the gas and electricity sectors and the European Green Deal, as well as the coupling of the gas and electricity sectors and the long-term decarbonisation of the European economy. Against that backdrop, ACER and CEER have jointly published a "Bridge Beyond 2025 Conclusions Paper" (November 2019).

In the meantime, CEER is continuing to pursue its 2019-2021 strategy, the main elements of which are the promotion of digitisation, decarbonisation and the dynamic regulation of the gas and electricity sector for the benefit of consumers.

Since Brexit was postponed from 29 March 2019 to 31 January 2020 and because the future relationship between the EU and UK will still be negotiated during the transitional period until 31 December 2020, Ofgem (Office of Gas and Electricity Markets), the government regulator in Great Britain, has been given temporary member status within CEER until 31 December 2020. With this status, the United Kingdom can still be considered a fully fledged member, even despite Brexit-related uncertainties.

In 2019, ElCom joined the SFOE and Swissgrid to get involved in the work of the Pentalateral Energy Forum (PLEF) to ensure network security in winter and distribute redispatch costs. It participates in the discussions on the further development of capacity management on the northern Italian border. ElCom is an observer at the European Electricity Regulatory Forum, the only meeting of which (2019) was devoted to the challenge of integrating the EU's internal energy market. ElCom hardly participated in the collaborative efforts of the OECD Network of Economic Regulators (NER).

7 Outlook

Legislation governing the energy and electricity supply is changing constantly. For ElCom, that means reassessing legal issues that had actually been cleared up over the course of multi-year court proceedings and the possibility that new proceedings could rolled out (on issues such as granting priority for electricity supplied by border power plants or remuneration for feeding electricity into the network). From that perspective, it is important that transitional provisions clearly define which law applies to which matters.

Within the context of gas market liberalisation, the Swiss Federal Office of Energy initiated a consultation on a gas supply act in the autumn of 2019. The consultation draft calls for ElCom's name to be changed to "Energy Commission" and for it to also monitor compliance with the Gas Supply Act. ElCom has published its stance on the consultation draft on its website. It considers an approach congruent to that used for the country's electricity supply as correct and also acknowledges the appropriateness of being put in charge of monitoring supply security as it relates to gas.

One major issue in 2020 will be control over efforts to implement Directive 2/2019 on eliminating coverage differentials. ElCom has already drawn attention to the fact that the coverage differentials must be eliminated within three years. It also stressed that no shortfalls may be created for the purpose of creating reserves and that coverage differentials must not be misused as financial instruments. Evaluations of the cost accounting data submitted by network operators on 31 August 2019 revealed that not all network operators have complied with ElCom's demand that they continue to reduce coverage differentials. Additional audit steps will be taken in the next few months as a result.

With respect to the rules on interconnected operations, negotiations will take place in 2020 regarding how Swiss network security should be incorporated into the international integrated network (Synchronous Area Framework Agreement; SAFA). These negotiations will focus on the calculation and determination of import and export capacities. They also concern the coordination and financing of redispatch measures.

Additionally, the key parameters governing the structure of the electricity market will be predefined within the scope of the revisions of the Federal Energy Act and the Federal Electricity Supply Act in 2020. This must result in the creation of incentives to maintain an adequate level of domestic (winter) production, something which ElCom has already been urging for quite some time now.

8 About ElCom

ElCom, from left to right: Carlo Schmid-Sutter (President), Christian Brunner, Laurianne Altwegg (Vice President), Dario Marty, Sita Mazumder, Matthias Finger, Andreas Stöckli

ElCom is responsible for monitoring the Swiss electricity market and securing compliance with the Federal Electricity Supply Act. As an independent state supervisory authority, ElCom is playing an active role in the transition from a monopolistic electricity supply system to a competition-based electricity market. It is ElCom's responsibility to monitor the electricity prices charged for the basic supply. ElCom also monitors whether the network infrastructure is maintained and expanded so that supply security is guaranteed for the future.

