Report on the activities of ElCom 2022

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1 Foreword by the President

Werner Luginbühl
President of ElCom

Security of supply

The effects of the Russian invasion of Ukraine in February 2022 have led to a European energy crisis on an unprecedented scale. For decades it was taken for granted that electricity would be available, so the issue of supply was barely discussed. Then the situation became so acute that Strommangellage ('power shortage') was chosen as Switzerland's Word of the Year for 2022.

Accordingly, 2022 was an extraordinarily challenging year for ElCom. The war, the unstable supply situation owing to dependence on Russian gas, the lack of available nuclear power generation capacity in France, the dry summer and extremely high wholesale prices generated considerable uncertainty about electricity supplies, and determined the key points of focus during the year under review. Other issues were the worrying liquidity situation at Alpiq in December 2021 and at Axpo a few months later, which necessitated federal government intervention in the form of a financial backstop.

As an independent regulatory and supervisory authority, ElCom provided important expert support during the year just ended, working closely with the other authorities concerned to establish a financial backstop (Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry; FiRECA) and winter reserves, and to take other action to secure power supplies in Switzerland. ElCom also played a key role in communicating the cause-and-effect relationships in the energy crisis, possible shortages, and the various measures that had been instituted. In view of the sharp rise in enquiries from the media and the general public, this was an appreciable contribution. It may be noted with some satisfaction that, with enor-

mous effort and in a very short space of time, ElCom was able to prepare and implement measures that would significantly reduce the risk of shortages in Switzerland in the event of a shortfall in imported electricity.

While critics will doubtless accuse ElCom of having overreacted, it must be remembered that this action on security of supply should be seen as an insurance policy. The winter of 2022/2023 proved unproblematic in Switzerland, primarily because Europe succeeded remarkably quickly in substituting Russian gas with gas from other sources, repairs and maintenance at around 50 French nuclear power stations were completed faster than expected, domestic Swiss power stations offered plenty of capacity, and especially also because of incredible luck with the weather. None of this could have been assumed in the summer of 2022.

The Supply Security working group is chaired by ElCom and consists of representatives of the Swiss Federal Office of Energy (SFOE), the Federal Office for National Economic Supply (FONES), the Swiss Armed Forces National Economic Supply unit (WL), the Organisation for Power Supply in Extraordinary Situations (OSTRAL), Swissgrid, the Swiss Federal Nuclear Safety Inspectorate (ENSI) and the cantons. It met for the first time throughout the summer, monitored the supply situation, and drew up proposals for immediate action. A variety of measures were adopted to shore up energy supplies for the winter. These included hydropower reserves, the construction of a peak-load (reserve) power plant at Birr in the canton of Aargau, bringing existing gas power stations on line, contracts securing emergency generation capacity, temporarily increasing transmission network capacity, and reducing residual water levels.

In view of developments at the beginning of the year, and to be better prepared for further applications for financial support from the electricity sector, it was decided in spring 2022 to begin preliminary work on a financial backstop, in the form of the aforementioned Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (FiRECA). The corresponding draft was adopted by the Federal Council on 30 September 2022. With preparations in place, FiRECA entered into force on 1 October 2022 with the application from Axpo AG for financial support from the federal government.

As the expert body, ElCom has the final say on which companies in the Swiss electricity industry are to be classified as systemically critical. Furthermore, in accordance with Article 19 paragraph 2 FiRECA, ElCom analyses and monitors documentation and information on completed energy trading transactions, as well as reports on market developments which might cause systemically critical companies to require additional liquidity. From the point at which an application for loan support is made, ElCom also monitors the liquidity requirements of the company in question. The internal reporting associated with FiRECA will begin in 2023.

Market Surveillance

In December 2022 the Federal Council sent the draft Federal Act on Supervision and Transparency in the Wholesale Energy Markets (known by its German acronym, GATE) for consultation. The present energy crisis has demonstrated the importance of greater transparency in and surveillance over the wholesale energy market on which Swiss energy products are traded. Strengthening these aspects will help to stabilise and ensure trust in the integrity of these markets.

The bill imposes certain obligations on market participants. They must be registered with the supervisory authority and provide the information necessary for market surveil-

lance, such as transactions and trade bids for wholesale energy products. This implements the disclosure regulations concerning insider information that apply under the European Regulation on Wholesale Energy Market Integrity and Transparency (REMIT). In addition, GATE is intended to prohibit any conduct that could distort the market, such as market manipulation and insider trading.

Pricing and Tariffs

High wholesale prices in the first half of the year and during the summer months presented enormous challenges to many energy supply companies. They, and politicians, increasingly turned their attention to procurement strategies and procurement-related risk management. Not every energy supply company was able to smooth out high prices with structured procurement that was spread across several deferred tranches.

In some places, prices for both customers on the free market and 'captive' basic supply customers have simply exploded. This led to a high number of enquiries from the general public, which fully occupied the ElCom Technical Secretariat for weeks. ElCom does not approve any tariffs, however, and neither is it responsible for the tariffs charged to free market customers. Rather, ElCom monitors prices and tariffs for network usage, examining them where there is cause for suspicion. It also conducts investigations in specific cases into whether the reported costs on which the tariffs are based are recoverable, and their level justified. It may order tariffs to be lowered or prohibit increases.

Answering the many enquiries was a very demanding task for our staff. In addition to the sheer volume of questions, they were particularly affected by the many individual stories they were told. The village bar and restaurant, for example, which had struggled through two years of COVID-19 restrictions and now feared having to close, or private individuals who did not know how they were supposed to pay their electricity and gas bills. Often, in answering these many enquiries they had to be not only efficient, but also empathetic.

Despite multiple additional challenges, ElCom was able to advance important operational projects and, in some cases, complete them. For example, connection to the DETEC eGovernment portal concluded ElCom's EDES project, which concerned the full replacement of the IT infrastructure that collects data from more than 600 network operators. Progress was also made with the campaign to eliminate network operators' shortfalls. This relates to costs that have not yet been adequately factored into tariffs, if at all. They not only present a latent risk of tariff hikes for consumers, but may also be subject to interest at the expense of end users at the applicable WACC rate. Investigations into these shortfalls led to proceedings being opened in more than 70 cases in the autumn of 2022. With this campaign, by the end of the year ElCom had succeeded in reducing the shortfall-related risk of future tariff increases by a total of around CHF 1 billion.

Irrespective of market developments in energy prices, ElCom regularly reviews the rules it applies to evaluating reasonable costs and profits relating to the distribution of energy to basic supply customers. From the beginning of 2024, the threshold applied under these evaluation rules will be reduced from its current level of CHF 75 to CHF 60 per invoice recipient. This does not mean, however, that distribution system operators are forced to report costs of less than CHF 60. If a distribution system operator's costs were higher than this threshold, ElCom would examine whether or

not they were recoverable. The figure of CHF 60 is thus simply a criterion for further examination by ElCom. The cost ceiling is effectively being lowered. If the total of administration and distribution costs, plus profit, continues to exceed CHF 100 even after costs have been reviewed, this CHF 100 is applied as the cost ceiling. It was previously CHF 120.

Legal proceedings

In the year under review, ElCom had for the first time to address in a decision whether it was possible to revert to being a basic supply customer after a business takeover. ElCom also issued its first decision on the permissibility of a community for self-consumption and its right to be a basic supply customer. Furthermore, in the interests of a comprehensive assessment of security of supply, for the first time a decision was issued ordering Switzerland's three largest power companies to submit the standard contracts they had concluded on the wholesale electricity market for deliveries to Switzerland and a delivery duration of at least one month. In the course of proceedings concerning measures in the event of a risk to the stable operation of the transmission network, in mediation talks led by the ElCom Technical Secretariat the parties succeeded in concluding an agreement comprehensively governing implementation. The case was therefore closed.

Personnel

The Federal Council appointed Jürg Rauchenstein, Dipl. Ing ETH, to serve as a new member of the Commission from 1 September 2022. He replaces Dario Marty, former Director of the Federal Inspectorate for Heavy Current Installations (ESTI), who had been with the Commission since 2018 and headed the Networks and Supply Security committee. We would like to thank Dario Marty most warmly for his hard work and commitment on behalf of the Commission.

Werner Luginbühl
President of ElCom

2 Interview with the Director

With volatile market prices and, in some cases, massive hikes in energy tariffs, the past year saw renewed discussion of some fundamental issues of market design and regulation.

The price trend that we have seen on the market over the past two years is unprecedented. Can the market settle by itself, or should there be regulatory intervention? Where do the limits of regulation lie?
It is true that the course of market prices since autumn 2021 has been extraordinary in terms of not just their rise, but also their volatility. Most of all, price swings on the futures market in August 2022 were so extreme that they threatened the stability of the system as a whole. In the wake of a sharp drop in deliveries of Russian gas to Europe, gas and electricity prices contained enormous risk premiums that reflected the elevated uncertainty about supply capacities. However, regulation in the sense of a cap on wholesale prices would have further destabilised the markets in this situation, especially since it would have driven demand additionally from the supply side. As long as competition continues to function, market and pricing mechanisms can help ensure stability of supply, even where circumstances are tense.

Does the electricity market need a complete overhaul? And does ElCom need more powers to intervene to correct the market?
There are indeed discussions ongoing in Europe right now about adjustments to the design of the electricity market. It should be remembered, however, that the developments seen in 2022 were highly extreme, and the result of a genuine crisis situation. Even under these circumstances, the electricity market displayed a surprising degree of resilience. I do not believe there is any urgent need to redefine the mechanisms of the wholesale electricity market. In view of its physical and economic integration in the European energy market, Switzerland is nonetheless affected by discussions at EU level. It also has some catching up to do where surveillance of the wholesale energy market is concerned. There is a need for greater transparency, especially in phases of extreme price volatility and the associated risks to the system, as well as a greater risk of market manipulation. The Federal Council has initiated the relevant legislation in the form of GATE.

Does it still make sense to fully deregulate the market?
You could also ask that question from the opposite perspective. To what extent does the current system of basic supply benefit the consumer? Many distribution system operators (DSOs) generate little, if any, of their own electricity. They, and by extension their customers, are thus also almost entirely at the mercy of the market. That is reflected in the increases in basic supply tariffs for 2023, which have been significant in some cases. At the same time, the tariff gap within Switzerland has widened hugely. Households can pay anywhere between 9 and 71 cents per kilowatt hour. It is difficult to get across that such differences can exist within the regulated part of the market. The law also gives DSOs scope to prioritise their own renewable production at cost for basic supply customers. In practice, this means that even if a DSO has its own production, in many cases it offers basic supply customers only limited protection against high wholesale prices.

Should basic supply customers not be better protected against market price volatility?
In practice, the degree of price hedging depends chiefly on the electricity portfolio and/

or procurement strategy of the DSO. In principle, it would be possible for a DSO to cushion price volatility by having a higher proportion of its own production, and making more long-term purchases. Hedging strategies can also be costly, however, meaning that the consumer ends up paying more. In particular, to date there has been no liquid, functioning market for very long-term procurement.

Urs Meister
Director of ElCom

« As it stands, the statutory framework surrounding the basic supply of electricity is not designed explicitly to protect consumers against swings in market prices. »

It is therefore questionable that a legal requirement for DSOs to purchase on a long-term basis and protect their end customers would actually have any benefit. Another factor is that consumers have differing interests and capacities for risk. While I'm sure that some would be willing to pay a little more on average for stable prices, others are well able to accept fluctuating prices. It is possible that a deregulated market would permit a range of products with different hedging strategies even for small consumers.

What can be done to ensure that captive customers are not permanently disadvantaged?
As I mentioned, the law allows DSOs scope to prioritise their own – or third party-generated – domestic renewable energy for the basic supply. If its production costs are lower than the market price, it is possible that its being given priority will benefit basic supply end users. On the other hand, this priority places consumers at a disadvantage if market prices are lower than the generation costs for their local operator's own electricity. Assuming ups and downs in market prices, as long as priorities remain unchanged consumers would both benefit and lose out. Things might well even themselves out over time. It's a different picture if a DSO is always adjusting its priorities depending on movements in the market price. As prices rose there were around 30 DSOs that abandoned their previous priorities for 2023. In a fully deregulated market it would no longer be possible for basic supply customers to be systematically disadvantaged. If the market were to remain partially deregulated, we would have to examine the extent to which DSOs' freedom to set priorities should be restricted.

Will basic supply customers again be facing tariff increases in 2024?
Yes. At the moment we can expect tariffs to rise again for 2024 in many cases. There are various reasons for this. Firstly, it is likely that many energy supply companies that buy most of their electricity on the market have not yet fully passed on the higher prices that they have paid. While a large proportion of required electricity for 2023 was probably bought on the futures market before the sharp price rises, the proportion for 2024 will be lower. This means that higher electricity market prices will tend to be more heavily weighted in tariffs for 2024 than for 2023. This naturally depends on the energy supply companies' individual procurement

strategies. Prices in recent months have fluctuated significantly, so the impact on these companies' tariffs will also vary. Secondly, from 2024 onwards consumers will pay a surcharge to offset the additional costs of taking short-term action to ensure security of supply. In particular, these costs relate to implementing the winter reserve. Thirdly, as interest rates have risen, the Federal Department of the Environment, Transport, Energy and Communications (DETEC) has also raised the weighted average cost of capital rate for the electricity grid and for production that is billed under the basic supply.

3 The Swiss electricity market

The Bickigen substation in Wynigen is one of the largest nodes in the Swiss electricity grid. Transformers here feed electrical power into the regional and supraregional distribution networks.

3.1 Structure of network operators in Switzerland

There were around 610 active network operators in Switzerland in 2022. They supply a total of approximately 5.65 million invoice recipients (up 1.4% year on year), serving some 5.9 million measurement points (up 1.5% year on year). The sector is very diverse: while the largest network operators supply over 300,000 end customers, average network operators serve just 1,620 each, and the smallest only 45. Of the total, only 80 network operators supply more than 10,000 end users, with 14 having a customer base of over 100,000 consumers (Figure 1).

This heterogeneity is also reflected in the many different types of legal structures in which these network operators are organised. Just 25 per cent of network operators are joint-stock companies, compared with around 20 per cent cooperatives. The remaining 55 per cent are either municipal utilities or companies under public law. The number of network operators in Switzerland fell by around seven per cent to 610 between 2016 and 2021. There has been a clear trend towards fewer network operators for some time now, which is attributable in part to network takeovers and mergers between communes. According to the official Swiss commune register, the number of communes decreased from 2,294 to 2,136, or slightly more than seven per cent, during the period 2016 to 2021. Switzerland's population increased by around four per cent during the same period. This resulted in an increase in the number of end users per network operator.

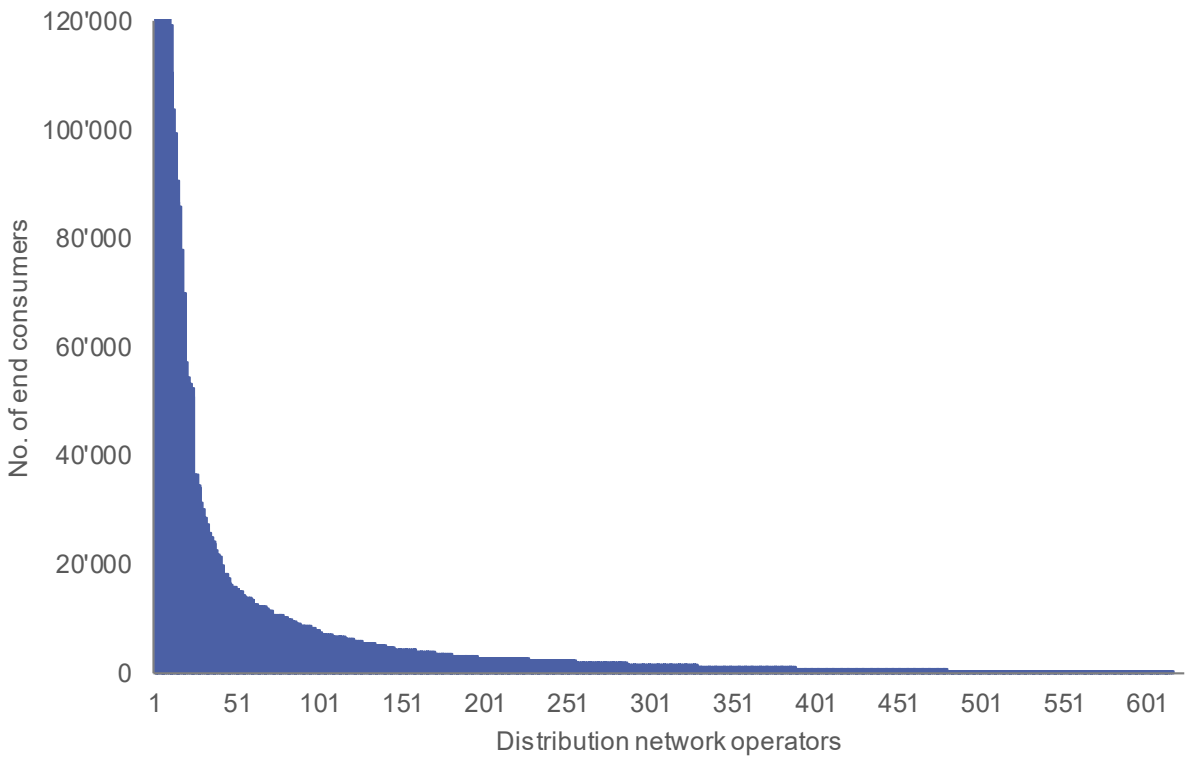


Figure 1: Number of end users per distribution system operator. To improve readability, the vertical scale has been cut off at 120,000 end users; the data cut off concerns nine distribution system operators.

Network operators declared a total offtake of around 56 million MWh for 2021, a comfortable five per cent more than in 2020. Figure 2 below shows the network operators' shares of total offtake in Switzerland. Just ten network operators supply 42 per cent of the energy sold to end users on the distribution network (dark blue in Figure 2 below). If volumes are expanded to show the largest 50 network operators, the proportion rises to three quarters of the total volume of energy supplied (dark blue, light blue, green, yellow and orange in Figure 2). The next-largest 50 network operators together deliver just 11 per cent, while all of the remaining network operators (just under 500) in total account for only an aggregated 15 per cent of the energy used by end users (network operators 51–60, 61–70, 71–80, 81–90, 91–100 and the 'Rest' in Figure 2).

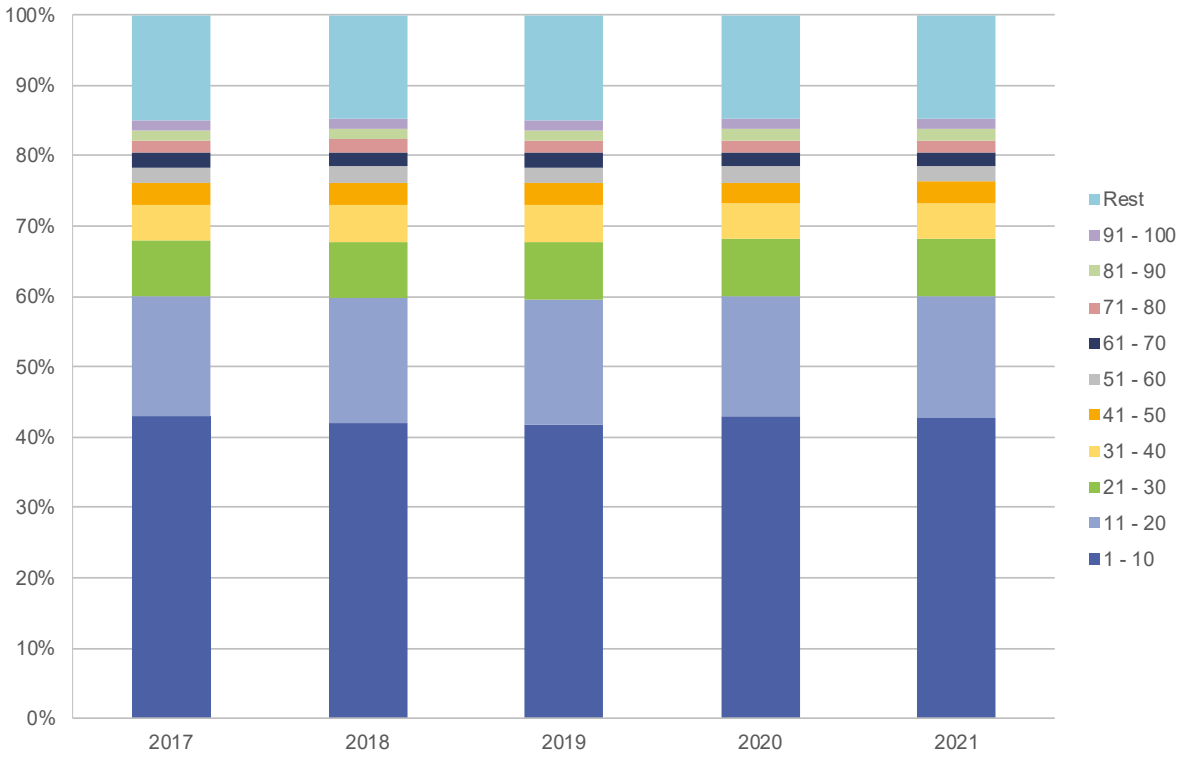


Figure 2: Percentage share of energy supplied via the distribution network by company size.

3.2 Market access and switching rate

Currently, only consumers with an annual consumption of at least 100,000 kWh are entitled to free market access, i.e. to select their own electricity provider. They have until the end of October each year to decide whether they wish to switch from basic supply the following year. Once in the free market, a large consumer can no longer return to regulated basic supply ('once free, always free' in accordance with Article 11 paragraph 2 last sentence ESO).

ElCom regularly conducts a survey of the largest distribution system operators to determine the number of potential and actual end users on the free market. This currently includes operators with feed-out of over 100,000 MWh. In total, these operators together supply almost four million or just under 71 per cent of end users in Switzerland. [1]

The distribution system operators in the survey represent a total of over 34,000 end users with the right to free market access (0.6 per cent of all end users). Of these end users with the right to choose free market access, around 23,400 had exercised this right up to and including the 2021 planning year (68 per cent), according to the energy supply companies responding to the survey. For 2023, the distribution system operators surveyed still reported 22,300 end users who had exercised this right (66 per cent).

The network operators covered by the survey feed out a total of almost 40 TWh or some 71

per cent of final energy consumption (around 56.5 TWh declared total feed-out). Around half of this (approximately 21 TWh) goes to end users who theoretically have the right to free market access, while 17 TWh or 82 per cent of the market-eligible energy goes to end users in this group who have actually exercised their right to free market access. This share is thus also slightly down on previous years.

The right to freely choose an electricity supplier was exercised on a relatively small scale in the first few years after the market was liberalised (Figure 3). As market prices fell, the number of end users choosing to exercise this right rose sharply in the years that followed. By 2021 the share of end users in the free market had already begun to dip slightly, and this decline has continued into the planned 2023 figures. To a certain extent, the decrease has statistical origins and results from the fact that the sample of participating companies may represent fewer end users by the time the survey is completed. Other reasons are that the number of large consumers with the right to free market access has increased more than the number of those who have chosen free market access; as market prices rise, consumers are more reluctant to switch to the free market. The decline in absolute numbers also probably reflects the high number of company closures in 2021 and 2022.[2]

1 The figures in this survey come directly from the energy supply companies and are not examined in any detail by ElCom.

2 Cf. 2022 debt collection and bankruptcy statistics from the Federal Statistical Office (FSO).

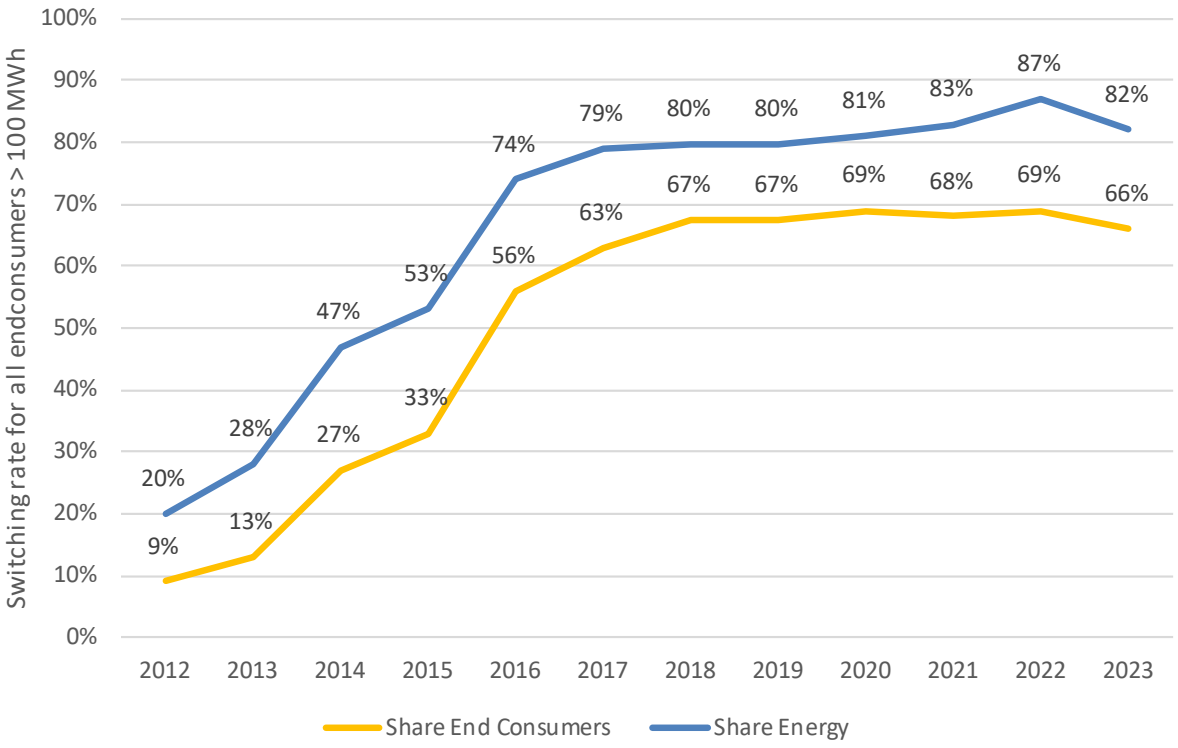


Figure 3: Around two thirds of all market-eligible customers have to date switched to the free market (orange line). These consume four fifths of the energy consumed by all market-eligible customers (blue line).

3.3 Basic supply, substitute supply and self-consumption

For the first time, ElCom had to rule on whether a planned community for self-consumption was permissible, and whether the resulting entity was eligible to be a basic supply customer. In the case in question, it deemed the conditions for a community for self-consumption under Article 17 paragraph 2 Energy Act (EnA) to be fulfilled as soon as energy for self-consumption is produced independently at the production site, and the facility's output accounts for at least ten per cent of the community's connected load. ElCom held that, from this point onwards, the network operator was obliged to supply the community in accordance with Article 6 paragraph 1 Electricity Supply Act (ESA). It also ruled that plans in the case in question did not constitute the manifest abuse of a right in the sense of Article 2 paragraph 2 Civil Code (CC).

ElCom also issued its first decision on the right to receive the basic supply in the context of a business takeover. In this decision it held that, where the same consumption site continues to exist unchanged with all rights and obligations following a sale, this site would still fall under the principle of 'once free, always free' in accordance with Article 11 paragraph 2 final clause Electricity Supply Ordinance (ESO). In this particular case, all of the rights and obligations relating to the consumption sites in question were acquired as part of the acquisition and merger, and existing business activities continued unchanged. ElCom thus concluded that the consumption sites in question were not entitled to be served by the basic supply, because they were the same consumption sites as previously, for which the right to network access had already been exercised.

The ElCom Technical Secretariat made informal enquiries to gather considerable additional information on the topics of basic supply, substitute supply, and self-consumption. The key questions and answers in this regard are published in the notification entitled Steigende Elektrizitätspreise: Fragen und Antworten zur unterjährigen Anpassung der Energietarife, zur Ersatzversorgung und zur Rückliefervergütung (Rising electricity prices: questions and answers on the intrayear adjustment of energy tariffs, substitute supplies and feed-in remuneration), which is continually updated.

3.4 Transmission network tariffs

As the overview in Table 1 shows, the tariffs for the transmission network fluctuate. In 2023, all tariffs are higher. The general system services increased from 0.16 cents/kWh to 0.46 cents/kWh. However, the network usage tariffs, which are governed by Article 15 paragraph 3 ESO (30 per cent working tariff, 60 per cent power tariff, 10 per cent basic tariff) rose to a lesser extent year-on-year. In contrast, the tariff for active power losses was increased from 0.14 to 0.30 cents/kWh (cf. section 5.7, System services).

	2019	2020	2021	2022	2023
Network usage					
Working tariff [cents per kWh]	0.19	0.18	0.20	0.25	0.27
Power tariff [Swiss francs per MW]	31 100	28 800	33 600	43 920	48 660
Fixed basic tariff per exit point	288 000	269 400	319 800	413 040	443 700
General system services tariff [cents per kWh]	0.24	0.16	0.16	0.16	0.46
Individual system services tariff					
Active power losses [cents per kWh]	0.14	0.25	0.15	0.14	0.30

Table 1: Transmission network tariffs for network usage and general system services for distribution service operators and end users (source: Swissgrid AG).

Tariffs for system services are exposed to price trends on the international electricity markets. Swissgrid must purchase system services at higher prices again for 2023, as it has been doing since summer 2021, in fact. As operator of the highest level of the electricity network in Switzerland, Swissgrid must publish its tariffs for the following year as early as April. Estimates are therefore based on the information available 12–18 months ahead of the actual purchase. Consequently, in both 2021 (tariffs calculated in the first quarter of 2020) and 2022 (tariffs calculated in the first quarter of 2021), Swissgrid had to buy at prices that were higher than it had budgeted. Swissgrid tariffs for 2023 therefore not only reflect expected prices for 2023, but also help to offset the shortfalls recorded in 2021 and 2022.

In order to compare the tariffs of the various network operators, ElCom converts the tariff components (working, power and basic tariffs) into cents per kWh. If the individual tariff components of the transmission network are combined in cents per kilowatt hour, this results in an amount of 1.11 cents per kWh for 2022 and 1.56 cents per kWh for 2023. This amount is factored into the distribution system operators' network usage tariffs, and therefore spread according to the solidarity principle across all end users in Switzerland.

3.5 Distribution network tariffs

3.5.1 Sharp rise in tariffs in 2023

The electricity price is made up of four elements: the network usage 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 at the latest before the respective tariff year. This means the average price of electricity in 2023 has risen sharply on the previous year: in 2023 a typical household will pay around 27 cents per kilowatt hour (cents/kWh, all median figures, weighted by residents). This corresponds to a total increase of 27 per cent.

Specifically, energy tariffs have risen by around 65 per cent, or 7.94 cents/kWh, to 13.08 cents/kWh, while network tariffs were only slightly higher compared with 2022 levels (+ 0.79 cents/kWh). This is primarily due

to the increase in Swissgrid's system services costs (cf. section 3.4 above). Charges for renewable energies did not change, remaining at 2.3 cents/kWh, while the fees paid to the state rose by around 10 per cent on average. The total tariff also includes the network surcharge for the promotion of renewable energy. This was gradually increased from 1.5 cents/kWh to 2.3 cents/kWh during the period up to 2018 and has since been stable. Figure 4 shows the composition of average overall electricity prices in cents/kWh.

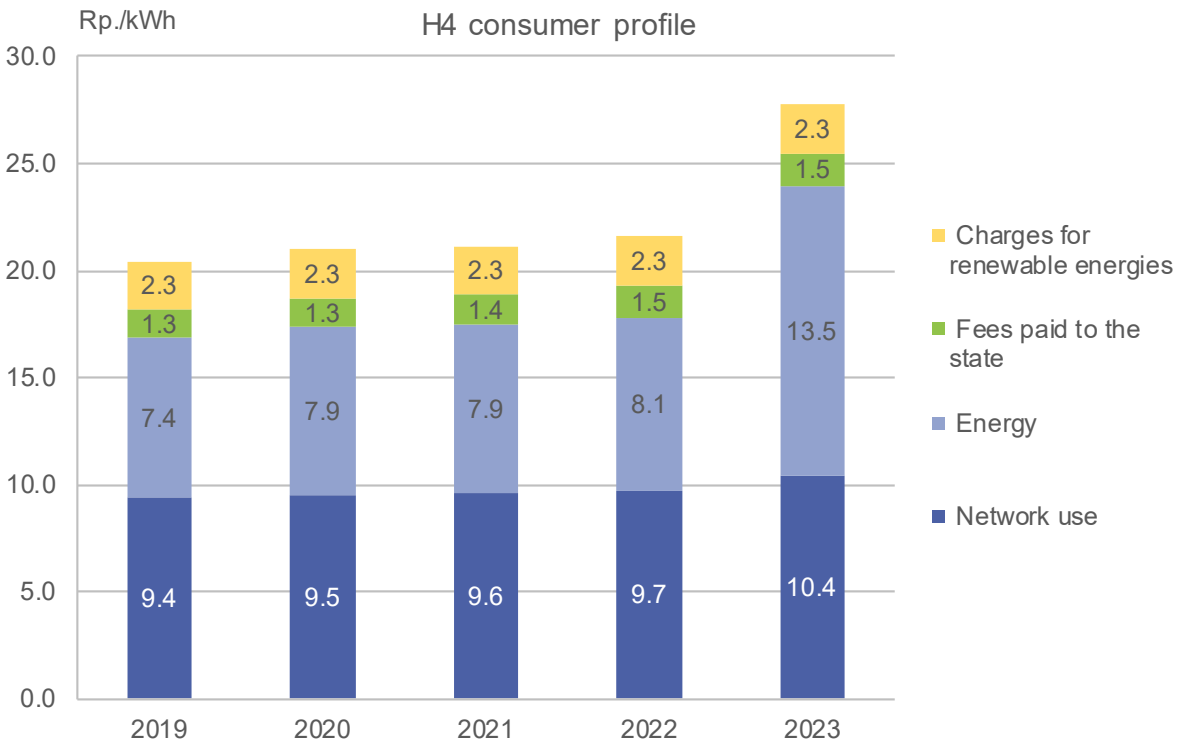


Figure 4: Cost components of the average overall electricity price for the H4 consumer profile (excluding VAT)

The tariff components in the above bar chart are weighted by invoice recipients for technical reasons, and not by residents as in the calculation of costs on ElCom's electricity price website. This means there are slight differences between the two calculation methods.

A typical household with the H4 consumer profile consumes an average of 4,500 kWh per year. At a tariff of around 27 cents per kilowatt hour, this household will therefore pay over CHF 1,215 (+ CHF 261 year on year). It is a similar picture for small and medium-sized enterprises in Switzerland. Here, the median total price rose by 24 per cent.

There is nonetheless variation between network operators within Switzerland. This can be considerable. The following Figure 5 shows the significant differences in 2023 tariffs for a typical H4 profile household.

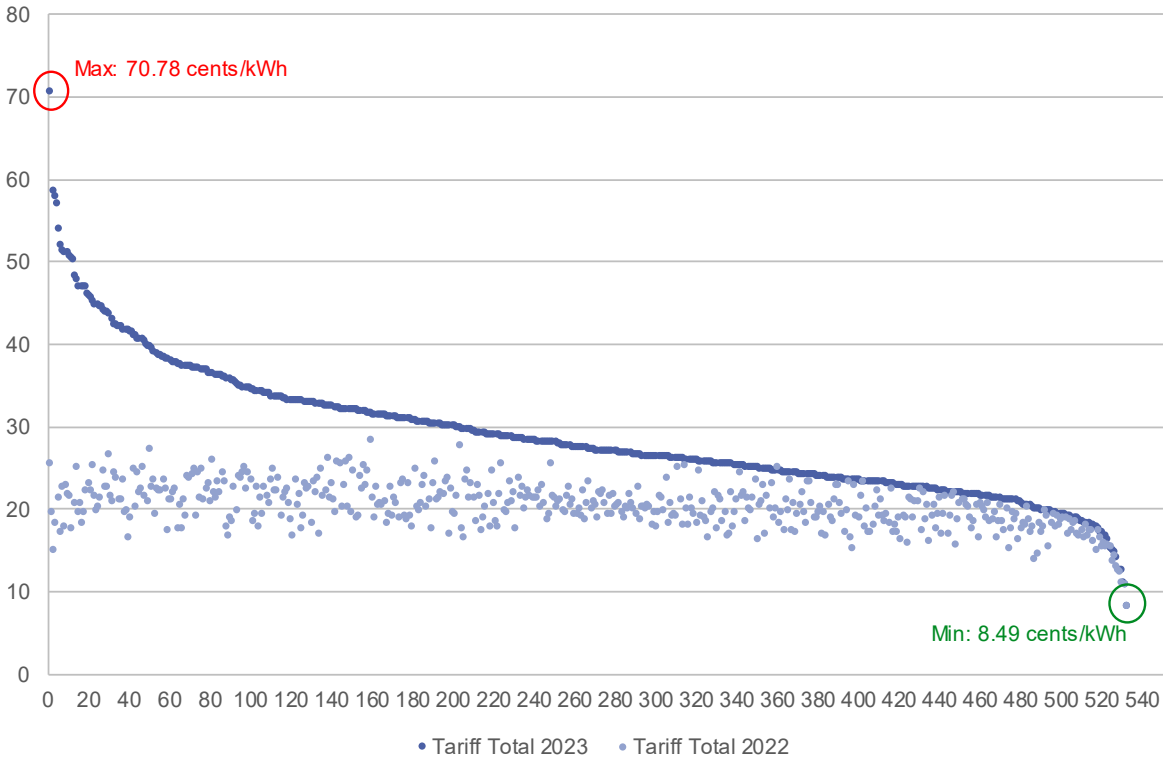


Figure 5: Distribution of tariffs (total in cents/kWh) comparing 2023 (dark blue) and 2022 (light blue), with a maximum spread of 70.78 cents/kWh and a minimum of 8.49 cents/kWh. The survey covered 610 network operators with a total of 540 different tariffs (x-axis)

The enormous heterogeneity of tariffs in Switzerland means that annual costs for an average household in Switzerland vary from around CHF 3,150 to just over CHF 383 per year, corresponding to a difference of CHF 2,770 per year or CHF 230 per month. Detailed information about the tariffs of each commune and an interactive map can be found on ElCom's electricity price website (www.strompreis.elcom.admin.ch).

3.5.2 Median communal tariffs in Switzerland for the 2023 tariff year

The median communal tariffs for 2023 are shown on the Swiss maps that appear below (Figures 6 to 9). The colours used for the individual communes indicate their tariffs in relation to the median figure for Switzerland. If a commune's tariff is within +5 and -5 per cent of the median, it is shown in yellow. If its tariff is 5 to 15 per cent above the median, it is coloured orange, and if it is more than 15 per cent higher it is shown in red. The same applies to communes with tariffs that are lower than the median. If the tariff is between 95 and 85 per cent of the median figure, they appear in light green, and if it is less than 85 per cent of the median, they are shown in dark green. The colour variations therefore show where the communal tariffs stand in relation to the national benchmark.

Median network usage tariff

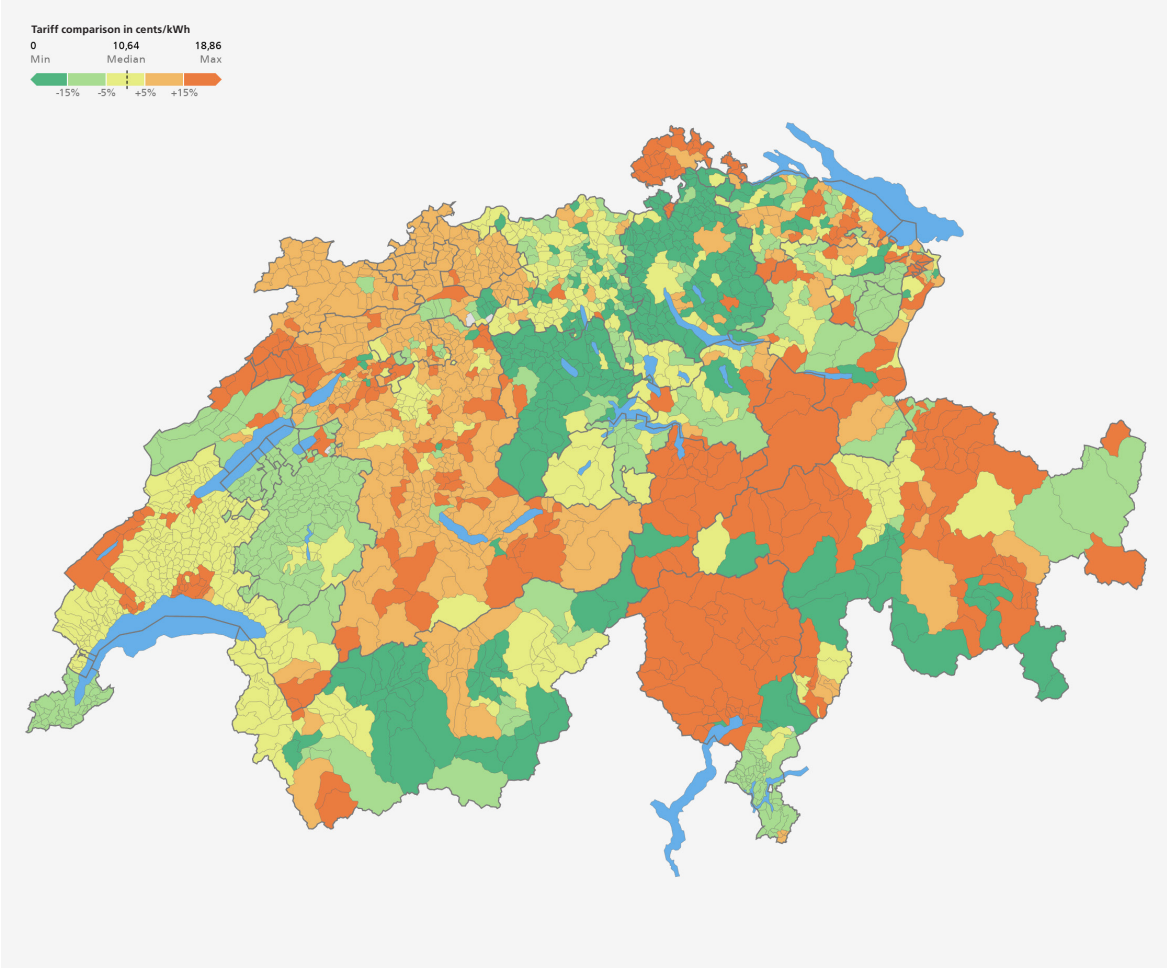


Figure 6: Median communal tariff for network usage for the H4 consumer profile in 2023

Median energy tariff

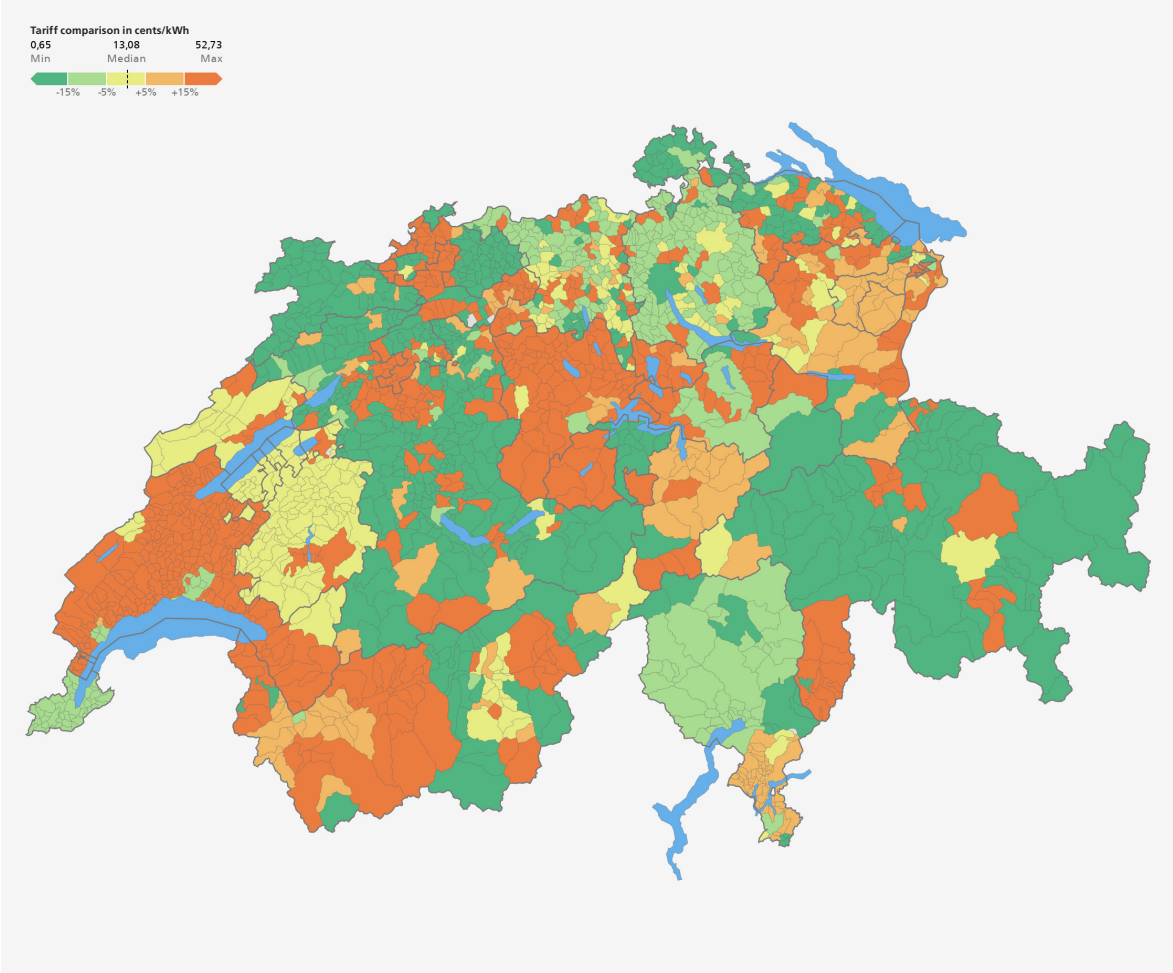


Figure 7: Median communal tariff for energy for the H4 consumer profile in 2023

Fees and payments to the state

Figure 8 shows the median cantonal and communal fees and payments to the state. It does not show the uniform Switzerland-wide federal charges for the promotion of renewable energy.[1] Fees and payments to the state are not controlled by ElCom, but are determined in local political decision-making processes. The median fees and charges for 2023 are 0.99 cents/kWh. It is noticeable that there are many high and low amounts, but relatively few at or close to the median (shown in yellow).

1 As the network surcharge is uniform throughout Switzerland, it is not shown here. It is included in the total tariffs for 2023, however (cf. Figure 9).