Key electricity sector data
ElCom supervises wholesale electricity trading and the electricity sector, including Swissgrid. Its supervisory activities include network use tariffs, electricity tariffs for fixed end consumers, supply security, the condition of the electricity networks and the allocation of network capacities in the event of congestion at the country's borders.

No. of network operators: approximately 630
No. of network levels: 7
Lengths of electricity networks: Network level 1 – approx. 6,650 km | network level 3 – approx. 8,700 km | network level 5 – approx. 45,000 km | network level 7 – approx. 145,000 km (overhead lines and cable, including building connections)
Transformers: network level 2 – 145 | network level 4 – 1,143 | network level 6 – approx. 59,000 (including mast transformers)

Total network use revenue: CHF 3.5 billion

Annual investments: approx. CHF 1.4 billion

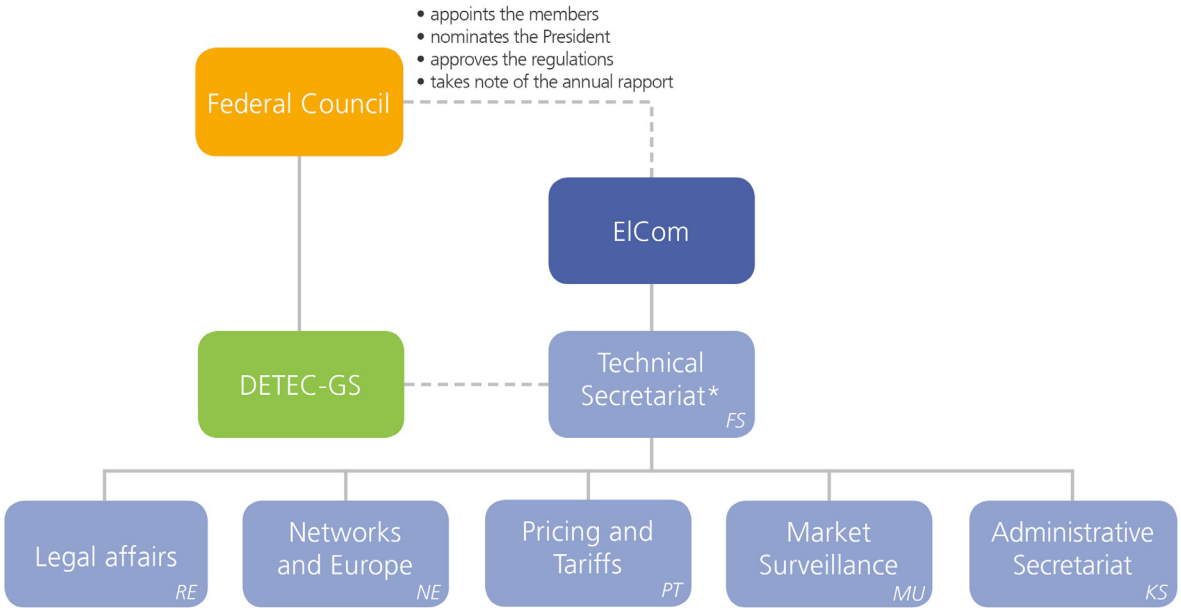
Annual electricity consumption: 58 TWh
Production: 68 TWh
Electricity imports: 31 TWh | **Electricity exports:** 33 TWh

ElCom possesses wide-ranging competencies for performing the following duties in particular:

- Examining all network use remuneration: In the liberalised energy market, the use of the networks for electricity transmission is compensated via network use remuneration. ElCom examines the lawfulness of this form of remuneration.
- Supervising electricity tariffs for fixed end consumers (basic supply, i.e. households and other end consumers with an annual consumption below 100 MWh) and all those end consumers who do not opt for network access.
- Ruling on disputes associated with free access to the electricity network: Major consumers (with an annual consumption of at least 100 MWh) have been able to freely choose their electricity supplier since 1 January 2009.
- Monitoring electricity supply security and the status of the electricity networks.
- Defining the procedures for the allocation of network capacities in the event of congestion in cross-border transmission lines, and coordinating activities with European electricity market regulators.
- Carrying out comprehensive supervision of the national grid operator (Swissgrid AG) following transfer of the ownership of the transmission network to Swissgrid AG (unbundling).
- Supervising wholesale electricity trading.

8.1 Organisation and personnel

ElCom comprises five to seven independent members appointed by the Federal Council, plus a Technical Secretariat. It is not subject to any directives of the Federal Council and is independent of the administrative authorities.



*Administratively linked to the general secretariat of DETEC

Figure 19: ElCom organisation chart

8.1.1 Commission

The seven commission members are independent of the electricity industry, and they all hold part-time mandates. On average, the commission holds a plenary meeting once a month and its members also attend meetings of the five committees: Pricing and Tariffs, Networks and Europe, Legal Affairs, International Relations and Market Surveillance.

In the year under review, the Commission consisted of the following members:

President:

- Carlo Schmid-Sutter (since 2007): former member of the Council of States, attorney-at-law and notary public

Vice President

- Laurianne Altwegg (since 2015): Degree in Political Science, responsible for energy, environment and landscape at the Western Switzerland Consumers Association (FRC)

Members:
- Christian Brunner (since 2014): Degree in Electrical Engineering, Federal Institute of Technology, Zurich, former Director of Alpiq Networks Business Unit
- Matthias Finger (since 2007): PhD (political science), Professor of Management of Network Industries at the Swiss Federal Institute of Technology, Lausanne
- Dario Marty (since 2018): Degree in Electrical Engineering (University of Applied Sciences), former Head of the ESTI
- Sita Mazumder (since 2018): PhD in Economics, Professor of Economics and Computer Science at the Lucerne School of Information Technology, Lucerne University of Applied Sciences and Arts
- Andreas Stöckli (since 2019): Attorney-at-law, Professor of Constitutional and Administrative Law at the University of Fribourg

Committees
In the year under review, the Commission operated the following committees:

Prices and Tariffs
- Sita Mazumder (Chair)
- Laurianne Altwegg
- Christian Brunner
- Andreas Stöckli

Legal
- Andreas Stöckli (Chair)
- Lauriane Altwegg
- Carlo Schmid-Sutter

Networks and Supply Security
- Dario Marty (Chair)
- Lauriane Altwegg
- Christian Brunner
- Matthias Finger

International Relations
- Christian Brunner (Chair)
- Matthias Finger
- Dario Marty
- Carlo Schmid-Sutter

Market Surveillance
- Matthias Finger (Chair)
- Christian Brunner
- Sita Mazumder
- Andreas Stöckli

Resignations and new appointments
During the year under review, the long-standing President of ElCom, Carlo Schmid-Sutter, announced his resignation as of the end of 2019. Carlo Schmid-Sutter has presided over ElCom since it was first founded in 2007. His decision to resign was necessitated by the limit on his term of office. Federal Councillor Werner Luginbühl was chosen as his successor. This long-standing cantonal councillor and member of the Council of States will step up as President of ElCom on 1 March 2020.

In addition to Schmid-Sutter, Matthias Finger and Christian Brunner have also announced their resignations from the Commission. Matthias Finger, a professor at the Swiss Federal Institute of Technology, has also been a member of ElCom since it was founded in 2007. The Federal Council appointed Katia Delbiaggio to succeed him. Delbiaggio is a professor of economics at the Lucerne University of Applied Sciences and Arts and will join ElCom on 1 January 2020.

Christian Brunner will resign at the end of June 2020. This electrical engineer with a degree from the Federal Institute of Technology has been a member of ElCom since 2014. The Federal Council has appointed Felix Vontobel to replace him. Vontobel is also an electrical engineer and has been employed by Repower AG since 1987. He will be taking up his post at ElCom on 1 July 2020.