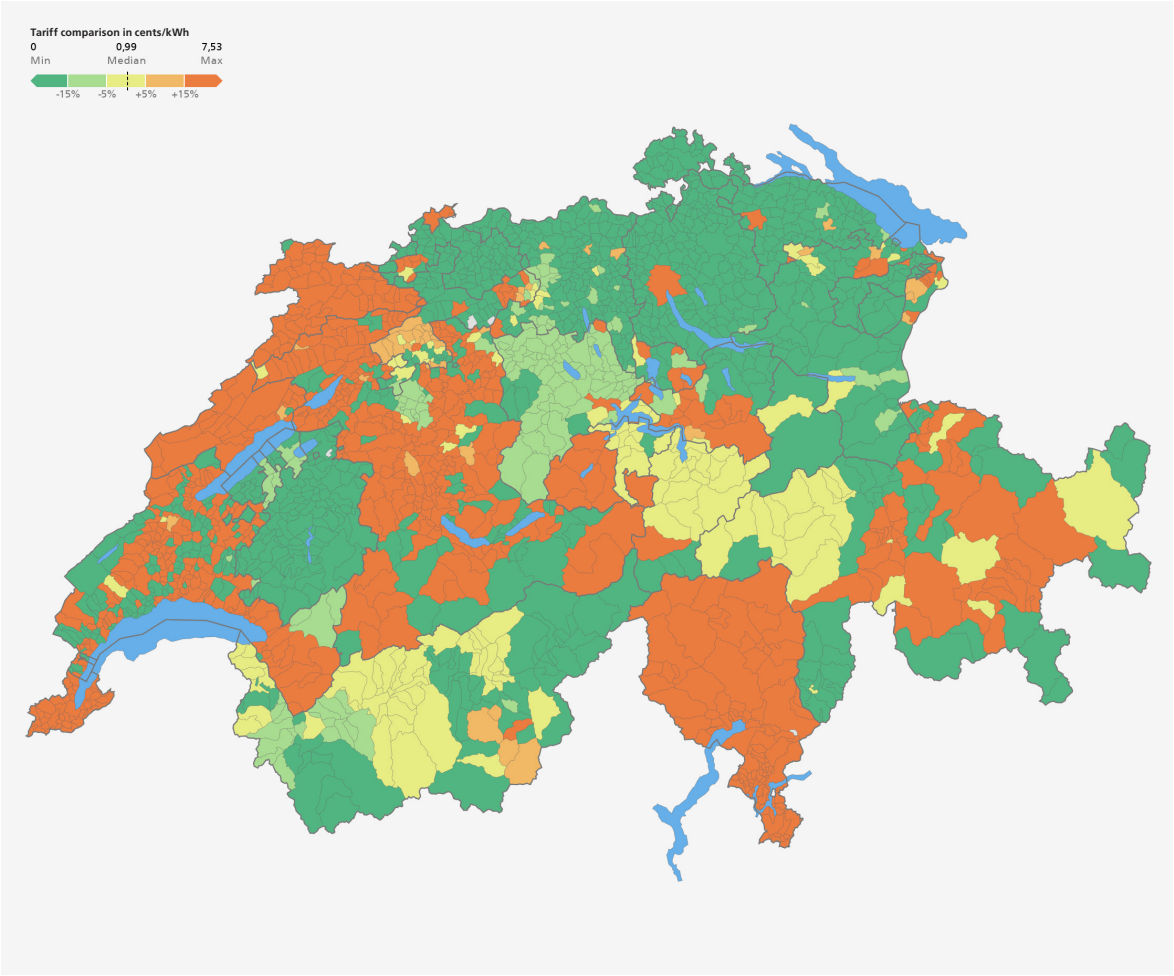


Figure 8: Median communal tariff for cantonal and communal fees and payments to the state for the H4 consumer profile in 2023

Median overall electricity tariff

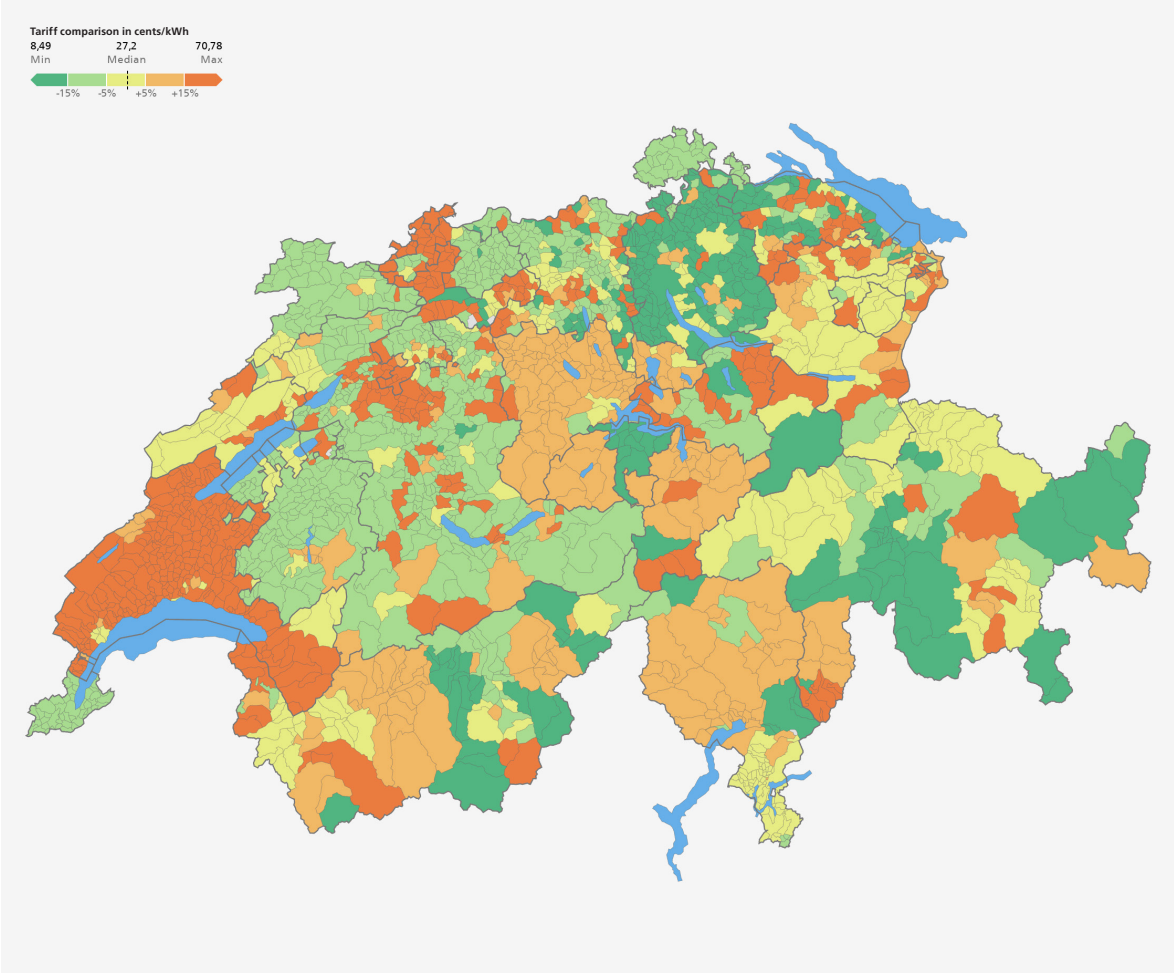


Figure 9: Median communal tariff for the overall electricity tariff for the H4 consumer profile in 2023

3.5.3 ElCom action in connection with high electricity tariffs for 2023

The increase in electricity prices that began in the final quarter of 2021 initially affected mainly market customers and distribution network operators. The market price increase took off again in the course of the reporting year. At the latest when tariffs were published at the end of August 2022 it was clear that the problem had spread widely to include end users with basic supply. ElCom was swamped with enquiries as a result (cf. section 10, Facts and figures). More than 1,000 general enquiries were received during the year under review, around two and a half times the figure in previous years. Many end users were highly unsettled by the tariff increases– some huge – imposed by the various network operators (cf. section 3.5, Distri-

bution network tariffs). ElCom therefore published the most common questions and answers on its web page (Häufige Fragen: Steigende Stromtarife für Haushalte 2023 – 'FAQs: rising electricity tariffs for households in 2023', available in German, French and Italian).

Many of the complaints primarily concerned the increase in electricity prices communicated by network operators, while some also related to the rise in Swissgrid's system services costs (cf. section 3.4 above). The latter frequently featured in the network operators' communications on tariffs. There were also numerous enquiries from industrial and business customers who purchase their electricity on the free market. Part of ElCom's remit is to examine electricity tariffs for captive customers, as well as all of the price-related aspects of network usage by electricity network operators. It is not responsible for the electricity tariffs paid by customers on the free market.

Under electricity supply legislation, the cost-plus system applies. This means that network operators are permitted to calculate the costs they incur for operating the networks and purchasing energy fully into tariffs. ElCom does not approve any tariffs. It does, however, monitor prices and tariffs for network usage, examining them where there is cause for concern. It also conducts investigations in specific cases into whether the reported costs on which the tariffs are based are recoverable, and their level justified. It may order tariffs to be lowered or prohibit increases (Art. 22 para. 2 ESA). Examinations of individual tariffs are based on a review of actual costs and the applicable rules, which are Art. 14 and Art. 6 ESA for network usage remuneration and energy respectively.

In many cases, end users asked why prices in Switzerland had risen so sharply given the high level of domestic production. Under the law (ESA), the share of the tariff allocated to the supply of energy to captive customers is based on generation costs for efficient production, and on the distribution system operators' long-term supply contracts. Prices are heavily dependent on how much an energy supplier generates itself and also – if it does not have sufficient independent output or any at all – on how it purchases electricity for end users. Data gathered by ElCom shows that energy must be bought on the market for around two-thirds of end users in Switzerland.

Although Switzerland generates a large volume of electricity itself, prices depend on European wholesale prices. This is because Switzerland is heavily intermeshed with the European electricity grid, with over 40 cross-border transmission lines. Since gas and coal are the commodities that drive electricity prices in surrounding European countries, changes here also impact on market prices in Switzerland.

In some cases, the basic tariff for basic supply customers has switched from a dual-rate to single-rate tariff. Depending on consumption patterns, this may result in an increase in network costs, for example in the case of electrical boilers or heating systems that were previously operated during off-peak hours.

The sharp rise in energy tariffs also gave rise to complaints that the new tariffs had already been applied in 2022, specifically when the meter had been read in the old year. This approach is unlawful where the tariffs communicated for 2023 became applicable only on 1 January of this year. However, usage may be estimated in the case of readings from conventional meters, where readings cannot be made on a specific reference date for logistical and technical reasons. Some network operators

also offer the option of a self-reading on the reference date (31.12.xxxx) and communicating this to the network operator. End users fitted with smart meters are not affected by this.

ElCom also received various questions as to whether it is lawful for tariffs to apply from 1 October of one year to 30 September of the next. ElCom takes the view that a tariff year must correspond to the calendar year. Therefore, tariffs must, in principle, be applicable from 1 January to 31 December. Electricity supply legislation does not clearly define the tariff year, however. ElCom has therefore raised the matter with the Swiss Federal Office of Energy (SFOE) that the next revision of the Electricity Supply Ordinance should expressly define the tariff year. In addition, ElCom calls upon the suppliers concerned to consider making the relevant adjustment for future years.

In addition to enquiries from the public, ElCom received many from network operators concerning high prices. Questions covered subjects such as the options that the law offers to reduce tariffs, liquidity, or a return to basic supply (cf. below).

With regard to the high tariffs for 2023, ElCom has published two sets of FAQs in German, French and Italian: one for end users (FAQ – Rising electricity tariffs for households)[1] and one covering enquiries from network operators about high tariffs (Rising electricity prices: questions and answers on the intrayear adjustment of energy tariffs, substitute supplies and feed-in remuneration)[2].

ElCom has set up a number of internal working groups to address the extraordinarily high costs of purchasing electricity on the market, and the resulting increase in tariffs. In the spring of 2022, the 'High tariffs' working group conducted a survey of electricity suppliers that asked about their procurement methods. The responses allowed the Commission to make an initial estimate of the tariff increases that could be expected for 2023, and to plan the necessary steps. The working group also developed an examination procedure, the first stage of which permits the causes and impact of cost increases to be determined. The analysis in this preliminary examination is based on the documents that network operators submit to ElCom as part of the annual reporting process. Suppliers are therefore not required to satisfy any additional requirements in this initial step. The results of the analysis provide the basis for further steps in the examination of energy costs. It is clear that the rapid increase in prices in itself does not offer sufficient indication of tariffs that are not legally compliant.

1 available at www.elcom.admin.ch > Häufige Fragen - Steigende Stromtarife für Haushalte 2023

2 available at www.elcom.admin.ch > Dokumentation > Mitteilungen > Steigende Elektrizitätspreise: Fragen und Antworten zur unterjährigen Anpassung der Energietarife, zur Ersatzversorgung und zur Rückliefervergütung

3.5.4 General tariff structure

In 2022, ElCom once again answered many queries concerning amendments to the Electricity Supply Act of 23 March 2007 and the Electricity Supply Ordinance of 14 March 2008, which entered into force on 1 June 2019. Some of them have been published in the amended notification entitled Fragen und Antworten zur Energiestrategie 2050 (Questions and Answers on the Energy Strategy 2050). The increase in the number of smart meters on the Swiss distribution network means new tariff models are also increasingly

being introduced, which are provided, for example, as options to the basic tariff in the network tariffs. There is an option, for instance, for dynamic tariffs that better reflect the load that end users place on the grid at any given time. This in turn permits more fine-tuned load management and consumption, thereby reducing costs. This kind of dynamic tariff can be provided subject to certain conditions under the current legal provisions. ElCom issued the notification Fragen und Antworten zu neuartigen und dynamischen Netznutzungs- und Energieliefertarifen (Questions and Answers on New and Dynamic Network Usage and Energy Supply Tariffs)[1] in 2019 which sets out the legal framework in section 3.3.

ElCom also addressed energy supply company participation models, which have been offered in a variety of forms in Switzerland. With such models, the energy supplier builds and operates a new electricity production facility, usually a photovoltaic (PV) system. Interested end users are able to participate in a particular way, usually by paying a one-off sum that relates to a specific area (in square metres) of the PV system. In return, they receive regular compensation over a given period of time, frequently a certain volume of electricity over 20 years. This is settled along with the electricity bill. The rules on unbundling must be observed here, specifically those relating to the separation of sensitive information set out in Article 10 paragraph 2 of the Electricity Supply Act of 23 March 2007 (ESA). Where such models involve a deduction being made from the electricity bill, these requirements may make them unlawful if they are not based on the basic supply tariff. There are also questions in connection with network access. ElCom has therefore issued a notification on participation models of this kind,[2] in which it sets out a compliance framework for their structure that enables them to be regarded as legally permissible. Existing models that do not satisfy this framework must be amended by 1 January 2024.

1 Available at www.elcom.admin.ch > Documentation > Information

2 Beteiligung' von Endverbrauchern in der Grundversorgung an Produktionsanlagen – Modelle der Verteilnetzbetreiber (Participation of basic supply customers in production facilities – distribution system operator models), notification of 26 August 2022, available at www.elcom.admin.ch > Documentation > Information

3.6 Submission of cost calculations and tariffs with EDES

Every network operator must submit the cost calculation, which forms the basis for the network and energy tariffs for the following year, to ElCom in electronic format by the end of August. An IT infrastructure to handle this was set up in 2010, but in the past three years it has had to be replaced gradually by a new data collection system, EDES. Mandatory data submissions were made using the new online forms for the first time during the 2021 reporting year. ElCom's electricity prices website has also been modernised. This project was largely completed in autumn 2022 when the infrastructure was connected to the DETEC eGovernment portal.

The new web-based data delivery system provides various benefits compared to the previous, Excel-based solution. Checks are now integrated into the online forms. This means that the network operators can be provided with support through automated feedback when completing the cost calculation forms – in other words before official submission to ElCom. This

'prior check' enables further improvement in the quality of the data submitted and reduces rectification workload for network operators.

ElCom underlined the importance of the cost calculation in 2020 and provided clarification concerning submission and subsequent amendment (Directive 1/2020). This states that amendments to submitted cost calculations can only be made upon request and following approval or at the request of ElCom. Network operators must also confirm that the cost calculation data submitted on 31 August is correct and complete by providing a legally valid signature. If a network operator wishes to amend data at a subsequent stage, they must submit a well-founded application to ElCom.

3.7 Examination of tariffs

3.7.1 Reduction in shortfalls poses a risk of potential tariff increases

In addition to high electricity prices, ElCom continued to focus on the issue of shortfalls. These are costs that have to date not been factored sufficiently, if at all, into tariffs, and therefore present a latent risk of future tariff increases for end users. ElCom thus launched a broad campaign in the summer of 2019. Having first communicated the issue widely, in late summer 2021 it requested all network operators with high shortfalls to either write off the coverage differentials not reduced within the stipulated three-year period on a tariff-neutral basis, or to present a reduction plan to ElCom. These activities continued in 2022, with the examination of around 600 cases of such problematic shortfalls at a total of 400 network operators. In around 250 cases, these examinations resulted in spring 2022 in instructions to write off shortfalls originating prior to 2018 on a tariff-neutral basis. They may no longer be calculated into future tariffs. Compliance was then audited following the network operators' submissions of their cost calculation data as at 31 August 2022. Once these 250 cases had been reviewed, proceedings were initiated in just over 70 cases in autumn 2022.

In response to this campaign many network operators declared their willingness to write off their shortfalls on a tariff-neutral basis. On a cumulated basis, this cuts shortfalls in the network and energy business areas by slightly over CHF 1 billion.

3.7.2 Examinations of network tariffs

After over a decade of regulatory activity, the core issues concerning the grid have largely been resolved, either through decisions by ElCom or court rulings. In particular, this applies to the issue of historic and synthetic evaluation of network installations.

Partial proceedings concerning the distribution key for shared network-related operating costs were concluded with a letter of completion in early 2022. At issue was the internal allocation of the costs of support areas, which was previously made on the basis of revenue. A solution was reached in partnership with the distribution system operators concerned that such internal allocations will in future be resource-based. This achieves an appropriate distribution key in the sense of Article 7 paragraph 5 ESO.

In a further case, two distribution system operators appealed against the network costs

charged by their common upstream operator. While such availability costs remained relatively stable for around ten years, they have recently risen significantly. The two network operators are requesting a detailed examination of network costs by voltage level, as well as the resulting coverage differentials. ElCom has initiated the corresponding preliminary review.

3.7.3 Examinations of energy tariffs

Where energy supplies to basic supply customers were concerned, the focus was on the tariffs published in August for the following year, and the associated increases, which were huge in some cases. As described above, ElCom is still at the preliminary investigation stage in this regard. There has been no need to date to conduct specific examinations without first going into additional detail in initial analyses. Otherwise, work in the reporting year once again concentrated on the average price method and the 95 / 75-franc rule (from 2024 onwards this will become the 60-franc rule).

The average price method concerns the issue of how electricity procurement costs are divided between basic supply customers and free market customers. In specific terms, it aims to ensure trading activities are adequately taken into account in the calculation of the recoverable energy costs. ElCom identified various network operators which had billed their fixed end users disproportionately high energy costs over the previous years and as a result may not have applied the average price method in accordance with the practice of the courts and ElCom. In its final vote on 15 December 2017, Parliament also upheld Article 6 paragraph 5 ESA and therefore ElCom's average price method supported by the Federal Supreme Court. As a result, ElCom then initiated proceedings against various network operators.

In January an appeal was lodged with the Federal Administrative Court against a decision made by ElCom the previous year. It was rejected in full in the summer, and the following corrections by ElCom were upheld: (a) Trading transactions (back-to-back contracts) not previously taken into account in the procurement portfolio now included in the calculation of the average price; (b) Reduction in the interest rate used to calculate generation costs (WACC production); (c) Interest on net current assets applied by the network operator removed from generation costs. All of these points have the effect of reducing the costs paid by basic supply customers. The judgment was taken to the Federal Supreme Court in the summer, but the appeal was once again rejected.

In the remaining proceedings still in progress, all or some of the following points are contentious: definition of the quantity and cost of energy to be used when calculating the average price method, implementation of ElCom Directive 2/2020 on WACC production, interest on energy coverage differentials and differentiation of network operators within a group company.

A preliminary analysis identified a further case in which the average price method was not applied correctly. The network operator concerned made the necessary adjustments during the reporting year, effecting the correction via the coverage differential, so ElCom was not required to initiate proceedings.

A further case concerned the reimbursement of interest on surpluses. As part of a decision concerning costs and tariffs for energy supplies in 2016, which was upheld by the courts of all instances, ElCom cut the recoverable costs for

a network operator. The operator concerned subsequently also refused to reimburse the interest earned from the surplus to its end users. In mid-2021 ElCom then initiated proceedings concerning the correct handling of coverage differentials (reduction, payment of interest, etc.). This was followed in autumn 2022 by an ElCom decision, two aspects of which were contested. It was claimed that the statute of limitations for past interest claims had expired, and also that a legally enforceable decision on part of the matter had already been made in previous proceedings. An appeal against the ElCom decision was lodged with the Federal Administrative Court. Furthermore, in October 2022 ElCom stated its position on the issue of levies on the energy tariff. In its decision, it essentially held that no fiscally motivated levy may be included in the energy tariff. The decision is not yet legally enforceable.

3.8 Profit on sales: the 75 / 60-franc rule

The 75-franc rule has become well established in recent years. ElCom nonetheless once again had to require some network operators to make adjustments. This rule was established by ElCom in order to facilitate an assessment of the reasonable administrative and distribution costs and profits of grid operators relating to the distribution of energy to basic supply consumers. The following principle has applied since early 2020: if the declared total of administrative and sales costs, including profit, does not exceed CHF 75 per invoice recipient, they will not be evaluated more closely by ElCom for reasons of prioritisation. Where administrative costs – after evaluation by ElCom – of over CHF 75 per invoice recipient are recoverable, a network operator may factor in a profit using the same calculation method as on the grid, provided the total amount does not exceed CHF 120 per invoice recipient.

ElCom regularly reviews whether the threshold is still appropriate in the light of developments in costs and profits. As a result, it amended the corresponding directive during the year under review. Under the new rules, a threshold of CHF 60 per invoice recipient, and CHF 100 in total, will apply from 1 January 2024 (Directive 3/2022). Despite this reduction, network operators should still be able to achieve an appropriate profit on energy sales.

3.9 Sunshine Regulation

The ‘Sunshine Regulation’ uses a transparent and standardised process to compare the quality, cost efficiency and tariffs of different network operators. It makes divergences clearer to see. This type of regulation supplements the tariff evaluation procedures, which can be extremely resource-intensive 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 shortcomings, without the need for inter-

vention by the regulator. For comparison purposes, network operators with similar structures are grouped together.

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

To evaluate the indicators, ElCom divided the network operators into a total of eight groups based on topographic criteria (population density) and the quantity of energy supplied to end users (energy density). The individual results are calculated on this basis. These were sent to the operators individually in December 2022.

The indicators calculated remained practically unchanged in the year under review. Only one compliance indicator was adjusted in line with new regulatory requirements. New energy density data has also been applied to the allocation of network operators to the eight different groups. As in the past, ElCom published various explanatory documents and findings on the Sunshine Regulation on its website. These also contain the changes referred to above. During the current year, the situation will be reviewed again to determine whether any new indicators should be incorporated into the calculations, or existing ones amended.

As in previous years, the creation of a legal basis for the publication of results within the framework of the revision of the Electricity Supply Act was again a key issue: The aim is to make the publication of the individual results of the network operators accessible to a wide audience – in the same way as the tariffs on ElCom's electricity price website. During the reporting year ElCom continued preparatory work with a view to possible publication at a later date.

3.10 Issues relating to measurement services

In judgment A-2372/201 of 26 July 2022, the Federal Administrative Court set aside the appeal against ElCom decision 233-00093 of 6 April 2021 concerning the use of a smart meter, and referred proceedings back to ElCom for further clarification. In its deliberations, the Court determined that the consent of the end user was not required to install a smart meter, and that data processing is subject to the Federal Data Protection Act and not cantonal law. The network operator must guarantee the data security of measuring systems and comply with data protection law. This applies regardless of whether or not the smart meter is certified. The use of an uncertified measuring system does not violate data security or data protection law in the case ruled upon. ElCom must clarify and examine what specific data is actually processed, at what intervals and for what purposes. Only then, the Court found, would it be possible to rule on whether a sufficient basis in law exists on which to process the data, and whether the principle of proportionality is upheld. In addition, the smart meter used could be switched off. This constitutes an intelligent control and regulation system under Article 17b ESA. The end user's

consent is not required for its use. On this point, ElCom must determine whether the fact that the smart meter can be switched off effectively prevents its use, or whether suitable technical, or perhaps organisational or operational, measures might mean that consent is, in fact, required. ElCom has recommenced these proceedings.

Questions were raised as to measurement in connection with the sale of electricity to a third party and not to the local network operator. Producers connected on or after 1 January 2018 are entitled to a smart meter. Irrespective of the output of the facility, the costs are to be paid by the network operator. However, the size of the facility may affect the way in which that output is measured. Energy law provides that those with a capacity of more than 30kVA be measured in terms of net production, while those with a capacity of less than 30kVA must have their production measured if net production is fed into the grid. If there is no self-consumption, the production measured in this way may be used for data submission. If some of the electricity generated is consumed by the facility's owners, the actual feed-in may have to be measured (additionally) using a smart meter, i.e. the surplus must be measured. The network operator must determine the most efficient method. Producers connected prior to 1 January 2018 are not entitled to have a smart meter installed. If they are already measured on the basis of load profile, the network operator must continue to bear the measurement costs. If this is not the case, producers have the option of having a meter installed at their own expense.

3.11 Unbundling

The statutory provisions on the separation of network operation from other areas (unbundling) are becoming increasingly important as network operators are stepping up their participation in competitive areas of the market. ElCom therefore paid particular attention to the unbundling of network operations, the prohibition of cross-subsidisation and the prevention of the use of information advantages from the network area during the year under review. The SFOE is responsible for the prosecution of criminal violations of the regulations on unbundling. ElCom answered numerous queries about unbundling and provided information for and raised awareness amongst network operators.