Representation of gender and language regions
There were two female and five male ElCom commission members during the year under review, which corresponds to a ratio of women to men of 29 percent. In terms of representation of language regions, the ElCom commission members are as follows: German-speaking region: five persons; French-speaking region: two persons.

8.1.2 Technical Secretariat

The Technical Secretariat provides the Commission with technical and specialised support, prepares ElCom's decisions and implements them. It conducts administrative proceedings and carries out the necessary clarifications. It is independent of any other authorities and is solely subject to the directives of the Commission. At the administrative level, the Technical Secretariat is affiliated with the General Secretariat of the Federal Department of the Environment, Transport, Energy and Communications (DETEC). The Administrative Secretariat is ElCom's central contact point for the general public, the electricity industry and the media. It coordinates the activities of the Commission and the Technical Secretariat and provides the Commission with administrative support. As of 31 December 2019, the Technical Secretariat employed 44 personnel on a full- or part-time basis, including three apprentices. This corresponds to 38.9 full-time equivalents (FTE). The employees are made up of 17 women and 27 men, which represents a female proportion of 38 percent. The average age of all employees is 43.3. Breakdown by national language:

- Italian: 2 employees
- French: 5 employees
- German: 37 employees

During the year under review, Stefan Burri, who had headed up the Pricing and Tariffs section for many years, passed away suddenly on a ski trip. For the Technical Secretariat of ElCom, his passing meant the loss of a highly intelligent economist, a loyal supervisor who was always willing to lend a hand and an extremely likeable colleague.

Head of the technical Secretariat (44 employees)

Renato Tami
lic. iur., attorney-at-law and public notary

Networks and Europe (9 employees)

Michael Bhend
degree in engineering, Federal Institute of Technology

Pricing and Tariffs (12 employees)

Barbara Wyss
PhD in economics

Market Surveillance (5 employees)

Cornelia Kawann
degree in engineering, doctor of technology, MBA

Legal Affairs (11 employees)

Nicole Zeller
attorney-at-law

Administrative Secretariat (7 employees)

Simon Witschi
M.A.

8.2 Finances

In the year under review, ElCom had a budget of CHF 11.7 million at its disposal. Its effective expenditure amounted to almost CHF 10.3 million. This amount covered ElCom's entire personnel and operating costs, including the additional expenditure associated with the final activities for its market surveillance IT systems, additional expenses in the area of electricity supply security and projects in connection with the replacement of existing IT systems.

On the income side, ElCom received a total of CHF 4.9 million, the main sources of which were payments of supervisory fees by Swissgrid for ElCom's cooperation with foreign authorities and court costs paid by parties involved in legal proceedings.

8.3 Events

ElCom-Forum 2019

The tenth edition of the ElCom Forum took place at Congress Center Basel on 15 November. Around 300 people from the energy sector attended presentations and discussions on topics related to ElCom's ten years of electricity market regulation. High-profile speakers from industry, management and academia took stock of the current state of Switzerland's regulated electricity industry and discussed the major challenges that lie ahead.

The ElCom Forum 2020 will be held at the Culture and Congress Centre in Lucerne on 13 November.

Informational events for network operators

ElCom also held a total of six informational events for network operators at several different locations in Switzerland in the spring of 2019. The main topics of these events were tariff setting, cost accounting, cyber security, electricity market prices and news about the SFOE's energy policy. A total of just under 600 people took part in the six events. Both the participants and the employees of ElCom and the SFOE regarded this as a welcome opportunity sharing professional experience.

Market surveillance workshop

As in previous years, a workshop focusing on market surveillance at ElCom was held in Bern in the year under review. The 2019 workshop focused on recent developments regarding the monitoring of wholesale energy markets in Switzerland and Europe.