3.12 Feed-in remuneration

Electricity prices were not the only things to rise to an unprecedented extent in 2022. As a result of this price trend ElCom received more enquiries than ever before about remuneration for feeding own production from small generation plants into the grid. These mainly came from owners of small photovoltaic systems, who wanted to know whether local network operators would have to increase this feed-in remuneration as a result of higher electricity prices and tariffs. However, such remuneration must be

agreed primarily on a contractual basis, which is why a rise in electricity prices and tariffs does not constitute a direct obligation for network operators to increase it. Operators are, however, obliged to accept electricity offered to them from small generation plants run on renewable energies within their network area, and to pay appropriately for it. The basis for this is their costs of procuring comparable energy from third parties and/or generation costs at their own production facilities (cf. Art. 15 para. 1 a and para. 3 EnA and Art. 12 para. 1 EnO). In view of the higher costs of purchasing from third parties, these rules would tended to have led to an increase in feed-in remuneration. However, they apply only subsidiarily in the sense of a minimum legal regulation where producers and network operators are unable to reach agreement. In practice, the approach of many operators is to calculate an offer for the remuneration only once a year, as they do with electricity tariffs, and publish it as at the end of August on their tariff sheets, as well as reporting it to ElCom. Here, implied acceptance (cf. Art. 6 CO) on the part of a producer may be assumed at least until they first make known to the network operator in provable form that they do not accept the remuneration.

Given the contractual nature of the remuneration, neither publication nor reporting to ElCom are any obstacle to a subsequent change in the rate of payment. Apparently, however, many network operators take the criteria of Article 12 paragraph 1 EnA (and thus chiefly market prices) into account at least to some extent in their bid because, as far as it can be seen, remuneration rates have been raised almost across the board. The degree of these increases nonetheless differed widely, and there are (still) considerable differences between network operators. Some voluntarily pay the reference market price for electricity from PV systems that is set quarterly by the SFOE[1] (without requiring proof of origin), and significantly increased the remuneration accordingly. However, small producers and prosumers struggle to accept that remuneration can be five times higher or lower in neighbouring communes. According to a study published in January 2023 by ETH Zurich and the University of Bern, local remuneration for solar power not only heavily affects the profitability of solar panels on a roof in Switzerland, but the low rates paid by many network operators are actually proving a disincentive to the expansion of solar systems.[2] It is therefore also worth mentioning that higher prices have given rise to third-party purchasers offering to buy the production of those running small generation plants. This is essentially lawful, irrespective of the size of the plant in question. Article 15 EnA and its implementing provisions provide only for an obligation to purchase on the part of network operators, but not a right to do so. In addition, neither other federal energy law nor energy supply law contain regulations that forbid producers from selling their own production to third parties. Furthermore, neither EnA or EnO set notice periods for terminating the agreement between producers and network operators. These notice periods must therefore be determined contractually, which is why ElCom is not responsible for adjudicating on them.

In its decision 222-00001 of 11 May 2021, ElCom examined Article 12 paragraph 1 EnO for the first time, concluding that the provision is lawful. However, this decision

was challenged, and the appeal procedure is still pending before the Federal Administrative Court. The contentious point is whether the generation costs of own production facilities may be taken into account.

1 cf. Art. 15 para. 1 of the Ordinance of 1 November 2017 on the Promotion of Electricity Generation from Renewable Energy Sources (REnGO; SR 730.03)

2 Tobias Schmidt et al, 'Quantifying the degree of fragmentation of policies in targeting household solar PV in Switzerland, published in January 2023, pp. 4, 16 and 18 (available at https://www.research-collection.ethz.ch/handle/20.500.11850/596612); cf. also the related press release (in German) Flickenteppich bremst Solarausbau (Patchwork hampering solar growth)

4 Market Surveillance

2022 saw an unprecedented rise in electricity prices. Starting from averages at around EUR 50/MWh, prices peaked at over EUR 1,000/MWh (source of settlement prices: EEX).

4.1 Extraordinary wholesale market price rises in 2022

Contrary to the market's original expectations in autumn 2021, the extraordinary trend set in when Europe did not receive gas as planned via Nord Stream 2 in 2022. This was caused by a range of delays in certifying the pipeline, followed by the German government's February 2022 decision to halt the entire certification process.

The rise in prices on the futures market that had begun at the end of 2021 continued through into 2022, and intensified following the Russian invasion of Ukraine on 24 February. The year as a whole saw a massive drop in deliveries of Russian natural gas to Europe, causing European energy prices to skyrocket. The volumes of gas reaching Europe via the Nord Stream 1 pipeline were cut for the first time on 17 June 2022, to 40 per cent of capacity. On 26 July, following planned maintenance, they were cut again, to 20 per cent of capacity. Then, at the end of August, Nord Stream 1 was switched off entirely on the grounds of equipment problems. The pipeline has not been operational since. At the end of September, Norway and Denmark reported an act of sabotage, in the form of four leaks, to the two Nord Stream 1 and Nord Stream 2 pipelines. The German government had already suspended certification of Nord Stream 2 in February 2022. Thus, contrary to the market's original expectations (before the start of the war), no gas at all reached Europe via Nord Stream 2 in 2022.

Changes to supply routes that resulted in bottlenecks in the European gas infrastructure, the need to find alternative sources of gas, and price-setting mechanisms not designed to cope with a supply shock added to price volatility and increases.

However, another major factor in 2022 was the very low availability of French nuclear generation capacity owing to stress corro-

sion found unexpectedly in a number of reactors. This availability reached its low point on 4 September 2022 at just 22.9 GW of an installed capacity of 61.4 GW. To provide a comparison: on the same day the previous year French reactors were delivering 46.4 GW. The situation was further exacerbated in summer 2022 by high water temperatures and low flow rates in France's rivers.

While the price spread for Switzerland's year-ahead product (delivery year 2022) had already been high in 2021, at a maximum price of EUR 332/MWh, prices for the annual contract for 2023 hit unprecedented highs, peaking in August 2022 at price for the year ahead for France of over EUR 1,100/MWh (!). Why were prices at the end of August so extremely high? Alongside the fundamental problem of high gas prices because of the war in Ukraine, and the limited availability of French nuclear power stations, was a third issue: water. Southern Norway, the Alps and the Iberian Peninsula were all experiencing water scarcity, leading to a sharp rise in electricity prices. Low water levels in the Rhine also restricted coal shipments.

Shortly after this August peak, prices tumbled back through to the end of the year. While the price increase for electricity supplies to Switzerland in the 2023 delivery year was 780 per cent higher in August 2022 than it had been in early January 2022 (from EUR 123/MWh to EUR 1,082/MWh), by the end of December it was 'only' 116 per cent higher (from EUR 123/MWh to EUR 265/MWh).

A more detailed description of price trends on the spot and futures market can be found in ElCom's Market Transparency report.

4.2 Market transparency in wholesale electricity trading

On 22 December 2021 ElCom was contacted by Alpiq AG. The company requested that the government provide "temporary, energy crisis-related liquidity support". The background to the request was Alpiq's liquidity needs following the sharp rise in prices connected with electricity trading. In on-exchange trading the exchange functions as counterparty, so an electricity producer wishing to sell its future production on the futures market in the present must provide surety (the 'margin') to the exchange or to a clearing house in the form of cash. Should the seller default, the exchange would have the necessary funds to itself buy the energy needed to fulfil the trade with the buyer. Since margins are recalculated daily, the funds that must be provided also change every day along with prices and depending on market volatility. The surge in prices in December had apparently taken Alpiq to the limits of its ability to provide liquidity. The company therefore approached the federal government for support so that it would remain able to act financially should prices rise further. Alpiq subsequently withdrew its application on 3 January 2023.

On 2 September 2022 Axpo AG applied for a loan of CHF 4.4 billion, because the very high prices at the end of August had resulted in extremely high margin calls that it might not be able to satisfy without federal government support. Axpo's application triggered the entry into force of the Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (FiRECA). The company subsequently received a credit line of CHF 4 billion to secure its liquidity during the energy crisis.

Electricity prices were driven even higher in the course of the year because of nuclear power stations in France being taken offline for technical reasons. The market situation remained tense to a greater or lesser degree throughout the year. Although the high electricity prices and volatility both eased as the year drew to a close, the related activities took up a great deal of ElCom's resources. This work included weekly reporting to the Federal Council on security of supply.

This year's Market Surveillance Section workshop also dealt with the high price trend and its impacts. It looked in particular at whether high prices present opportunities or risks to energy companies, from a range of perspectives. The workshop began with ElCom presenting its model for measuring changes in liquidity needs when prices change, based on a portfolio. It then examined the impacts of high prices and liquidity requirements from the point of view of an exchange. The discussion went on to cover the resulting liquidity risks from the point of view of a power company. The workshop concluded with a report on liquidity monitoring in the financial sector.

As is the case every year, the annual Market Transparency report was also presented at the workshop. It offers a further comprehensive examination of annual trends on the spot and futures markets. The report also provides a good overview of the principal activities and analyses of the Market Surveillance section.

The ElCom reporting infrastructure has been further enhanced in response to rising data volumes and the new data that must be supplied under Article 19 paragraph 2 FiRECA. Since FiRECA has only just come into force, this data was initially transmitted manually once a month via a secure link. Automated data transfer via an authorised data provider (registered reporting mechanism, RRM) began on 1 January 2023.

Discussions with some energy regulators in neighbouring countries continued to take place online during the year under review. These meetings offer an opportunity to discuss the impacts of high energy prices in the individual countries, as well as current market events and measures. Against this background, coordination meetings were also held with FINMA, SIX and EPEX Spot.

As a member of the CEER Market Integrity and Transparency Working Group (CMIT), ElCom participated at the European level this year in formulating possible measures to mitigate high liquidity requirements. The priority here was to set out the financial industry's surety requirements and their effects on hedging transactions in the energy sector. There were then discussions with a number of clearing houses and more in-depth talks with other regulatory authorities. These efforts were a major factor in the European Securities and Markets Authority (ESMA) determining in the autumn that surety for energy trading could also be deposited in the form of bank guarantees, and not as cash only, as previously.

The focus at this year's ACER EMIT forum was also on the transparency and integrity of stressed power and gas markets. The European wholesale energy market found itself under considerable pressure in 2022, reflected in high prices and volatility. The situation was further exacerbated by tougher surety requirements and margin calls. At the forum, ACER and a range of stakeholders discussed the implementation and potential update of REMIT, including topics such as transaction reporting, data quality and market surveillance. ACER pointed out the increase in high-frequency trading and the growth of wholesale energy markets, on which trading is increasingly shifting to financial products

rather than the traditional wholesale energy products. Finally, the forum discussed the revision of the REMIT Implementing Regulation. It was suggested that REMIT be extended to cover system services markets. The forum emphasised the value of REMIT, especially at times of stressed markets. Where the disclosure of insider information is concerned, the forum would welcome a standard platform managed by ACER.

4.3 Market surveillance: facts and figures for 2022

Despite extraordinary events on the markets, the number of market participants registered with ElCom rose from 82 to 86 in 2022. By contrast, the number of registered reporting mechanisms (RRM) connected to the ElCom infrastructure remained unchanged at nine. This number will change in 2023, however, as a further RRM began the registration process at the end of 2022.

RRMs transmit data from the market participants active on EU markets. To date, this covered energy trades on those markets alone, but the data has now been expanded to include energy trades by systemically critical market participants in the Swiss market. As in previous years, ElCom received the fundamental data and the publications on insider information via its own specially created interfaces – ENTSO-E and the EEX transparency platform.

New legal foundations resulted in an increase in the volume of data transmitted in 2022. During this observation period, 59.6 million standard transactions and the associated trading orders were reported to ElCom. This is 30 per cent higher year on year. Reported orders were the principal factor here, up by 11.2 million, while the number of standard contracts rose by only 3.1 million. Reported standard contracts included transactions with the Swiss market for the first time, as required by FiRECA. The increase in delivered orders is explained by a trend towards increasingly shorter-term trading activities and the related greater use of automated trading algorithms.

The majority of the reports – just under 90 per cent – once again related to standard contracts in 2022. The dominance established in previous years of spot over futures transactions in the standard contracts was maintained, with a slight rise from 95 to 96 per cent. It is striking here that the majority of transmitted data – 74 per cent – originates from continuous short-term trading. In addition to standard contracts, registered market participants reported a 12 per cent decline in non-standard contracts.

Meanwhile, disclosures of fundamental data and insider information fell, with some 815,000 fewer reports registered than in 2021. This is just under 13 per cent lower.

To obtain better market understanding and to efficiently monitor and assess the performance of the markets and the pricing mechanisms, ElCom uses other data, such as the EEX settlement prices, which are used as a reference in the analyses, as well as information from Refinitiv. In addition, information from public sources, such as MeteoSwiss, is also used to produce various reports and analysis. In 2022 ElCom also began receiving data directly from European Commodity Clearing (ECC).

The processing and analysis of the data collected enables an evaluation of developments on the Swiss and European wholesale trading markets. It became particularly clear in 2022 that it is of enormous importance for security of supply to monitor and analyse price trends in surrounding markets, and their origins, very closely, because developments and events in neighbouring countries have a considerable effect on market prices in Switzerland. The fundamental data available is also used in various publications, particularly in the spot and futures market reports and the market transparency report, which helps improve transparency for production and consumption-side market participants. All data available helps increase the quality of ElCom's analyses, studies and publications.

4.4 Measures in Switzerland: FiRECA, ElCom decision, and GATE

In view of developments at the beginning of the year, and to be better prepared for further applications from the energy sector for financial support from the federal government, preparatory work began as early as spring 2022 on an Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (FiRECA). The bill was passed by the Federal Assembly on 30 September 2022.

By mid-2022 the situation concerning the security of electricity supply had reached a further crisis point. The risk that there would be no further gas deliveries from Russia had become very real. It was therefore necessary to step up monitoring for security of supply, not just of gas but also of electricity. Given close trading relationships, the insolvency of one company could spread to others, ultimately jeopardising system stability and thus security of supply itself.

ElCom therefore issued a decision, based on Article 25 paragraph 1 ESA, that Switzerland's three largest energy companies were to submit to ElCom all standard contracts concerning wholesale electricity trading for delivery to Switzerland and a delivery duration of at least one month that pertained to the 2022 delivery period and future periods up to that date. They were not required to submit data on products that had been traded on EPEX SPOT, as these had already been reported to ElCom.

With preparations in place, FiRECA entered into force on 1 October 2022 with the application from Axpo AG for financial support from the federal government. The law governs financial assistance to provide subsidiary support to systemically critical companies in the electricity sector that are experiencing a liquidity squeeze, the aim being to secure Switzerland's electricity supply even in the face of unforeseen developments.

As the expert body, ElCom has the final say here on which companies in the Swiss electricity industry are to be classified as systemically critical. Furthermore, in accordance with Article 19 paragraph 2 FiRECA, ElCom analyses and processes documentation and information on completed energy trading transactions, as well as on market developments, that might cause systemically critical companies to rely on additional liquidity.

From the point at which the loan application is submitted, ElCom additionally moni-

tors the liquidity needs of the company in question on the basis of its open positions with counterparties, and its margin calls on all organised markets. A further module was added to the existing market monitoring system to facilitate this. The internal reporting associated with FiRECA will begin in 2023. On 16 December 2022 the Federal Council sent the draft Federal Act on Supervision and Transparency in the Wholesale Energy Markets (known by its German acronym, GATE) for consultation. The new bill covers transparency and integrity on the electricity and gas markets in Switzerland. ElCom is intended to be the supervisory authority for both markets.

4.5 EU measures to reduce energy prices

The EU investigated the impacts of rising energy prices on industry and end users, and developed a corresponding package of measures. These were examined in terms of their potential effects on Switzerland in a joint working group with the SFOE, as well as in ElCom's weekly reporting to the Federal Council. The following are some of the packages adopted by the EU in 2022 to reduce energy prices:

- Toolbox: adopted in October 2021 and expanded in March 2022
- Council Regulation (EU) 2022/1854 of 6 October 2022 on an emergency intervention to address high energy prices
- Council Regulation (EU) 2022/2576 of 19 December 2022 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks, and exchanges of gas across borders
- Council Regulation (EU) 2022/2578 of 22 December 2022 establishing a market correction mechanism to protect Union citizens and the economy against excessively high prices
- Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy

The Toolbox permits broader regulation of end user prices on gas and electricity markets. In the event of a complete cessation of Russian gas supplies, it would offer the option of setting an administrative price cap on all gas imports. Other measures include the accelerated expansion of renewable energies, and flat-rate support payments to households.

The aims of the Council Regulation of 6 October 2022 on an emergency intervention to address high energy prices are to:

- reduce electricity demand
- set a cap on electricity market revenues and determine the distribution of surplus revenues to end users
- introduce a solidarity contribution from oil and gas companies, and
- permit member states to introduce regulated tariffs for households and SMEs, as an exemption from the rules of the EU Electricity Directive (EU/2019/944).

Where electricity consumption is concerned, EU member states were to implement measures to reduce gross monthly electricity consumption between November 2022 and March 2023 by ten per cent compared with average monthly consumption over the previous five years. In addition, each member state was to cut its gross electricity consumption during peak hours by five per cent. The market revenues of companies generat-

ing electricity from wind, solar, geothermal, hydropower, biomass fuel (excluding biogas), waste, nuclear energy, lignite, and crude petroleum sources were capped at EUR 180/MWh. The cap applies to transactions across all periods (years, quarter, day-ahead, intraday) and irrespective of whether the electricity is traded OTC or on an exchange. Existing or future contractual obligations, a power purchase agreement (PPA) and futures transactions that produce market revenues from electricity generation that are below the cap are exempted from the Directive.

Council Regulation (EU) 2022/2576 of 19 December 2022 enhancing solidarity contains provisions for the expedited setting up of a service allowing for demand aggregation and joint gas purchasing by undertakings established in the European Union, secondary capacity booking and transparency platforms for liquid natural gas (LNG) facilities and for gas storage facilities, and congestion management in gas transmission networks. To prevent excessive prices, it provides for an intraday volatility management mechanism in the event of excessive price swings, and an ad hoc reference value for LNG prices to be developed by ACER. The Regulation also determines measures, for the case of a gas emergency, to distribute gas fairly across borders, to safeguard gas supplies for the most critical customers and to ensure the provision of cross-border solidarity measures. Furthermore, mandatory demand aggregation is to apply to 15 per cent of the EU's storage filling target volume. The aim of these measures is to harness the market power of the EU effectively and to prevent member states competing against each other.

Council Regulation (EU) 2022/2578 of 22 December 2022 establishing a market correction mechanism provides that this mechanism would be activated automatically when the following 'market correction event' occurs:

- the front-month TTF derivative settlement price exceeds EUR 180/MWh for three working days, and
- the front-month TTF derivative settlement price is EUR 35 higher than the reference price for LNG on the global markets during the same three working days.

As soon as the dynamic bidding limit is activated, it applies for at least 20 working days. The Regulation entered into effect on 15 February 2023 and has a limited term of one year. The limit does not apply to OTC transactions, day-ahead markets and intraday markets. The Commission will review the Regulation by 1 November 2023 with respect to the general gas supply situation and, depending on the result, may propose that its validity be extended.

If the dynamic bidding limit is below EUR 180/MWh (i.e. the reference price is less than EUR 145/MWh) on the last three consecutive working days after the 20-day validity period, it is automatically deactivated. It is also deactivated automatically at any time if, under the Gas Security of Supply Regulation, the European Commission declares a regional or EU emergency, especially in a situation in which the supply of gas is not sufficient to cover demand (rationing). In both cases, ACER will publish a deactivation notice on its website.

Finally, in the interests of accelerating the deployment of renewable energies, the Regulation is intended to speed up the approval procedure for plants generating energy from renewable sources, and define precise time periods here.

4.6 Hedging strategies and liquidity requirements for the financial backstop

In June 2021, Karl Frauendorfer and Robert Gutsche of the University of St Gallen published an empirical study of the financial reports of Alpiq, Axpo and BKW for the attention of stakeholders in the Swiss electricity industry.

In his two follow-up studies in May 2022 (Alpiq: Quo Vadis? and Geschäftsmodell der Axpo: Cui Bono? (Axpo's business model: cui bono?), Dr Frauendorfer postulates that Alpiq and Axpo are gradually building up speculative proprietary trading positions. Their actual hedge on electricity production deviates significantly from an evenly distributed hedge, i.e. linear over three years, he suggests. The gross value of energy derivatives and the volume netted out had been much higher in 2021 than a year previously, leading Dr Frauendorfer to believe that any amount set for the financial backstop should be higher than previously thought.

ElCom analysed Dr Frauendorfer's studies. In doing so it paid particular attention to replicating the operational metrics for the financial result from hedging with liquid futures, in order to estimate liquidity required for hedging production on the wholesale market. This was intended to permit an estimate of the appropriate amount for the financial backstop. It was assumed that systemically critical Swiss energy companies pursue a deterministic three-year hedging strategy (Hedge Index). 'Deterministic' means that, regardless of market prices, the hedge is executed equally across the financial year, and daily with the same trading volumes. For liquidity reasons and in the interests of simplicity, only the closing prices of German annual products were considered. ElCom is aware that the producers' hedging strategy does not focus solely on annual products or on the German market, but this approximation should be sufficient to determine the scope of the financial backstop.

As at the balance sheet date of 31 December 2021, to hedge production for three years in advance, ElCom calculated a price of EUR 60.16/MWh for the 2022 delivery year, EUR 57.93/MWh for the 2023 delivery year, and EUR 62.89/MWh for the 2024 delivery year. On 31 December 2021, the EEX closing price for these calendar years was EUR 219.88/MWh for 2022, EUR 125.14/MWh for 2023 and EUR 88.55/MWh for 2024. 'Liquidity required' refers to the change in the value of the contract as at the balance sheet date. This means that the difference between the price of the hedge and the EEX closing price for this contract corresponds to the actual variation margin that is always payable on exchange transactions, and is due on OTC trades only if a credit support annex (CSA) has been agreed with the counterparty. The required liquidity calculated by Dr Frauendorfer does not include the additional liquidity in the form of the initial margin that is due when trading on exchange, with which the exchange hedges itself against any changes in price in the next two trading days so that it is able to make a substitute purchase on the market without incurring losses if a counterparty defaults. The reason given for this omission is that the initial margin is returned when the contract is delivered. However, the energy company must of course be able to supply these liquid funds prior to delivery.

In the view of ElCom, the required liquidity calculated on the basis of the Hedge Index underestimates the actual liquidity needed if a market participant trades frequently on exchange, but overestimates it if the market participant engages only in OTC trading with counterparties that do not have CSA agreements.

It is argued that the scope of the financial backstop should be calculated on more than simply production volume, because in the event of crisis the actual liquidity required is that which is called on all trades in order to manage the trading book. Speculative proprietary trading is covered by the trading book.

The ElCom opinion was that, when determining the scope of the financial backstop, it should calculate the liquidity that might be required were wholesale prices to continue rising from Q2 2022 onwards (the point at which the federal government was drawing up the financial backstop internally), because companies had been able to meet previous calls themselves.

Discussions at the time with market participants revealed that rising liquidity requirements on the exchanges had caused them to trim or suspend their hedging strategies for the 2025 delivery year. These should have begun in January 2022. This market risk is accepted in order to reduce liquidity risk. Market participants have also already implemented a whole range of measures to reduce the liquidity they need. It is difficult to calculate the liquidity required for proprietary trading strategies. ElCom did not see any need to adjust the size of the financial backstop for the time being.

4.7 Analysis of the CRE survey

Market prices for electricity rose steeply in 2022. The trend was particularly pronounced on the French market owing to the limited availability of French nuclear power stations during the year. This raised a number of questions, because forward prices should represent the average of anticipated prices over the observation period, but they also reflected a built-in risk premium owing to the prevailing uncertainty and the related negative view of market conditions. Where French products, in particular, were concerned, the risk premiums contained in future prices were far higher than could be expected, even factoring in the pessimistic scenario for the winter ahead. This phenomenon was particularly evident in the price spread between France and Germany for futures contracts for the 2022/2023 winter (cf. Figure 10).

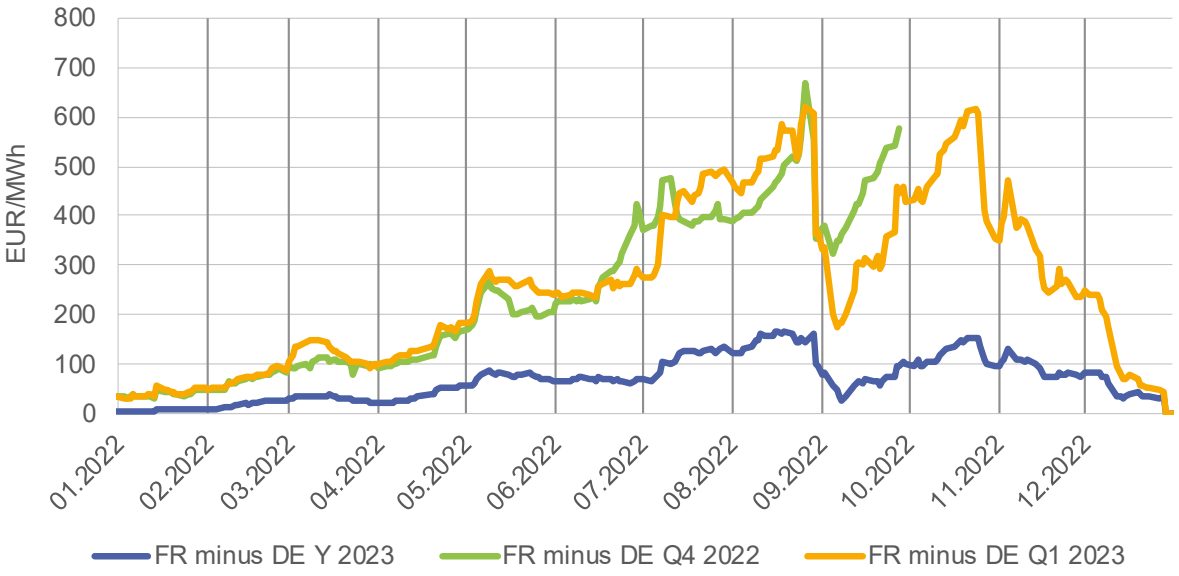


Figure 10: Price spread between Germany and France on base load futures contracts Q4 2022, Q1 2023 and Cal 2023

With these factors in mind, the French Energy Regulatory Commission (CRE) decided to analyse these developments and in August 2022 conducted a survey of the 44 most important actors on the French market to determine their strategies and expectations.

In view of their trading operations, this analysis also covered Swiss market participants, which are highly active on the French market in order to hedge their production and manage the associated risks (price, volume, etc.) as early and effectively as possible. Under Article 26a ESO, ElCom had access to the responses of four Swiss market participants.

The CRE survey asked market participants about their trading strategies, hedging activities and market risk management methods and strategies. Its scope was limited to the FR Q4 2022, FR Q1 2023 and FR Cal 2023 products. The responses received by ElCom showed that market participants' trading patterns have shifted in response to new market conditions. There were three main changes.

Firstly, high market volatility has led the various market participants to modify the way in which they manage risk. They are evidently monitoring the risks associated with positions and liquidity more closely, and reviewing internal limits more regularly.

Secondly, respondents reported curbing trading activities globally in view of the elevated risk. Some actors have instituted restrictions on trading and proprietary trading, for example, which was a factor in lower activity on the French market. At the same time, the rise in margin calls on the electricity exchanges owing to higher prices also prompted market participants to severely constrain on-exchange trading in order to limit the associated liquidity risk.

Thirdly, unlike other neighbouring countries, the French market displays a very high risk premium, so Swiss market participants re-evaluated their trading strategy. For reasons of risk, the German market was preferred over the French as a hedging instrument. In

addition, some market participants seem to have decided to reduce their trading activities on the futures markets and shift instead to short-term contracts, because they prefer to be more heavily exposed to price risk (because of not hedging until a later date) than to volume risk (because of updates to forecasts of the availability of production facilities). CRE[1] also found that actors were withdrawing from the French long-term market. Furthermore, it appears that some buyers that must cover both their consumption and provision needs at the same time purchased the volumes they need earlier than previously. This distortion might have contributed to greater price volatility on the French market.

1 Electricity futures prices for winter 2022-2023 and the year 2023 – CRE

4.8 Monitoring of winter product spreads

In 2022 the Market Surveillance section paid particular attention to the trend in spreads on winter products. The price differential between Q4 22 and Q1 23 Base, as well as between December 22 and January, February and March 23 was monitored in the interests of security of supply within Switzerland. Spreads between Switzerland and France and Switzerland and Italy for winter 2022/2023 were also tracked continuously.

Wholesale market prices for Q4 22 that are higher than in Q1 23, or prices for December 22 that are higher than for January or February 23 might result in storage facilities emptying faster than usual, thereby sharply increasing the risk of electricity shortages towards the end of the winter. Price spreads between Switzerland and neighbouring countries offer an indication of expected commercial flows.

The price spreads on Q1 23 Base between Switzerland and its neighbours changed markedly in the course of the year. While Q1 23 Base was still being traded in Switzerland for EUR 1,000/MWh via Italy and approx. EUR 400/MWh via Germany at the end of August 2022 (close to the French price level), by the end of 2022 its price had evened out across all countries. The market put the risk of shortages in France, Switzerland and Germany at its highest in the summer of 2022, on the basis of low output from French nuclear power stations and the possibility of gas shortages in Germany. The risk of gas shortages in Italy was much lower owing to its good connections to the international LNG market, which is why futures market prices in Italy did not contain any risk premium compared with the marginal costs of gas-fired power stations.

By the end of 2022 and in early 2023 price spreads were reflecting the less stressed outlook for the 2022/2023 winter. Milder weather in Q4 22, and the associated lower gas consumption, meant that gas storage facilities in north western Europe were very full (84.5 per cent) at the beginning of 2023. Heavier rainfall, mild temperatures and lower spot prices towards the end of the year also meant that Swiss reservoirs were at very high levels as the new year began. In addition, more availability at French nuclear power stations towards the end of 2022 softened the risk premium on the French market, considerably narrowing the price spread between countries for the 2023 delivery year, as well as for Q1 23. Prices therefore trended closer to gas power stations' marginal costs.

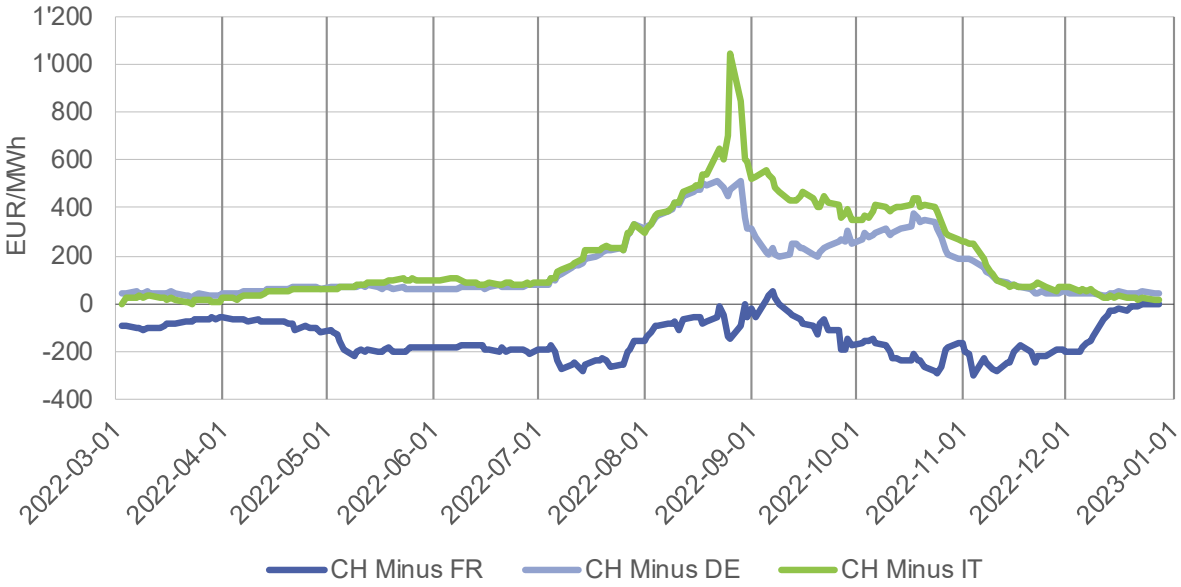


Figure 11: Price spread between Switzerland and neighbouring countries France, Germany and Italy for Q1 23 Base

Prices for the winter months in Switzerland also reflected this easing. While January and February 23 were still trading considerably higher than December 22 and March 23 in October of 2022, monthly contracts converged in November. At the end of December, average December spot prices were even lower than the futures market price for January, February and March 2023 (cf. Figure 12).

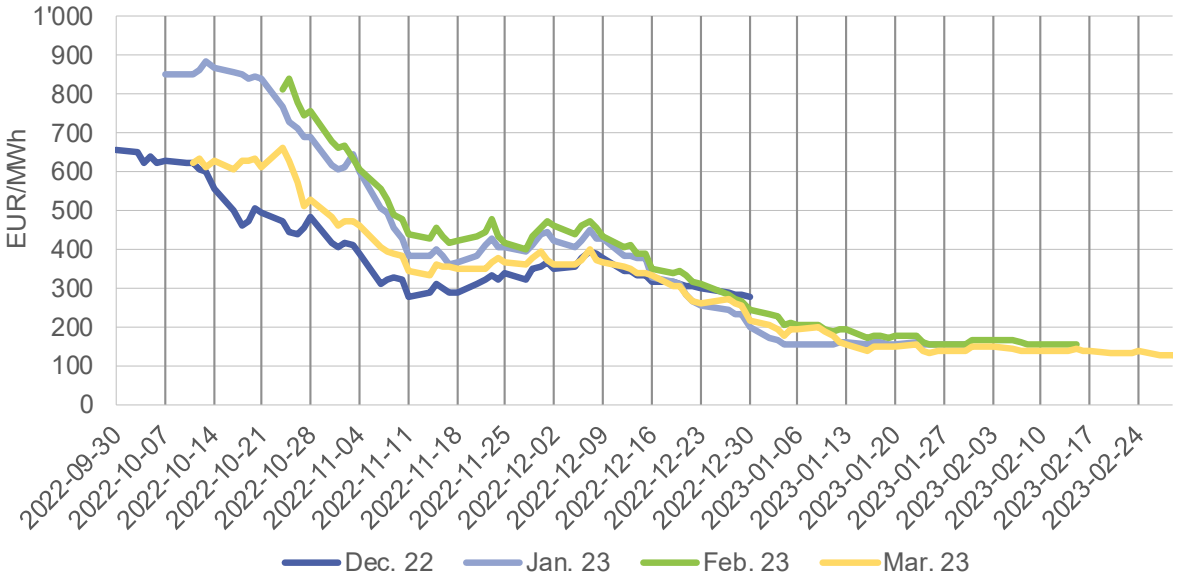


Figure 12: Closing prices for Base monthly contracts for Switzerland for December 2022 and January, February and March 2023 from 01.10.2022 to 09.01.2023. Before delivery begins EEX closing prices apply; during delivery the average of EPEX spot prices and EEX closing prices for outstanding daily and weekly contracts are shown. At the end of delivery the price reflects the average of EPEX spot prices

5 Security of supply

In some countries, wind energy plays a key role in ensuring security of supply. Only a relatively small share of Switzerland's electricity is generated by wind power plants. The picture shows a wind turbine in Entlebuch.

5.1 Introduction

Under the Electricity Supply Act (ESA, Art. 22 para. 3 and 4), ElCom is responsible for monitoring security of supply. If there are indications of a significant threat to domestic supply in the medium or long term, Article 9 ESA 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 upgrading and expanding the electricity networks. Security of supply is assured if the required quantity of energy is available at the applicable quality standard and at reasonable tariffs across the entire electricity network at all times. During the reporting year the war in Ukraine and record-low availability at French nuclear power stations had a significant impact on security of supply. This also produced record price levels and peaks on the European and Swiss electricity markets (cf. section 4.1 and for comprehensive background and details of price trends also the ElCom Market Transparency Report, to be published in May 2023).

The tense market and supply situation meant ElCom monitored supply developments more closely with the involvement of other federal authorities and Swissgrid within the Supply Security working group.

5.2 Security of supply – review and outlook

In order to fulfil its monitoring mandate, ElCom uses comprehensive monitoring methods to observe medium to long-term supply security. The key results of these monitoring activities for the year under review are presented in the following sections.

5.2.1 Review of winter 2021/2022

Electricity prices rose continuously during the course of 2021 due to increases in the price of gas and other commodities. The below-average availability of French nuclear power plants also impacted on prices – the four biggest units were deactivated in mid-December 2021 for safety reasons, resulting in record prices over the Christmas period especially on the French market. This also had an effect on prices in Switzerland and in neighbouring countries.

As prices rose, initial liquidity problems began to emerge at some energy companies in Switzerland abroad. Here as in other countries, these ultimately resulted in the introduction and activation of a financial backstop for systemically critical companies in the energy market[1] (cf. also section 4.6).

From December 2021 Switzerland's nuclear power stations were fully available for the winter, and Swiss reservoirs were at normal levels at the beginning of 2022. There was good availability on the transmission network and the import and export capacities were also at the normal level.

Although the market situation eased again early in the year, prices rose once more after the Russian attack on Ukraine. Uncertainty over Russian gas supplies to Europe had the greatest impact on prices.

Switzerland's security of electricity supply was continually ensured during winter 2021/2022, despite the high prices on the market and the below-average capacity of French nuclear power stations. High availability in the transmission network and therefore good import options were a factor here. Sufficient production capacity was also available in Europe – particularly in Germany and Italy – which, in combination with high import capacities, had a positive impact on the Swiss supply situation at the end of the winter. The availability of Swiss nuclear power plants was also high, while the level of the reservoirs was in the normal range.

1 cf. Press releases "Ukraine: Bundesrat verabschiedet Botschaft zum Rettungsschirm für Strombranche (Ukraine: Federal Council adopts dispatch on financial backstop for electricity sector) (admin.ch)" and "Energie: Bundesrat aktiviert Rettungsschirm und gewährt Axpo einen Kreditrahmen (Energy: Federal Council activates financial backstop and grants Axpo credit line) (admin.ch) (both available in German, French and Italian)"

5.2.2 Incidents in the course of the year

The ElCom-led Supply Security working group met continually throughout the summer in order to closely monitor the tense electricity supply situation, which was also being reflected in consistently high prices. The situation with gas supplies remained a major driver here, but gas storage volumes were increased according to plan to reach their target levels.

Alongside gas supplies, reduced generation capacity at French nuclear power stations owing to problems with stress corrosion was still

a major factor. It took the summer to find a solution, resulting in record-low availability.

Persistently high summer temperatures also affected nuclear power station operations, because production may have to be reduced or halted to avoid high river water temperatures. In July, in the interests of security of supply, ElCom refused permission for the Beznau nuclear power plant to shut down entirely, resulting in production continuing at a reduced level.

A variety of measures were adopted during the year under review to shore up energy supplies for the winter. These included (cf. section 5.3) the hydropower reserve, the construction of a peak-load power plant in Birr in the canton of Aargau, and an increase in transmission network capacity. In the latter case, preparations advanced to increase the voltage in the transmission network from 220 to 380 kV temporarily for the 2022/2023 winter. There are plans to test this increased voltage on the Bickingen-Chippis and Bassecourt-Mühleberg lines from January 2023.

In response to high prices and energy supply worries, Germany decided to extend permits to produce electricity from nuclear power and coal, and to reactivate power stations. This maintained high import capacities and redispatch options, thus enhancing Switzerland and Germany's support for each other's supply security.

ElCom helped support an SFOE-commissioned Swissgrid adequacy study to analyse short-term security of supply in Switzerland for the 2022/2023 winter.

Internally at ElCom, a comprehensive package of measures was implemented to ensure operational continuity in the event of a power outage or power shortages.

1 cf. Studie zur kurzfristigen Strom-Adequacy Schweiz im Auftrag des Bundesamts für Energie – Winter 2022/2023 (German only)

5.2.3 Situation in winter 2022/2023

Following record-high electricity prices in September, prices in the EU eased markedly to stabilise at a high level. The mild weather up to the end of the year helped here, as did healthy hydropower production and the increasing availability of the French nuclear power station fleet. The latter (electricity) and the war in Ukraine (gas) remained the main drivers. The gas situation settled thanks to LNG imports from Europe, among other factors, and levels at gas storage facilities were high.

Availability at French nuclear power stations had been forecast to be an all-time low for the winter, but as production ramped up and plans were implemented, it appeared to return to something approaching reliability after a long phase of uncertainty. Swiss nuclear power stations offered full availability during the winter, and Swiss reserves were on standby (hydropower reserve of 400 GWh from December, peak-load power stations at Birr [approx. 250 MWh] Cornaux [approx. 30 MWh] and Monthey [approx. 40 MWh]) from February/March 2023.

The transmission network was fully operational, and the temporary voltage increases on selected lines (see above) ready from January. The drop in temperatures from mid-January 2023 had little impact on the functioning of the system as a whole. ElCom thus judged the outlook for security of supply to have eased a little.

5.3 Winter reserve

The Federal Council has selected a range of measures to prevent a power shortage this winter. These include the creation of a hydropower reserve and the construction of a peak-load (reserve) power station at Birr in the canton of Aargau, as well as the deployment of further reserve power stations (Cornaux and Monthey), and pooled emergency power plants as additional reserves.

5.3.1 Hydropower reserve

With the Ordinance on the Establishment of a Winter Electricity Reserve (WResO; SR 734.722), among other things the Federal Council tasked ElCom with creating a reserve for the generation of hydroelectricity for the 2022/2023 winter. The legal basis for this hydropower reserve is to be found in Articles 9, 29 paragraph 1 let. g and 30 paragraph 2 of the Electricity Supply Act of 23 March 2007 (ESA; SR 734.7), as well as Article 5 paragraph 4 of the National Economic Supply Act of 17 June 2016.

The hydropower reserve is intended to ensure that power supplies in Switzerland can be guaranteed for a few weeks at the end of each winter, even in the event of elevated domestic consumption, reduced generation capacity at domestic power stations, and restricted import options. It thus represents a hedge to tide the country over an unforeseen crisis. However, were there to be power shortages throughout Europe, the hydropower reserve would be of only limited effect in ensuring security of supply, because it would not add to the energy within the system.

Based on these assumptions, in the autumn of 2022 ElCom determined that the hydropower reserve should hold 500 GWh of energy, with a tolerance of +/- 166 GWh. This had to be set aside between 1 December 2022 and 15 May 2023. The subsequent auction raised 400 GWh. The bidding structure meant that the full 500 GWh was not purchased, because the additional costs are not financially justifiable. In addition to remuneration for holding the reserve itself, hydropower plants are compensated for making it available as required. In practical terms, the reserve would be deployed if the market were no longer able to meet demand.

Power plants participating in the scheme are remunerated for holding the water in reserve on the basis of a competitive tender process. The 400 GWh reserve (excluding compensation for availability) cost EUR 296 million for the 2022/2023 winter. These costs are borne by all Swiss electricity consumers in proportion to their own consumption, as well as via a surcharge on the Swissgrid network tariff.

Experience with the hydropower reserve is being evaluated with a view to the 2023/2024 winter. The findings will determine whether it will be modified in the future.

5.3.2 Additional reserves

In addition to setting up a hydropower reserve, the Federal Council ordered the creation of an additional reserve. This is based on the new Winter Reserve Ordinance, which enters into force in 2023. At the time of going to press, the reserve consists of the peak-load power

stations at Birr (canton of Aargau), Cornaux (canton of Neuchâtel) and Monthey (canton of Valais), as well as emergency power plants that can feed into the additional reserve via poolers. The additional reserve is planned to offer 1,000MW of power. As is the case with the hydropower reserve, with the additional reserve power stations will be compensated for both setting capacity aside and making it available on demand, and financed via a surcharge on the Swissgrid network tariff. The Ordinance also provides for ElCom to draw up a call sequence for the power stations participating in the winter reserve. This is to be based on the priorities set out in the Ordinance. This is designed to ensure optimum coordination between the various elements of the winter reserve, depending on the supply situation.

5.4 Unscheduled flows

In an interconnected network, the actual (physical) flow of electricity never corresponds exactly to the traded and scheduled flows. The deviation between the physical and trading flows passes through the transmission network as unscheduled flows. Up to 30 per cent of the volumes traded from Germany to France currently flow physically through Switzerland.

The introduction of flow-based market coupling (FBMC) in the Central Western Europe region, excluding Switzerland, already saw trading capacities from Germany to France increase significantly, in turn causing some congestion on the Swiss grid, particularly during winter. In June 2022 the FBMC was expanded to the 'Core' region, consisting of 13 countries from France in the west to Romania in the East. This creates an additional degree of uncertainty.

The extensive efforts over many years of Swissgrid and ElCom are showing signs of progress. A contract was agreed in 2021 with the EU's 'Italy North' capacity calculation region, which ensures Switzerland's southern border enjoys equal treatment with Italy's other northern borders. This cooperation agreement was signed by Swissgrid and the transmission system operators of 'Italy North' after being approved by ElCom and the regulatory authorities of the other participating countries. This contract must be renewed annually and capacity is calculated using the NTC method.

Swissgrid and ElCom also continued their efforts aimed at achieving a similar solution on Switzerland's northern borders with the 'Core' capacity calculation region. An agreement is proving challenging here and remains uncertain. Flow-based market coupling – from which Switzerland is excluded without an electricity agreement – applies in 'Core'. The aim is to ensure balanced, mutual inclusion in the capacity calculations so that unscheduled flows of this nature only cause congestion in exceptional circumstances. Such an agreement is also required to enable Switzerland's neighbouring countries to include the flows with Switzerland in their 70 per cent target from the EU's perspective (see explanations on the 70 per cent minRAM in section 7.2).

The EU also plans to extend flow-based market coupling to Italy over the long-term. This makes balanced mutual inclusion in the capacity calculations all the more important. An agreement with 'Core' would lay a good foundation in this respect.

Another problem of unscheduled flows that jeopardise system security is presented by the platforms for trading balancing capacity, which are becoming operational one by one. Switzerland is currently participating on these platforms but whether that will remain the case in future is uncertain. Without Switzerland's participation, such unscheduled flows could occur in real time almost without any prior warning.

5.5 Cyber security

Electricity networks are increasingly controlled and monitored using smart information and communications technology. These systems offer the network operator more control options and enable more efficient system operation as well as the opportunity to provide new services. Greater use of IT networks also increases the risk of hackers gaining access to the power grid and compromising data availability[1], integrity[2] or confidentiality[3] or damaging technical systems. Such an incident could lead to considerable financial loss and above all reputational damage for the network operator concerned. According to the scenarios set out by the Federal Office for Civil Protection (FOCP), a widespread power outage could cause significant damage in extreme cases. This means cyber security is a key issue in ensuring supply security.

According to Article 22 paragraph 3 ESA, ElCom is responsible for monitoring the electricity markets with a view to ensuring secure and affordable supply in all parts of Switzerland. This implicitly also includes IT risks, which means ElCom also pays the due level of attention to the status of network operators' cyber security.

Cyber security is becoming more significant due to the increasing use of IT networks. The efficient, risk-based implementation of various industry documents is not just welcomed by ElCom, but also required. These include 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 Smart Measurement Systems) in accordance with FOCP's CIP guidelines. In the year under review, the SFOE continued its work on cyber security requirements in the Electricity Supply Act. A binding minimum standard is a key aspect. ElCom has held intensive discussions with the SFOE and in the VSE working group about this issue, as well as with the relevant stakeholders. These talks improved the mutual understanding of future regulation on cyber security and also helped to define ElCom's new supervisory strategy more clearly. ElCom refined this supervisory strategy during the reporting year. Future risk-based supervision focuses on improving physical cyber security. When implementing the new regulations and supervision, compatibility with the EU's new Network Code on Cybersecurity must be ensured.

1 'Availability' means that the systems and data to be protected are available and can be used upon request by an authorised unit.

2 'Integrity' means that the data processed is correct and complete, but also that the systems function properly.

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

5.6 Quality of supply

5.6.1 Network availability

The quality of supply is defined to some extent 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, System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI). SAIDI quantifies the average duration of interruptions per customer, while SAIFI indicates the average frequency of interruptions per customer. Figures concerning all unscheduled interruptions lasting longer than three minutes and that occur as the result of natural phenomena, human error, operational problems or external influences are factored into the calculations for both indices.

For the purpose of monitoring network availability, ElCom evaluates the interruptions to supply of the 94 largest Swiss network operators. These 94 network operators account for 88 per cent of the country's energy turnover via their networks. In 2021, the 94 biggest Swiss network operators recorded 5,136 unscheduled interruptions (see Table 2). This meant the number of unscheduled interruptions fell compared with the previous year. However, the number of interruptions on its own is not sufficient to draw reliable conclusions about network availability. It is only when this figure is combined with the duration of interruptions and the number of customers affected that a meaningful indication of network availability can be provided.