9 Annex

9.1 Facts and figures

A total of 228 new cases were received in 2019. 117 of these cases were successfully concluded in the year under review, meaning that 51 percent of cases were concluded in the year in which they were received. In 2019, a total of 314 cases were brought to a conclusion. The surplus from previous years, in particular from 2017, was massively reduced in 2019, continuing the trend from previous years. General enquiries are those submitted via the contact form on the ElCom website or by e-mail and which deal with routine matters. Handling these enquiries normally takes anywhere from a few hours to one or two days. Occasionally, general enquiries may lead to proceedings. 408 such general enquiries were received in 2019. All but 14 of these were dealt with in full (97 percent). A total of 131 rulings were pronounced in the year under review. A large portion of these concerned applications for increasing network capacity.

Complaints, etc.	Brought forward from previous years	Received in 2019	Dealt with in 2019	Carried forward to 2020
Specific matters relating to tariffs	21	27	40	8
Feed-in remuneration at cost	16	0	16	0
Increases in network capacity	68	91	138	21
Other cases	92	110	120	82
Total	**197**	**228**	**314**	**111**
General enquiries	9	408	403	14
Total including general enquiries	**206**	**636**	**717**	**125**

Table 8: ElCom activities: statistics for 2019

9.2 Meetings

The members of ElCom attend monthly plenary meetings. In addition to these, the five committees hold their own meetings and ElCom also organises workshops and other extraordinary meetings. In the year under review, the members of ElCom (in various compositions) attended a total of 14 full-day and 22 half-day meetings within Switzerland. Once a year, ElCom organises a retreat during which its members seek contact with the local network operators.

9.3 Publications

Directives

08 / 03 / 2019	Network reinforcements
27 / 03 / 2019	Coverage differentials
27 / 03 / 2019	WACC production

Notifications

16 / 04 / 2019	Structuring tariffs for fixed end consumers
29 / 05 / 2019	Changes to measurement services as of 1 June 2019
18 / 06 / 2019	Update: Questions and answers on Energy Strategy 2050
26 / 06 / 2019	Information sheet on the obligations of producers of electricity
19 / 12 / 2019	Consultation procedure on the Gas Supply Act (GasVG) by ElCom

Reports and studies

02 / 04 / 2019	Cyber Security 2019 – Report by ElCom
21 / 05 / 2019	Market Transparency 2018 – Report by ElCom
05 / 08 / 2019	Final report by the Working Group on the Responsibility for the Security of Electricity Supply
06 / 06 / 2019	Report on the activities of ElCom 2018
27 / 08 / 2019	Report on Balancing Power and the Reserve Power Supply 2018

9.4 Glossary

ACER	EU Agency for the Cooperation of Energy Regulators
aFRR, mFRR	Automatic / manual frequency restoration reserve Frequency restoration reserve
Balance management	Measures for constantly maintaining the electricity and capacity balance in the electricity system. It includes timetable management, data measurement and balance compensation management.
Blockchain	Expandable list of data sets linked together using cryptographic techniques
CBCA	Cross Border Cost Allocation
CEER	Council of European Energy Regulators
CEP	Clean Energy Package
CERT	Computer Emergency Response Team
CIP	Critical Infrastructure Protection Strategy
CMIT	CEER Market Integrity and Transparency Working Group
Congestion management	Ensures that the secure operation of the network can be maintained through preventive measures (e.g. NTC specification, capacity auctions) and operational measures (e.g. re-dispatch, reductions).
Control zone	Zone in which the national grid operator is responsible for network control. This zone is physically defined through measurement stations.
CORE	The CORE capacity calculation region consists of the former CWE (Central Western Europe) and CEE (Central Eastern Europe)
Cost-Plus Regulation	Method of cost regulation whereby each network operator determines the operating costs based on its own costs which includes a reasonable profit. This corresponds to the current cost regulation in Switzerland. In contrast, incentive-based regulation determines the costs that an efficient network operator would incur in the relevant network area.