	2018	2019	2020	2021	2022[1]	Unit
Interruptions	6 495	5 780	5 176	5 136		Number
SAIDI	14	8	12	8		Minutes per customer
SAIFI	0.27	0.17	0.21	0.16		Interruptions per customer

1 The figures on supply quality for 2022 will be published in June 2023 and will be available on ElCom's website.

Table 2: Supply quality in Switzerland from 2018 to 2022 (unscheduled interruptions only)

In 2021, the average duration of unscheduled interruptions per customer stood at eight minutes. This meant this indicator fell by four minutes nationwide compared with the previous year. The average frequency of unscheduled interruptions per customer in 2021 was 0.16, which was lower than in the previous year. Network availability remains extremely good in Switzerland. The high quality of supply in Switzerland is also confirmed by international comparisons. According to the 'CEER Benchmarking Report 7 on the Quality of Electricity and Gas Supply', Switzerland is among those countries with the highest quality of electricity supply in Europe.

5.6.2 Import capacity

In addition to network availability, the available import capacity is also a key factor in ensuring Switzerland's electricity supply security. The Swiss electricity sector can also use import and export capacity to execute transactions on the European market and exploit its competitiveness. ElCom therefore monitors the development of available cross-border net transfer capacity (NTC) consisting of import NTC and export NTC.

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

Table 3 provides an overview of the average changes in available import capacity, on the one hand for all borders together and the northern border, and on the other for each individual border between Switzerland and its neighbouring countries. Evaluated 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)	2018	2019	2020	2021	2022
Total	**6 756**	**6 657**	**6 982**	**6 562**	**6 838**
of which northern border (AT, DE, FR)	5 034	4 936	5 260	4 841	5 117
France	2 772	2 678	2 944	2 923	3 018
Germany	1 396	1 343	1 264	1 347	1 341
Austria	866	915	1 052	571	758
of which Italy	1 722	1 721	1 722	1 721	1 721

Table 3: Available import capacity (NTC) for Switzerland, 2018 to 2022 (average of hourly NTC for the year)

Higher import capacity from France and Germany resulted in an overall increase in import capacity in 2022. Long-term maintenance work in the Pradella region that had begun in 2021 was completed in November and was a further factor here.

Average import capacity from Switzerland's northern neighbours therefore returned to over 5,000MW. However, total import capacity still did not reach the average figure for 2020 which, as in 2017, was just under 7,000 MW.

5.6.3 Export capacity

Due to high transit flows through Switzerland from north to south, the capacity available for export to Italy and France is of particular importance to the network and supply security of Switzerland and its neighbouring countries (see Table 4). The volume of this export capacity to Italy also has a major influence over the utilisation of Switzerland's import capacity on its northern borders with France, Germany and Austria.

EXPORT NTC (MW)	2018	2019	2020	2021	2022
Total	**8 769**	**7 933**	**8 658**	**8 289**	**8 845**
of which northern border (AT, DE, FR)	6 115	5 415	5 928	5 497	6 023
France	1 184	1 163	1 136	1 209	1 194
Germany	3 888	3 491	3 708	3 629	3 946
Austria	1 043	761	1 084	659	883
of which Italy	2 654	2 518	2 730	2 792	2 821

Table 4: Switzerland's export capacity (NTC), 2018 to 2022 (average of hourly NTC for the year)

Like import capacity, export capacity also rose in 2022 due to an expansion in export capacity to Austria (for the same reason as for imports) and to Germany. Capacity to Austria nonetheless fell short of the previous average of over 1,000 MW recorded in 2017, 2018 and 2020. Export capacity to Germany was just under the 4,000 MW of 2017. Average export capacity to the north therefore increased overall, but was lower than 2017 and 2018 levels, when it stood at over 6,100 MW.

At Switzerland's southern border (Italy) export capacity was still well below the almost 3,000 MW achieved in 2017. For these reasons, aggregate export capacity also remained below the 9,129 MW of 2017.

5.6.4 Retrofitting decentralised energy generation plants

Many of the photovoltaic systems (PV systems) installed in the Swiss control zone and in the entire interconnected European grid are configured so that they switch off completely if the frequency reaches 50.2 Hz. This means the grid abruptly loses a relevant amount of energy generation which can jeopardise the system. In order to contain this problem, steps must be taken throughout Europe (including in the Swiss control zone) to ensure that no further systems are connected to the grid unless they comply with the applicable protection settings.

ElCom therefore issued Directive 1/2018 on 6 March 2018 which is published on its web-

site. A retrofit programme was also initiated in a letter sent to distribution service 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 ≥ 100kVA (Retrofit 1) because this enabled a major impact to be achieved quickly and relatively inexpensively.

The target set by ElCom of a maximum connected capacity of 200MVA from non-compliant PV systems could not be achieved through the Retrofit 1 programme. ElCom therefore decided at the end of 2019 to extend the retrofit programme to all PV systems with connected capacity of over 30 kVA (Retrofit 2). The Retrofit 2 programme was launched in January 2020 and obliges network operators to ensure the compliance of the PV systems concerned in their network area by the end of 2022 at the latest. By the end of 2022 just under three-quarters of distribution system operators reported completion of the Retrofit 2 programme. The remaining operators have either been granted an extension or have not yet provided feedback.

5.7 System services

Sufficient electricity production capacities must be available to guarantee supply security, while adequately sized transmission and distribution networks are required for the supply of energy to end users. 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 forward planning is not feasible. This means that even minor deviations from the targeted quantities have to be balanced out on an ongoing basis.

Generally, this balancing process involves bringing the production of electricity into line with the current level of consumption. This constant balancing of production and consumption requires power plants whose production can be efficiently controlled. The balancing capacity provided by these power plants is purchased in a market-based procedure, and the costs incurred are passed on to end customers via the system services tariff, which is used for charging for other services required for safe operation of the grid, including balance management, self-contained start and independent operation capability, voltage stability and compensation of active power losses. However, balancing capacity is the biggest element of system services in financial terms. The costs for balancing capacity stood at around CHF 492 million in the year under review. This is a significant increase in comparison with recent years. Just under 70 per cent of the annual costs for 2022 were incurred in the second half of the year. At CHF 91 million in October alone they even reached the highest monthly level since the system services market was launched in 2009. The steep rise in wholesale electricity prices, as described in greater detail in section 4, is a key factor here. One of the knock-on effects is that balancing capacity also trades higher. Figure 13 shows the price trend for balancing capacity over the past five years:

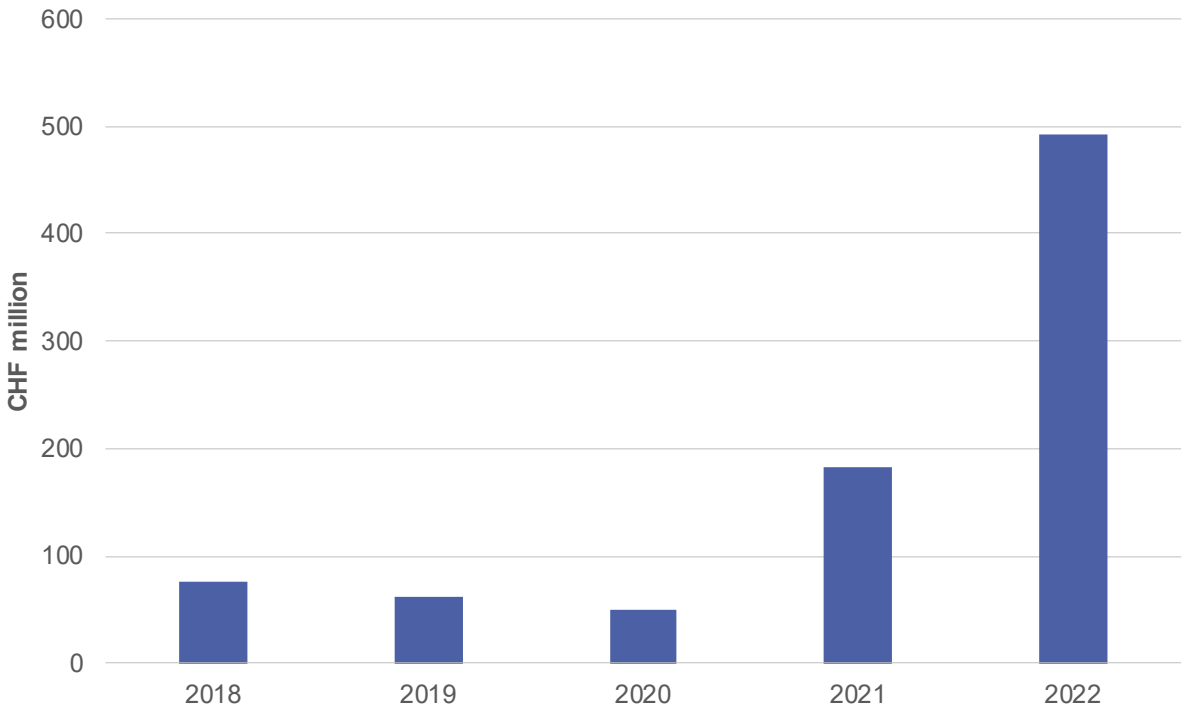


Figure 13: Balancing capacity price trend from 2018 to 2022

Since 2016, Swissgrid has been procuring a proportion of the balancing capacity for the spring in advance. This assures the availability of water reserves, while also improving 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. The costs of advance procurement came to around CHF 16.5 million during the reporting year. The time of purchase means that this figure is higher than the approximately CHF 6 million for 2021. To ensure security of supply during the taut 2022/2023 winter season, advance procurement was reorganised so that it is now staggered and begins as early as November. The costs of advance procurement for November and December 2022 came to CHF 99 million.

Swissgrid regularly develops balancing products to improve liquidity. The procurement of secondary balancing capacity was adjusted in 2019. Secondary balancing capacity had been purchased as a symmetrical product until mid-2018, which meant the provider had to offer the same amount of positive and negative secondary balancing capacity. The switch to an asymmetrical product now allows providers to only offer positive or only negative secondary balancing capacity. This also enables Swissgrid to carry out more targeted procurement of the quantities needed. To further improve liquidity, balancing products are also purchased on a smaller scale via international platforms, namely primary balancing capacity (FCR) and since October 2020, also tertiary balancing energy (replacement reserve).

5.8 Implementation of manual load shedding and preceding demand adjustments

In proceedings concerning manual load shedding and other measures in the event of a risk to the stable operation of the transmission network (adjustments to demand), in mediation talks led by ElCom the parties succeeded in concluding an agreement comprehensively governing implementation. In particular, the agreement governs the specific duties and tasks of the transmission system operator and connected distribution system operators regarding the organisational and technical implementation of manual load shedding and the preceding adjustments to demand. It also sets out the responsibilities of each party. The agreement therefore represents a firming up of the more general and abstract regulations set out in the VSE's industry recommendation on manual load shedding, and creates a basis for the efficient execution of these measures. It specifically also covers preparatory measures. Given that manual load shedding and the preceding adjustments to demand must be carried out quickly when the network is at risk, this represents significant value added. In addition, the agreement governs further obligations and tasks that the parties must fulfil. For example, they are obliged to hold joint training and exercises in preparation for manual load shedding and the preceding demand adjustments. Training must focus in particular on procedures and coordination processes. The agreement paved the way for a set of cost assumption and liability rules. In ElCom's view, these permit the proper distribution of costs between the participating levels of the network. They state that distribution system operators will bear the lion's share of recurring costs, while the costs caused by actually implementing the agreed measures will be borne largely by the transmission system operator. These latter costs are expected to be infrequent. Distribution system operators are also permitted to transfer costs and liability rules to downstream entities. This is likely to be key to ensuring implementation at lower grid levels, where progress has been slow to date. All in all, the agreement represents a material advance in preventing and eliminating threats to stable grid operation. It also improves network-side security of supply. The conclusion of the agreement also meant that the underlying administrative proceedings could be written off.

6 Network

The Swiss power grid needs targeted expansions and upgrades to support the restructured energy system envisaged in Energy Strategy 2050. The picture shows a pipeline on the Bernina Pass.

6.1 Facts and figures about the Swiss electricity grid

The Swiss electricity grid is run by around 610 network operators and covers a total length of over 213,931 kilometres, which is slightly more than five times the circumference of the Earth. Of this, the local distribution networks (network level 7) account for 71 per cent, while Swissgrid's national transmission network (network level 1) accounts for just over three per cent with around 6,650 kilometres. The remaining kilometres are made up by the medium-voltage levels (network levels 3 and 5). As part of regular cost accounting reporting, ElCom surveys the Swiss electricity grids according to various equipment classes each year. 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 have increased as a result of progress in cabling work.

Type of installation	2017	2018	2019	2020	2021	Unit
Conduit length HV (NL3), MV (NL5) and LV (NL 7)	120 509	122 616	124 941	130 205	131 705	km
HV cable (NL3)	1 992	1 906	2 053	1 968	2 099	km
MV cable (NL5)	34 675	35 307	36 433	36 428	37 725	km
LV cable (NL7)	79 269	80 029	82 179	81 264	82 653	km
LV building connection cable (NL7)	55 011	57 091	58 891	59 108	62 518	km
EHV overhead lines and cable (NL1)	6 590	6 652	6 717	6 717	6 652	Strand km
HV overhead lines (NL3)	6 791	6 777	6 788	6 658	6 773	Strand km
MV overhead lines (NL5)	9 784	9 458	9 346	8 818	8 751	Strand km
LV overhead lines (NL7)	8 150	7 663	7 899	6 972	6 760	Strand km
NL2, NL3, NL4, NL5 substations	1 056	819	825	823	862	Number
NL2 transformers	151	145	147	149	152	Number
NL2 switching fields[1]	164	167	163	168	178	Number
NL3 transformers[2]	77	76	76	87	86	Number
NL3 switching fields[1]	2 600	2 586	2 680	2 431	2 506	Number
NL4 transformers	1 150	1 143	1 153	1 143	1 186	Number
NL4 switching fields[1]	2 078	2 163	2 929	2 246	2 333	Number
NL5 transformers[2]	72	73	74	77	74	Number
NL5 switching fields[1]	29 934	30 685	39 486	39 411	40 068	Number
NL6 transf. stat.	53 144	53 730	54 850	54 142	55 546	Number
NL6 mast transformer stations	5 457	5 265	5 487	4 993	5 049	Number
LV cable distribution cabinets (NL7)	174 917	177 430	182 325	191 488	199 412	Number
Measurement points (all consumers)	5 573 672	5 635 760	5 779 344	5 715 085	5 951 287	Number
Number of network operators	636	630	632	623	610	Number

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 ESO.

2) Despite the fact that transformation generally takes place on the even network levels, transformation also takes place on odd levels in certain cases – such as to balance out different voltage series within the same network levels (e.g. at NL 3, between 110 and 50kV).

Table 5: Installations on the Swiss electricity grids

The total value of the Swiss electricity grid stands at around CHF 21.7 billion. The distribution network accounts for around 90 per cent of this figure.

The following figures concerning the distribution network show the distribution of ownership and network usage revenues by company size in terms of the total residual value of their installations. In both figures the 100 biggest network operators are ranked according to their size in groups of ten (1 to 10, 11 to 20, etc.) while the other 520 network operators make up the residual group. This indicates that the ten biggest companies (dark blue) hold just under 43 per cent of all declared assets (Figure 14). This is around the same as the next 90 biggest companies combined (group 11 to 20 to group 91 to 100). The approximately 520 small network operators ('Rest' – shown in light blue) have a share of just 15 per cent in total. This is around the same as five years ago.

A similar distribution can be seen in network use remuneration (Figure 15). The ten biggest network operators (in dark blue) account for around 42 per cent of all revenues – this figure has fallen slightly over the past five years. The share of total revenues accounted for by the around 520 small network operators ('Rest' in light blue) fell slightly, standing at 14 per cent.

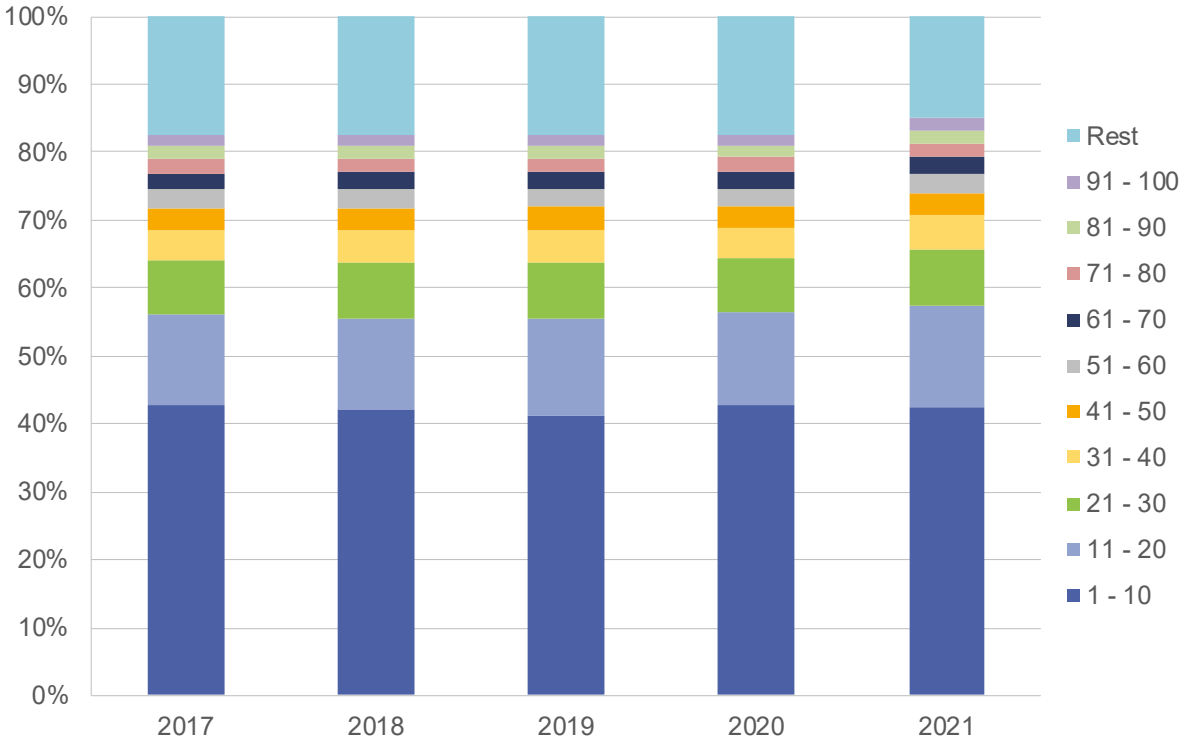


Figure 14: Proportional holdings in the distribution network by company size

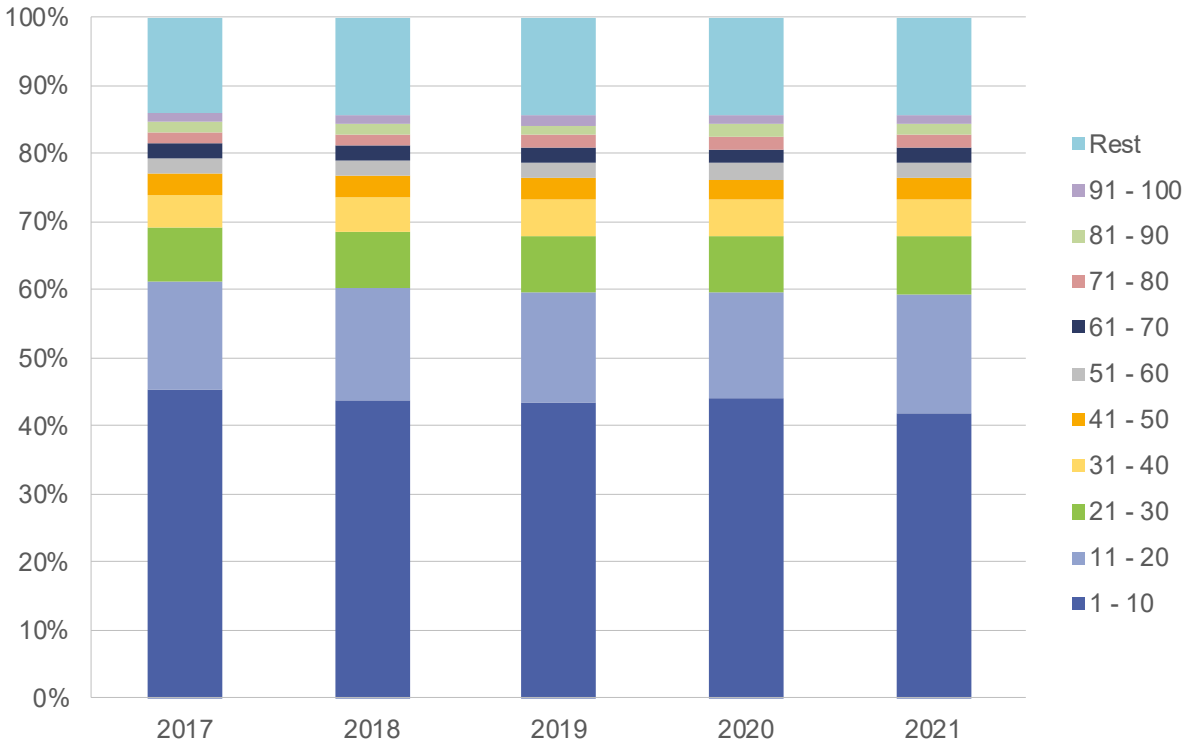


Figure 15: Proportion of network usage revenue (distribution network) by company size

The distribution service operators declared total network costs (including fees and charges as well as surcharges on the transmission network) of just over CHF 5.6 billion for 2021. These are based on the operating and capital costs of a secure, high-performance and efficient network in accordance with electricity supply legislation. In addition to this amount, there are duties and payments to the state. Surcharges on the transmission network must also be added on. However, this amount does not include the availability costs incurred by the individual network operators as these are entered as revenues for the respective provision, which means the position is neutral overall. The biggest components of the network costs on the distribution network are the operating and capital costs, making up a share of 67 per cent, which equates to almost CHF 3.8 billion (Figure 16).

The share of fees and charges has risen by 7 percentage points to 32 per cent over the last five years. This position includes duties and payments requested by cantons and communes on the one hand (9 per cent of costs) and the national statutory duties to promote renewable energy on the other (with 2.3 cents/kWh, 23 per cent of costs). The increase in this cost position during the prior period is primarily due to the gradual rise in the national statutory duties for the promotion of renewable energy from 2014 to 2018.

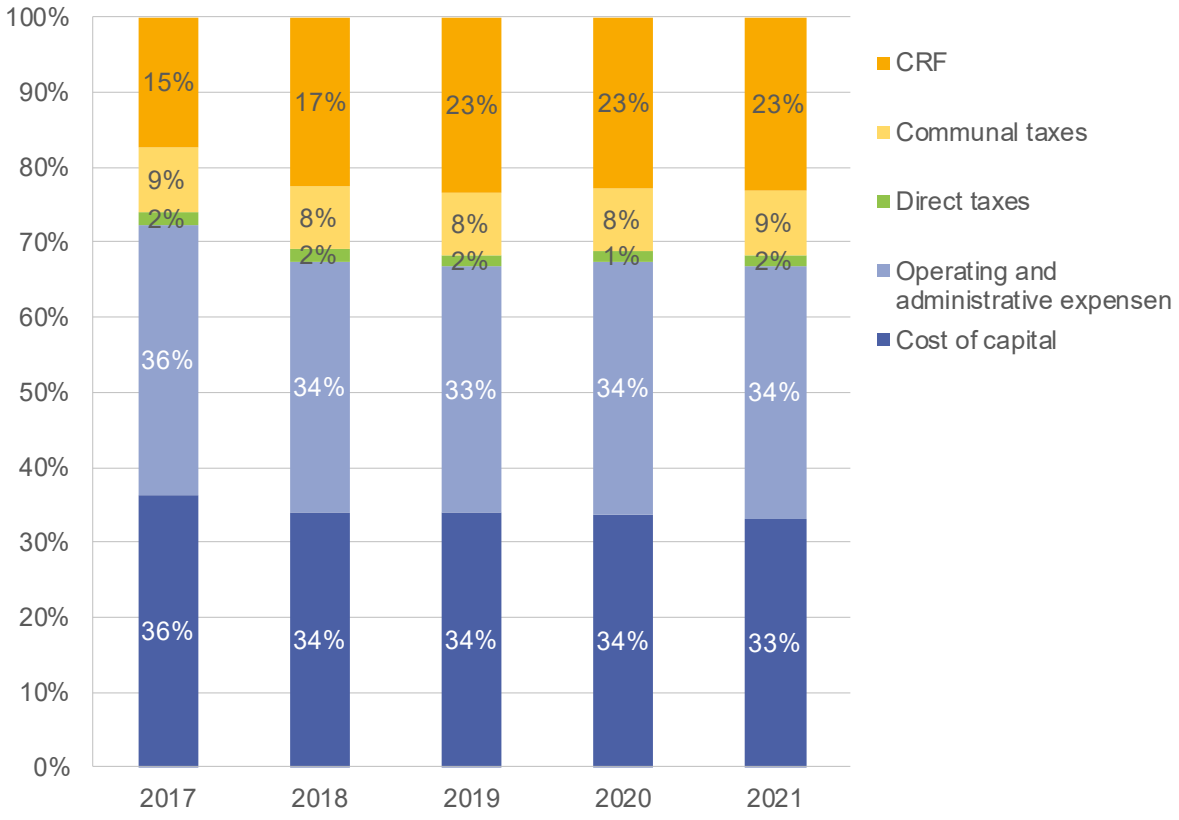


Figure 16: Breakdown of distribution network costs

In its 2021 Annual Report, Swissgrid reported network usage costs of CHF 586 million and system services costs of CHF 316 million. If the distribution network costs of just over CHF 5.6 billion are added to these cumulative costs of just under CHF 0.9 billion, the overall costs for the Swiss electricity grid come in at just under CHF 6.3 billion. Figure 17 shows the breakdown to the individual network levels (NL). The local distribution network (NL7) accounts for over half of the costs at around CHF 3.1 billion. Another fifth of the costs are incurred on NL 5. The cost shares of the transformation levels (NL2, NL4, NL6) – the linking element between the various connection levels – are relatively low overall. The high-voltage network (NL1 network usage incl. NL1 system services) operated by Swissgrid makes up a total share of 14 per cent of the overall costs for the Swiss electricity grid.

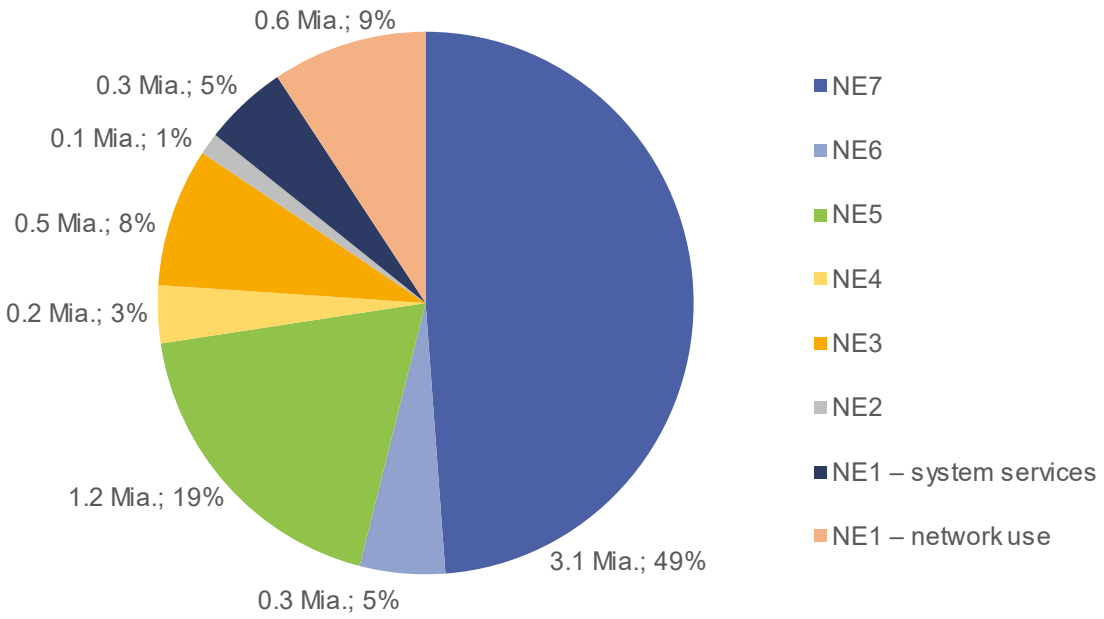


Figure 17: Costs in CHF billion and breakdown of the cost shares of the Swiss electricity grid (including fees and charges as well as surcharges on the transmission network) by transmission network (NL1) and distribution network (NL2 to NL7).

6.2 Network expansion and planning

6.2.1 Multi-year planning of the transmission network

In accordance with Article 9a ESA, the SFOE produces a set of scenarios as a basis for the planning of the transmission and distribution networks. The federal government's energy policy objectives, macroeconomic data and the international environment must be taken into account. When producing these scenarios, the SFOE consults appropriately with the cantons, the national grid operator, the other network operators and other stakeholders. Article 5a ESO states that the scenarios must be reviewed every four years and updated where necessary. The Federal Council approved the set of scenarios for 2030/2040 at its meeting on 23 November 2022.

Article 9d ESA provides that the national grid operator must present its multi-year plan to ElCom for inspection within nine months of the approval of the last set of scenarios by the Federal Council. The content of this multi-year plan is described in Article 6a ESO.

Swissgrid will submit the first multi-year plan based on the new set of scenarios to ElCom in 2023. Its past multi-year plans have been based on the Strategic Grid 2025 report, completed in early 2015. The report sets out nationally coordinated plans for the transmission network, and essentially fulfils the requirements of the ESA (Art. 8 para 2, Art. 20 para 2 let a). 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 network usage. The level of investment for the expansion and maintenance of the network 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 the Electricity Supply Act (Art. 22 para. 3 ESA). However, the uncertainty in terms of efficiency is probably considerably greater than suggested by the extensive, exact calculations regarding the indicated net benefits. For further discussion within the scope of multi-year planning and the evaluation options in the sectoral plan and planning approval procedures, the uncertainties need to be quantified using sensitivity analyses. This will increase the meaningfulness of the cost/benefit analysis. With regard to cross-border financing (CBCA), discussions concerning the methodology need to be stepped up between Swissgrid and ElCom, as well as within all relevant bodies. Based on the report 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 is a welcome development, the uncertainties over the 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.

6.2.2 Multi-year planning of the distribution network

Under Article 9b ESA, every network operator must determine network planning principles. It is worth noting that the network is generally only to be expanded if the provision of a secure, high-performance and efficient network cannot be achieved throughout the entire planning horizon by means of optimisation or upgrading. In accordance with Article 9b paragraph 3 ESA, ElCom may define minimum requirements in this respect. Under paragraph 4, the Federal Council may require the network operators to publish these principles.

Article 9c ESA establishes the obligation for network operators to collaborate for the purposes of expansion planning. This also includes the obligation to provide one another with any information required for this purpose at no charge. The network operators must sufficiently involve the cantons concerned and other parties affected in the planning process.

Article 9d ESA states that network operators must draw up a ten-year development plan (multi-year plan) for their network with a nominal voltage of over 36kV based on the scenarios and in line with the additional requirements for their network area. The planned projects are set out in the multi-year plan. This must demonstrate how effective and appropriate they are from a financial and technical perspective. The network development measures planned over the ten-year period must also be outlined. Under Article 6d paragraph 2 ESO, the Federal Council must draw up multi-year plans for distribution networks with a nominal voltage of over 36kV within nine months of approval of the most recent set of scenarios.

6.2.3 Participation in SÜL and PAP 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 ESA ("a secure, high-performance and efficient network"). DETEC decides on any differences of opinion between ElCom, the SFOE and ESTI (cf. agreement of 21 March 2018 [status as of 5 May 2020].[1] At the request of ElCom, Swissgrid drew up the 'module guidelines'. This aid helps with the planning of line construction projects on the transmission network for the systematic cost calculation of the electricity transmission lines variants.

In 2022, ElCom participated in the support group for the following Electricity Transmission Lines sectoral plan (SÜL) procedures as part of its statutory duties: All Acqua – Magadino, Vallemaggia (SÜL 109), Innertkirchen – Ulrichen (SÜL 203), Innertkirchen – Mettlen (SÜL 202), Marmorera – Tinzen (SÜL 701.1). The premature expiry of some easements of a Swissgrid line in the communal district of Balzers in Liechtenstein presents an unusual challenge. ElCom also issued several opinions on projects as part of planning approval procedures.

1 Available at www.elcom.admin.ch > Documentation > Information)

6.3 Investments in the network 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.

6.3.1 Investments in the transmission network

The actual amount invested in the transmission network in 2021 stood at CHF 166.5 million. During the period 2017 to 2021, the average annual level of investment in the transmission network stood at CHF 148.6 million.

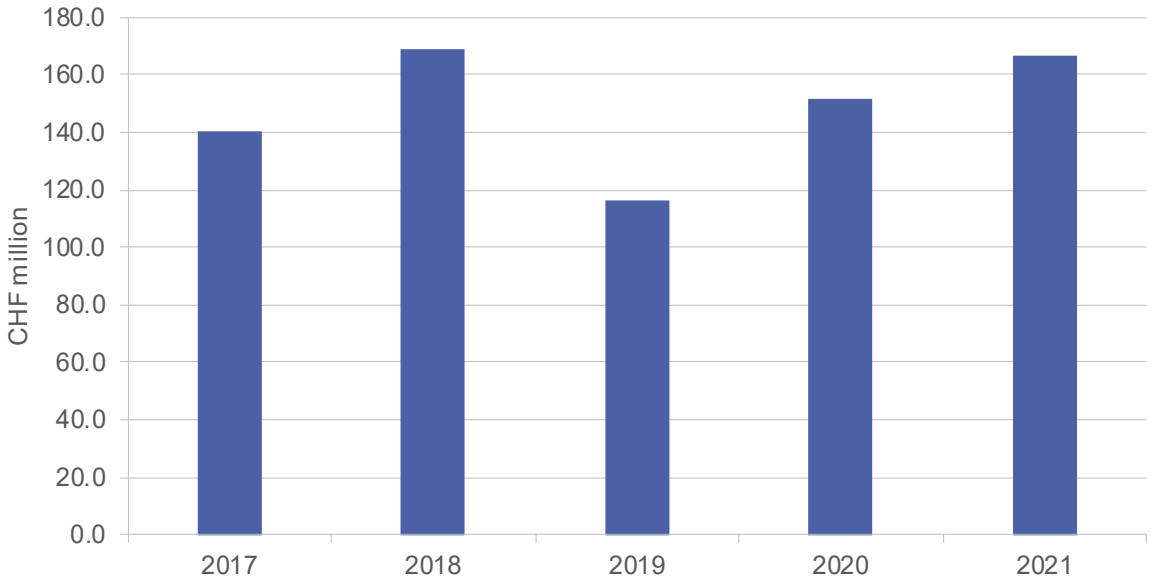


Figure 18: Investments in the transmission network

6.3.2 Investment in the distribution network

Between 2017 and 2022, the distribution network operators invested around CHF 1.4 billion annually (Figure 19). During this period, write-offs increased from CHF 929 million to over CHF 956 million. Due to a slight increase in investments, the investment surplus rose from around CHF 419 million to just under CHF 474 million despite higher depreciation. Since the reliability of Switzerland's electricity networks is very high – also by international comparison (cf. section 3.6) – ElCom still considers the investments in the distribution network to be sufficient.

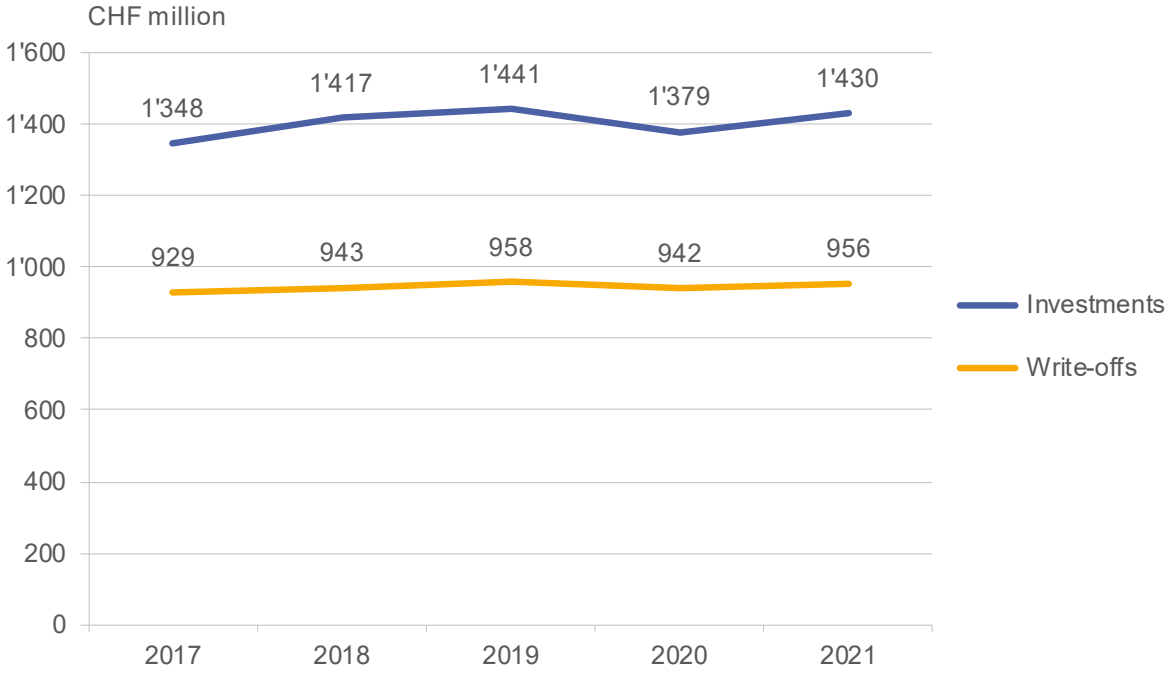


Figure 19: Investments and write-offs in the distribution network

6.3.3 WACC imputed interest rate for the network

In Switzerland, the cost-plus system is used as a basis for calculating the recoverable network usage remuneration. The recoverable actual costs for network operation plus an appropriate profit constitute the basis for the tariffs. The operating and capital costs of a secure, high-performance and efficient network are recoverable. The recoverable capital costs also include the imputed interest on the assets required for the operation of the networks in accordance with Article 15 paragraph 3 letter b ESA. Interest is paid via the WACC. According to Article 13 paragraph 3 let. b of the amendment to the Electricity Supply Ordinance of 30 January 2013, the imputed rate of interest on the aforementioned required operational assets corresponds to the weighted average cost of capital (WACC). The basis is the average eq-

uity and debt capital costs, which in simple terms include risk-free interest with a surcharge. In the current WACC calculation method set out in Annex 1 ESO, the risk-free debt and equity capital rates are frozen at 0.5 and 2.5 per cent (floor). That is why the WACC has never fallen below 3.83 per cent in recent years up to and including 2023, even during the phase of low interest rates.

The WACC for the network aims to cover the network's debt capital costs. It also ensures risk-oriented return on the capital deployed through the equity yield rate. The main risks of network operation are reduced to almost zero. This is achieved through the cost-plus system and the option for grid operators to make additional charges for all budget deviations above the coverage differentials via the tariffs (cf. ElCom Directive 2-2019 on coverage differentials).

ElCom essentially supports a WACC calculation method that takes account of the risks in grid operations and the current situation on the capital markets. However, it has pointed out on numerous occasions that the current methodology in the context of the current low-interest environment produces a WACC that is too high, especially in view of overstated risks and the set minimum interest rates. The calculation method must therefore be adjusted accordingly. ElCom also identifies major shortcomings in the way in which the risk premium and peer group used to defined the beta factor in the WACC calculation are determined. Given the very sharp rise in energy tariffs even for 2023, not increasing the WACC – contrary to what would be suggested by a rise in the general level of interest rates – would ease electricity tariffs in the future.

6.4 Increases in network capacity

Additional network capacity may be required in order to connect producers of electricity from renewable energy to the distribution network. Swissgrid refunds the costs to the network operators by incorporating them into its calculation of the system services tariff. This form of remuneration requires approval from ElCom, which relies on a directive that serves as a guideline for network operators when submitting applications. This directive also defines the criteria for the assessment of such applications. In the year under review, ElCom evaluated 27 applications for the remuneration of costs associated with increases in network capacity.

ElCom has issued a total of 1,023 decisions over the past 14 years (cf. Figure 20, Table 6).

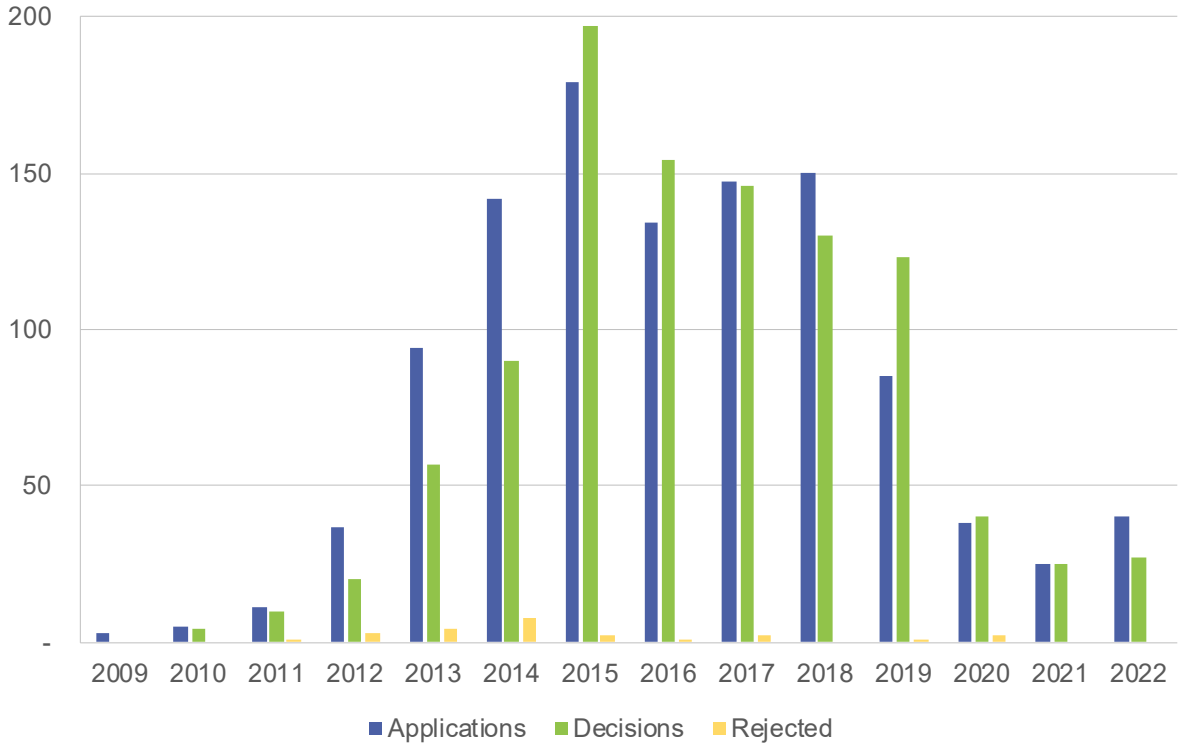


Figure 20: Number of submitted and rejected applications and decisions concerning remuneration for increases in network capacity

Total costs for network capacity increases stood at around CHF 122.1 million at the end of 2022 and the related power plant output amounted to 376 MW in total. Table 6 provides an overview of the key figures on decisions on remuneration applications for necessary network capacity increases for the period 2009 to 2022.

	Total	PV	Hydro-power	Wind	Other[1]
Number of decisions	996	937	34	4	21
Minimum generator output [kW][2, 3]	4	4	29	1500	22
Minimum generator output [kW][2, 3]	74 000	8 303	14 726	16 000	74 000
Total generator output [kW][3]	368 106	158 069	65 588	30 000	114 449
Minimum costs [CHF][2]	3 500	3 500	12 277	1 151 165	18 069
Maximum costs [CHF][2]	9 262 389	746 912	2990 952	9 262 389	2 117 200
Total costs [CHF]	116 670 841	71 006 334	20 069 704	19 853 343	5 741 460
Average costs [CHF][4]	117 022	75 861	590 285	3 308 891	273 403

Minimum relative costs [CHF/kW][5]	3	3	5	451	3
Maximum relative costs [CHF/kW][5]	9 719	9 719	4 148	1 116	2 877
Average relative costs [CHF/kW][5]	317	449	306	662	50

1) e.g. biomass and different plant types

2) Per application / decision

3) In the case of hydropower plants, output refers to the mean gross mechanical output; with the other categories of generation plant output is measured in terms of generator output

4) Corresponds to the average value of approved network reinforcement amounts per decision

5) Relative costs corresponds to the quotients from costs and generator output

Table 6: Figures relating to decisions on network capacity increases issued between 2009 and 2022

7 International activities

Switzerland's electricity network is closely interconnected with those of neighbouring countries. Some power plants even cross borders, such as the Punt dal Gall dam in the canton of Graubünden. It is located on the border between Switzerland and Italy, with half of the dam wall and most of the reservoir on the Italian side.

7.1 Introduction

From the second half of 2021, sudden, steep and relatively unexpected increases in the gas price put the brakes on economic recovery. Other sources of energy (coal, oil, etc.) and electricity prices also reached record highs, which by 2022 had gradually spread to all wholesale markets (exchanges). The outbreak of war in Ukraine in February 2022 resulted in even higher energy prices and further increased the risk of recession in Europe and around the world.

The price increases that initially affected only those countries in which consumers or power generation are more directly reliant on gas or even coal soon became a political issue throughout Europe and worldwide.

EU member states adopted the REPowerEU action plan designed to reduce and eliminate the EU's enormous reliance on Russia for its energy, thereby settling many of their differences of opinion about the causes of the crisis and what should be done to help. They agreed a common package of emergency measures to complement their own national programmes to reverse the rise in gas and electricity prices and mitigate its impacts. REPowerEU was also intended to help diversify fossil fuel supplies to the EU from other third countries, thereby reducing geopolitical dependencies through renewable energies as an additional factor.

Furthermore, it was decided from 2023 onwards to bring forward the reform of the EU's 2019 regulatory framework for electricity to counter the greater risk of supply shortages, including increases in the market price. By contrast, work on amending the CACM GL (EU Guideline on Capacity Allocation and Congestion Management 2015/1222) was pushed back. The CACM GL

is of great relevance to Switzerland with regard to the problem of unscheduled flows.

Electricity market reform will go hand in hand with the reform of the gas market, which began at the end of 2021. This should lay the foundation for a transition from fossil-based natural gas to renewable and low-carbon gases and improve the resilience of the gas system.

Single day-ahead coupling (SDAC) and single intraday coupling (SIDC) were expanded to other internal borders within the EU, while in parallel flow-based market coupling (FBMC) was introduced in eight further countries in mid-2022 to take the total from five to 13. It is to cover further countries in future, including Italy.

At the request of the European Commission, 2021 saw the start of a single project by ACER and ENTSO-E to produce an additional new network code. This work continued in 2022 and concerns the 'Network Code on Cybersecurity to set a European standard for the cyber security of cross-border electricity flows'. The project originated in Regulation (EU) 2019/941 on risk-preparedness in the electricity sector, but is being completed as an independent EU regulation.

In view of Switzerland's strong integration with neighbouring European countries, all of these developments and changes within and outside of the EU are of major importance – whether for the electricity sector, security of supply or at political, legal or economic level.

7.2 Congestion management

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

As the import and export capacity available is limited, they are mainly assigned based on market-oriented procedures in accordance with Article 17 paragraph 1 ESA. The following exceptions apply: priority is given to supplies based on long-term contracts concluded before 31 October 2002 (this concerns several contracts with France that are still running), on the one hand, and supplies from hydropower plants on the border on the other. Thirdly, capacities in intraday trading are not currently priced.

That means the lion's share of the capacities of cross-border lines is allocated within the framework of explicit auctions which award the transport right separately from the energy transaction. In contrast, the transport right is automatically granted to the highest bidder when electricity is sold on the market in implicit auctions. This has become standard in Europe for both day-ahead and intraday transactions as part of the single day-ahead coupling (SDAC) and single intraday coupling (SIDC) systems. In June 2022 the border between Hungary and Croatia was included in SDAC, while Greece and Slovakia joined SIDC in November. This means that capacity at all borders within the EU can be allocated implicitly. However, in the absence of accords on electricity, Switzerland is unable to participate.