DETEC	Federal Department of the Environment, Transport, Energy and Communications
Distribution network	High, medium or low voltage network for the purpose of supplying electricity to end consumers or electricity supply companies.
EEX	European Energy Exchange
EIV	Non-recurring remuneration
ElCom	Swiss Federal Electricity Commission
End consumers	Clients who buy electricity for their own consumption. This does not include power plants that buy electricity for their own consumption and for powering pumps in pump storage power plants.
ENTSO-E	European Network of Transmission System Operators for Electricity
EnV	Energy Ordinance
EPEX	European Power Exchange
ESTI	Swiss Federal Inspectorate for Heavy Current Installations
EU	European Union
FCR	Frequency controlled normal operation reserve
FINMA	Swiss Financial Market Supervisory Authority
FITS	Flexible Intraday Trading System
FOCP	Federal Office for Civil Protection
FSO	Federal Statistical Office
H4	5-room apartment with electric cooker and tumble dryer, but without an electric boiler
HV	High voltage

ICT	Information and Communications Technology
IDM / IDM CH Index	Intraday Market / Intraday Market Index Switzerland
IN	Imbalance Netting
KEV	Feed-in remuneration at cost
kVA	Kilovolt ampere
kWh	Kilowatt hour
kWp	Kilowatt peak
LV	Low voltage
Median	Value in the middle of a data series arranged by size, i.e. half of all the observations are smaller and half are larger than the median figure. (Unlike the average figure, the median is resistant to statistical outliers.)
MV	Medium voltage
MVA	Megavoltampere
MW	Megawatt
MWh	Megawatt hour
Net transfer capacity (NTC)	Maximum exchange programme between two network zones that is reconcilable with the safety standards of both zones and which takes technical uncertainties regarding future network situations into account.
Network access	Right to use a network in order to obtain electricity from any supplier or to feed electricity into a network.
Network use	Physical use of a network system based on feed-in or withdrawal of electricity.
NO	Network operator
NPP	Nuclear Power Plant

OT	Operational technology
PGV	Plangenehmigungsverfahren (planning approval procedure)
PLEF	Pentalateral Energy Forum
PV	Photovoltaic system
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency Regulation (EU) No 1227 / 2011 of the European Parliament and of the Council of 25 October 2011 on Wholesale Energy Market Integrity and Transparency.
Reserve power supply	Power supply that can be drawn on automatically or manually by power plants to maintain the scheduled level of electricity exchange and ensure the continued safe operation of the network.
RRM	Registered reporting mechanism
SAIDI	The System Average Interruption Duration Index (SAIDI) indicates the average duration of interruptions in supply to an end consumer in an electricity supply system.
SAIFI	The System Average Interruption Frequency Index (SAIDI) indicates the average frequency of interruptions in supply to an end consumer in an electricity supply system.
SFOE	Swiss Federal Office of Energy
SIDC	Single Intraday Coupling
Strand km	A cable strand (strand km) consists of several conductors (e.g. 1 km with 3 phase or single phase conductors = 1 km). In the case of cable lines, one kilometre describes the absolute length of the cable. For overhead lines, for example, 3 phase conductors correspond to one strand (see VSE document NBVN-CH edition 2007).
StromVG	Federal Electricity Supply Act
StromVV	Federal Electricity Supply Ordinance
SÜL	Electricity Transmission Lines sectoral plan

System services, SDL	The ancillary services necessary for the safe operation of networks. The main components are system coordination, balance management, provision of reserve energy, self-contained start and independent operation capability of generators, voltage stability (including reactive energy), operational measurements and compensating active power losses.
Transmission network	Network used for the transmission of electricity over large distances within the country and for connection to networks outside the country, usually operated within the range of 220 to 380 kV. The following items are integral parts of the transmission network: a) transmission lines and support structures; b) coupling transformers, switching systems and measurement, control and communication equipment; c) systems that are used jointly with other network levels, mainly in association with the transmission network or without which it is not possible to operate the transmission network safely and efficiently; d) switching fields before the transformer at the transfer point to another network level or a power plant.
TSO	Transmission system operator
TWh	Terawatt hour
VSE	Association of Swiss Electricity Companies
XBID	Cross-Border Intraday Market Project
ZEV	Zusammenschluss zum Eigenverbrauch (merger for own consumption)

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