Flow-based market coupling (FBMC) optimises and simultaneously allocates transport capacity at each border depending on the price difference and network situation. The gradu-

al introduction of FBMC by more and more EU member states will allow better economic use to be made of network capacities.

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 Regulation (EU) 2019/943 on the internal market for electricity of 5 June 2019 stipulates that at least 70 per cent of the capacity of all lines must be released for commercial cross-zonal trading so that market integration and supply security can be improved at a pan-European level. For this 70 per cent of cross-border capacity exceptions, are only provided up to 2025. In 2022 exceptions were still in place for all of Switzerland's neighbouring countries except France. Germany and Austria, in particular, have both published an action plan providing for a linear increase to the required 70 per cent. In 2022 Germany had to achieve 31 per cent, Austria 28.7 per cent. More information on the inclusion of Swiss flows in the 70 per cent targets can be found in section 5.4 (Unscheduled flows).

The development of EU regulation and methods (specifically the 70% rule, but also exclusion from balancing platforms) is likely to result in increasing shortages in the Swiss network and the greater use of operational relief measures including countertrading and redispatching. In 2022 work began on implementing a new international method to optimise relief measures together at the regional level. Swiss participation is planned, and welcomed by the EU. Implementation is scheduled for 2024 at the earliest.

7.3 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 timeframe upon expiry of which the line is transferred to the ownership of the national grid operator. Switzerland had one merchant line at the Italian border during the year under review. It was still subject to proceedings before ElCom, which have now been concluded. The exemption expired during the reporting period, and the line was subsequently transferred without payment to Swissgrid.

The discussions on the creation of an additional merchant line from Switzerland to Italy on an existing, disused line were stepped up again during the year under review. It cannot be ruled out that ElCom will be asked the following year to grant a network access exemption. Any decision would be based on the DETEC Ordinance on Exceptions to Network Access and to Allowable Network Costs in the Cross-Border Transmission Network (NetCEO).

7.4 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 service operator. Auction proceeds may be used to cover the costs of cross-border electricity supply, to meet the transmission network's recoverable costs or for the maintenance and expansion of the transmission network (Art. 17 para. 5 ESA). Swissgrid submits an application to ElCom outlining how it intends to use the proceeds and ElCom ultimately decides how they will be used (Art. 22 para. 5 let. c ESA).

Swissgrid submitted a proposal in the year under review regarding the use of auction proceeds from 2021 in which Swissgrid deviated from the agreed ratio of 55 per cent for the maintenance and expansion of the transmission network and 45 per cent for reducing the transmission network's recoverable costs. This was justified by various special effects. ElCom rejected the application in February 2021 and decided to maintain the agreed ratio on the use of proceeds. Due to the coronavirus pandemic, Swissgrid made an application for reconsideration in March 2021 and requested using the auction proceeds in 2021 solely for the reduction of recoverable costs. This application was approved by ElCom in view of the extraordinary situation.

For the use of the auction proceeds in 2022, Swissgrid requested a deviation from the agreed ratio of 65 per cent for the maintenance and expansion of the transmission network and 35 per cent for reducing the recoverable costs of the transmission network due to special effects (in particular the reduction of coverage differentials due to the implementation of the system audit, payment of compulsory purchase compensation for tranche B) and the COVID-19 pandemic. ElCom rejected the application and decided to maintain the agreed ratio of 65 per cent and 35 per cent on the grounds that the special effects specified could be planned for and the pandemic did not have the same surprising effect as in 2020.

Swissgrid submitted an application in the year under review on the use of auction proceeds from 2023 As in the previous year, it applied for a deviation from the agreed ratio of 65 per cent for the maintenance and expansion of the transmission network and 35 per cent for reducing the transmission network's recoverable costs on account of special effects. From the Swissgrid perspective, these include the expected proportionate reduction in a shortfall expected for the end of 2021 (as per the system audit decision), the payment of tranche B of compulsory purchase compensation, as well as other higher costs (higher operating expenses, higher write-downs, lower ITC revenues, higher costs for national redispatch, taxes and imputed interest effects). ElCom rejected the application and upheld the agreed ratios of 65 per cent to 35 per cent. This was because the special effects given had been foreseeable for some time (such as tranche B of compulsory purchase compensation), and the cost increases mentioned are not, in themselves, unusual. The ElCom decision means that a portion of the auction proceeds will be used to reduce tariff-related costs directly, while a greater portion will be used to expand the transmission network. This reduces recoverable regulatory fixed assets and therefore lowers recoverable capital costs in the long term. In December of the reporting year Swissgrid submitted an application for reconsideration of the allocation of

auction proceeds for 2023. It asserted that the geopolitical and market environment had changed significantly since ElCom's previous decision. ElCom rejected this application. It takes the view that the market climate has not changed to such an extent that would warrant reconsideration.

In general, ElCom aims to use the auction proceeds over the long term to smooth tariffs and therefore to the benefit of end users. Use of the auction proceeds for the expansion and maintenance of the transmission network is a suitable approach in this respect. This helps to keep recoverable costs down over the long term.

7.5 International platforms for the reserve power supply

The reserve power supply must balance out sudden fluctuations in electricity consumption and generation, making it a vital component of electricity supply security. The EU's third internal market package systematically extends the procurement and use of the reserve power supply beyond national borders. Considerable price advantages in procurement on the market (and ultimately for end users) and better protection against possible congestion are expected in some cases.

Dedicated international trading platforms are set up for this purpose. The platforms for the exchange of primary balancing capacity (the Frequency Containment Reserve, FCR), slow tertiary reserve (TERRE) and Imbalance Netting (IN) are operational and will be expanded as necessary. Two further platforms went into productive use in 2022, specifically the PICASSO platform for the exchange of secondary balancing capacity in June, and MARI for fast tertiary reserves in October. Switzerland is separate from the latter two platforms for the time being. This situation will remain for as long as ongoing proceedings prevent participation. The FCR (Frequency Containment Reserves) cooperation between transmission service operators dates back to the period before the introduction of EU network codes and is now the first regional cooperative arrangement to harmonise the market using the method specified by the Electricity Balancing Guideline (EBGL). This cooperative arrangement serves to procure primary balancing capacity in Europe's synchronous 50-hertz area in order to cut procurement costs and create market entry incentives for new balancing capacity providers and technologies. ElCom, as well as other regulators and stakeholders, are actively involved in the arrangement.

Within the FCR cooperation new adjustments are regularly discussed and introduced, one of the aims being to shift the market design towards real time. One example is the introduction in July 2020 of D-1 auctions with shortened contract durations of four hours. Operations run on the FCR platform thanks to a complex allocation algorithm which factors in various price zones and ancillary conditions, as well as marginal pricing, and calculates the corresponding product length.

Switzerland's participation on the three platforms for RR/TERRE, aFRR and mFRR is subject to an EU legal proviso according to which the European Commission decides on participation based on opinions from the ENTSO-E association and the European association ACER. ENTSO-E issued a positive opinion in September 2017 as did ACER in April 2018. However, access to the platforms is not guaranteed and depends heavily on the political relationship between Switzerland and the EU. The Directorate-General for Energy at

the European Commission reached a negative decision with regard to participation in the TERRE platform. This calls Swissgrid's longer-term involvement into question.

ElCom supports Swiss participation in the platforms as it sees considerable risks to secure network operation 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. This situation could also jeopardise the system security of the entire region surrounding Switzerland.

7.6 International bodies

The sharp increases in the prices of electricity and gas that had been relatively limited geographically in 2021 expanded to affect the whole of the EU in 2022. Then came the consequences of the invasion of Ukraine and the ongoing war, specifically the severe reduction or even cancellation of Russian gas exports to the EU, which affected many of its member states. As a result, Russia could no longer be regarded as a reliable supplier.

Extraordinary situations demand extraordinary decisions. In addition to imposing economic sanctions on Russia, the EU adopted a REPowerEU plan to end the EU's dependence on Russian gas and fossil fuels as soon as possible before 2030, and in a spirit of solidarity. A number of the measures and regulations planned under REPowerEU and described in section 4.5 of this report (EU measures to reduce energy prices) were adopted by the Council of the EU, in which the member states are represented, in urgent procedure to counter the risk of increasing difficulties with energy supplies to the EU.

A variety of mechanisms were deployed in response to the current circumstances, including fiscal measures such as taxes on excessively high profits. These were intended to halt the unprecedented rise in energy prices in 2022 and to stabilise or even significantly reduce gas and electricity prices by introducing price caps.

The worst of the impact of high energy prices on the economy, industry and energy consumers (including end customers for electricity) was to be specifically financed and mitigated. Action included extraordinary and temporary solidarity levies on oil, gas, coal and refineries, and caps on surplus revenues from electricity generation. To this end, just a few weeks after the Russian invasion, in March of the reporting year ENTSO-E synchronised the continental European electricity network with that of Ukraine and Moldova as an immediate emergency link-up. Since then, both transmission networks have been part of the interconnected European grid to ensure security of supply on both sides, the emergency operation of Ukraine's nuclear power stations and commercial electricity trading between Ukraine and Moldova, on the one hand, and the EU, on the other.

Further aspects of REPowerEU are based on energy efficiency and the massive use of renewable energies. These are the cornerstones of the EU's energy transition, which was revived in 2019 by the European Green Deal. They involve reducing the EU's greenhouse gas emissions by 55 per cent compared with 1990 by 2030, and achieving the net-zero car-

bon emissions target by 2050. To achieve these ambitious Green Deal targets there is the Fit for 55 package, launched in July 2021. Among its proposals is the revision of EU Directive 2018/2001 on renewable energy. The EU Green Deal and Fit for 55 will be hugely supported up to 2027 by the Next Generation EU post-Covid growth programme of 2020, which has funding of over EUR 800 billion.

The EU maintains its efforts to translate the Paris Climate Agreement of 2015 into practicable terms and to comply with its undertakings by means of energy efficiency and renewable energies, so that Europe will be the first climate-neutral continent by 2050. Alongside the digital transformation of the European economy and society, as well as the energy system and the renewed desire for European re-industrialisation, the energy transition remains a priority for the EU. REPowerEU reinforces this status to some extent. The EU states had to present coherent energy and climate plans and feasible reforms of their own national energy markets for the period 2021 to 2030.

Fit for 55 puts these ambitions into practice with the revision of around 100 items of legislation relating to the climate, energy and transport to align EU law with the Union's climate targets. This process will continue in 2023 with the adoption of a dozen of these laws, for which compromises or stable wording could not be reached before the end of 2022. They concern the target of 40 or even 45 per cent of renewable energy sources in the EU's energy mix by 2030, a ban on the sale of new petrol and diesel cars from 2035, and the final aspect of the reform of the EU carbon market, underscoring the producer pays principle by cutting the emissions of energy-intensive industries by 62 per cent by 2030 in relation to 2005 levels, etc.

As further action on the climate, a Carbon Border Adjustment Mechanism (CBAM) will also be introduced in stages by 2026. The CBAM is designed to set a carbon price for certain products imported into the EU, such as electricity and hydrogen, cement, iron, steel and aluminium, or fertilizer. Its architects also want to offer greater incentives to invest in more environmentally friendly production in the EU and abroad, and ensure the same competitive terms for companies from the EU and third countries.

Under the French and Czech presidencies of the Council of the EU in 2022, EU member states and institutions were primarily occupied by immediate joint action to manage the new energy crisis and the war in Ukraine.

Sweden takes on the rotating presidency in the first half of 2023, followed by Spain in the second half. Sweden is not planning any further emergency measures or regulations to reduce inflows of Russian gas to the EU, unless the situation so requires. This is because member states were able to agree in 2022 on a series of regulations that require certain coordinated measures. These include requirements for storage facility levels, a cap on wholesale prices, and a common procurement platform, for example.

Major reform of the 2019 legal framework for the EU electricity market will nonetheless begin in 2023, having been brought forward to counter the higher risk of supply shortages. This includes Regulation (EU) 2019/943 and Directive (EU) 2019/944. This reform will be conducted at the same time as an additional package of reforms, adopted in December 2021, concerning the gas sector, its markets and infrastructures, which covers cross-border aspects and provides for regional cooperation within the gas sector.

It remains to be seen how far integration and complementarity between the electricity and gas sectors will intensify, and the extent to which the equal treatment of all energy sources will become an objective in the interests of orienting the electricity and gas markets towards decarbonisation. Taxation could be a factor here. The EU wanted by the end of 2022 to progress with and step up the integration of the electricity and natural gas sectors in particular. The aim was to achieve a genuine internal European market for both sectors, with a certain convergence in their regulatory frameworks.

The reform of the EU gas market should largely take its cue from the EU electricity market legislation of 2019, with natural gas serving as a transitional source of energy until the EU has sufficient capacity for electricity generation from renewables, including hydrogen. The specific risks to security of energy supply in the EU, its emergency measures and its willingness to further accelerate the energy transition and decarbonisation might fragment specific regulations. It might also jeopardise other targets, such as a certain technological neutrality, and the equal treatment of different energy markets and sources (also with regard to taxation, for example).

The series of legislative proposals put forward by the European Commission in December 2021 aims to lay the foundation for a transition from fossil-based natural gas to renewable and low-carbon gases – biomethane and hydrogen in particular – to improve the resilience of the gas system. These proposals were made against the backdrop of a general rise in energy prices, including electricity, which had become heightened since the second half of 2021. The EU and its member states could do little to moderate this rise in 2022.

In 2015 ACER and ElCom signed a memorandum of understanding (MoU) agreeing ElCom's observer status in ACER's electricity working groups. The high degree of integration of Switzerland's power grid in Europe was the joint motivation for entering into this form of collaboration. After negotiations on the Swiss-EU framework agreement were halted in May 2021, ACER cancelled the MoU in August the same year. ElCom therefore lost its observer status and its right of immediate insight into the work of the groups in question. Since then it has not had any direct information on developments within the EU that are important to Switzerland and discussed by the ACER Electricity Working Group or its subgroups.

Since 2021 the European Commission has also denied ElCom the opportunity to participate as an observer on the European Electricity Regulatory Forum. Known as the 'Florence Forum', this body focuses on the challenge of integrating the European single energy market. ElCom is endeavouring to make up for this lack of information by engaging in bilateral discussions and continuing to represent Switzerland's interests.

Regional coordination centres (RCCs) were implemented in July 2022. These officially replace the regional security coordinators (RSCs) such as Coreso and TSCNet Services. Under the EU Electricity Regulation 2019/943 they now have an expanded remit and an amended governance structure based on new system operation regions. RCCs (like the RSCs previously) are key to coordination on the secure operation of the system. They conduct capacity calculations and safety analysis on behalf of the transmission system operators. As decided in 2021, and despite new EU and governance requirements, Swissgrid will be able to remain one of the

owners of TSCNet in future. Although Swissgrid will have less decision-making power under the new structure, the flow of information needed to operate the system safely is assured. The actual implementation of the RCC will nevertheless take several years and involve a great deal of uncertainty.

ElCom took part in the discussions on the development of capacity management on the northern Italian border.

ElCom has also had observer status on the Council of European Energy Regulators (CEER) since 2012. Like ACER, CEER and its member regulatory authorities had a particularly heavy workload in 2022 because the raft of legislative reforms at EU level and the energy crisis affect a large section of their responsibilities, and gas and electricity consumer protection. CEER was also involved in preparations for the World Forum on Energy Regulation (WFER) in March 2023.

The OECD Network of Economic Regulators (NER) has been working since 2021 on resourcing and the strategic planning and evaluation of economic regulatory authorities as well as, in a broader context, on the cross-cutting topics of green government and promoting innovation. The latter have shaped the entire work of the OECD since 2022.

8 Outlook

Security of supply will remain one of the focal points of ElCom's work. As in the winter of 2022/2023, in the short and medium term the capacity of French nuclear power stations and the availability of gas to ensure reliable electricity supplies for Europe and thus also Switzerland will be of particularly critical importance. For Switzerland specifically, a further priority will be to continue implementing short-term measures to stabilise security of supply, especially the winter reserve. ElCom plays a central role in monitoring supply security and putting these short-term measures into action.

The risk of gas shortages in Europe remains for the 2023/2024 winter in view of the huge drop in deliveries of gas from Russia and the possibility that they might cease entirely. The significance of gas-fired power stations in the European electricity mix means that this would also impact on the electricity market. The volume of gas remaining in European storage facilities at the end of the 2022/2023 winter will therefore be of enormous importance for the winter ahead. At the same time there is the question of the extent to which Europe can ensure supplies generally by adopting a higher proportion of liquid natural gas (LNG). Rapid progress with the expansion of LNG terminals, especially in Germany, should ease the situation somewhat, but uncertainties still surround the availability and thus also the prices of LNG on the international market, which is dominated by demand from Asia.

Precisely because of this persistent uncertainty, Switzerland must continue rigorously to implement its programme of short-term measures. ElCom has already begun preparations for the provision of the strategic hydropower reserve for the winter of 2023/2024, enabling an initial tranche to be put out to tender at the beginning of the summer. Thermal power generation reserves – the eight gas turbines in Birr, the two turbines in Monthey and Cornaux and aggregated emergency generation capacity – are also available for next winter. ElCom is also preparing the option of shutdowns to create reserves.

Electricity exchange with other countries remains important to Swiss supply security even, or perhaps more so, when the supply situation is tight. As interconnected operations continue to expand, thereby increasing cross-border trading in load flow-based optimisation, ElCom will pay particular attention to the reliability of the Swiss grid and to securing the import capacity needed to ensure security of supply. Close contact with European regulatory authorities and transmission system operators remains important in this regard.

Finally, cyber security is also a key element of security of supply. This issue has gained additional relevance in the context of the Russian war of aggression in Ukraine. ElCom will therefore continue to establish a risk-based approach to cyber security. From this basis it will then gather data from actors in the electricity market and raise their awareness of this sensitive topic. In practice, one of the tasks is to incorporate existing and newly planned requirements into Swiss law. The potential effects of the new EU Network Code on Cybersecurity on Swiss market actors and infrastructure operators must also be considered.

With the supply security situation still challenging, electricity prices remain at a relatively high level. Although prices on the futures markets settled considerably from the

end of 2022 onwards, especially compared with the summer, at the beginning of 2023 they were still extremely high in the context of recent years. This is likely to be felt in the tariffs for the basic supply. Many distribution system operators (DSOs), which largely purchase their electricity on the market, can be expected to raise tariffs again in 2024. Where multi-year purchasing strategies are in place, most operators should have a higher proportion of slightly cheaper electricity in 2023 than they will have in 2024. In addition, from 2024 onwards consumers will pay a surcharge on network tariffs to offset the additional costs of taking short-term action to guarantee security of supply.

With not only higher tariffs, but great variation between them, ElCom faces rising expectations from the public and consumers in terms of its supervisory role. In 2022 there was a sharp increase in enquiries from the media and consumers on issues such as energy tariffs, meter readings, feed-in remuneration and entitlement to basic supply (including in connection with communities for self-consumption). A further rise is expected. Resource constraints meant that answering these queries promptly was a challenge for ElCom. In addition to providing information on an individual basis, ElCom has also enhanced its online communications. Although the number of enquiries and complaints receded towards the end of 2022, it is likely to rise again in 2023 given that consumers in many places are now seeing much higher bills, as well as in response to any further announcements of tariff increases for 2024. ElCom will therefore maintain its efforts with regard to the oversight of distribution network tariffs, concentrating on improving the risk and data-based examination procedure. With the new EDES data collection system now in place, the focus will be on expanding data analysis.

To date ElCom has overseen the wholesale electricity market in accordance with Article 26a Electricity Supply Ordinance. Market surveillance became all the more relevant in 2022 in a climate of high and above all volatile wholesale prices. With the entry into force of the Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (FiRECA) at the beginning of October 2022, ElCom took on an additional oversight function. The evolution of this function, and especially how it should be reflected in systems and processes, will continue to occupy ElCom in 2023. This is because the new law brings with it a significant increase in the data that market actors must provide. As is the case where tariff oversight is concerned, the collection and analysis of these huge data volumes must be as automated as possible.

Major amendments to energy-related legislation also lie ahead in 2023, the most important being the bill consolidating the Energy Act and the Electricity Supply Act. The changes currently on the table would have a significant impact on ElCom's work with regard to implementing the winter reserve, for example, or oversight over network and energy tariffs. In addition, at the end of 2022 the Federal Council sent the draft Federal Act on Supervision and Transparency in the Wholesale Energy Markets (known by its German acronym, GATE) for consultation. Here, too, ElCom would play a key enforcement role. This year ElCom will therefore be active at the technical level to create the most effective and efficient framework possible for putting the various legislative amendments into effect.

ElCom is taking on major additional tasks as a result of the increasingly complex legal environment, greater political involvement in the details of expanding electricity production and the definition of electricity products and tariffs, not to mention its new supervisory functions. Not least in view of current debate surrounding the federal budget, there must be a frank discussion about ElCom's future financing and staffing. As an independent supervisory authority, ElCom must have sufficient resources to actually fulfil the remit conferred upon it by lawmakers. At current levels, ElCom will not adequately be able to perform its new tasks or fulfil the growing expectations of politicians, the public and consumers.

9 About ElCom

The Commission from left to right: Andreas Stöckli, Katia Delbiaggio, Felix Vontobel, Werner Luginbühl (President), Sita Mazumder, Jürg Rauchenstein, Laurianne Altwegg (Vice President)

ElCom is responsible for monitoring the Swiss electricity market and ensuring compliance with the Electricity Supply Act (ESA). 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 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 users, security of supply, the condition of the electricity networks and the allocation of network capacities in the event of congestion at the country's borders.

Number of network operators: around 610
Number of network levels: 7
Kilometres of electricity networks (overhead lines and cable, incl. building connections): Total approx. 214 000km | network level 1 – approx. 6 650km | network level 3 – approx. 8 900km | network level 5 – approx. 46 500km | network level 7 – approx. 152 000km

Number of measurement points: 5.9 million
Number of invoice recipients: 5.6 million

Annual investments: approx. CHF 1.4 billion
Annual electricity consumption: 2020 55 TWh | 2021 58 TWh | 2022 57 TWh

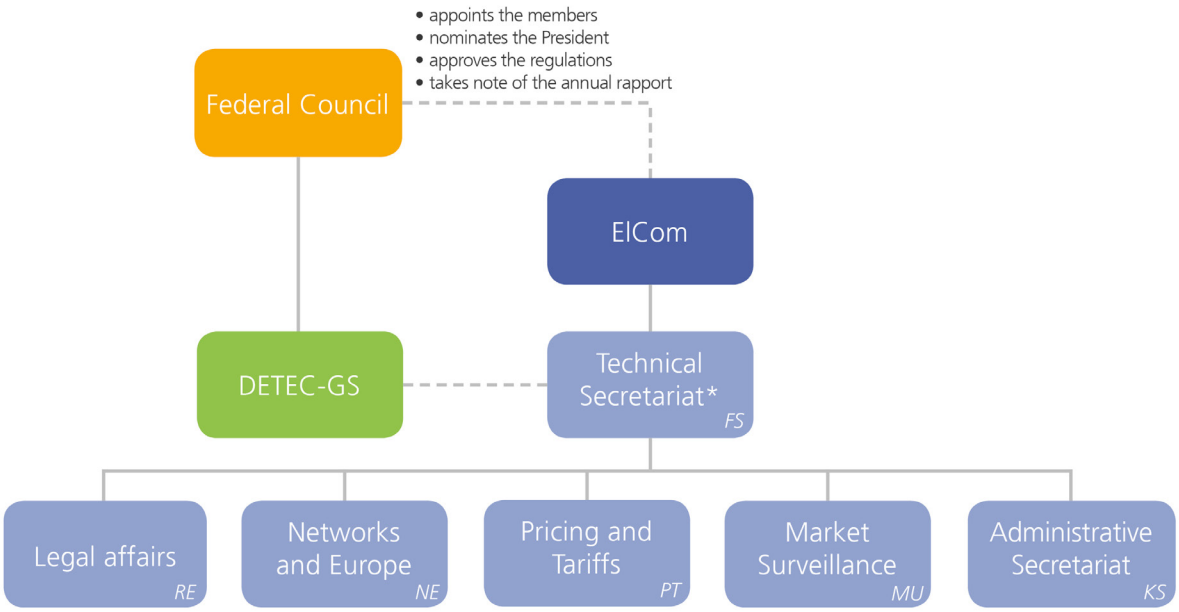
Production: 2020 69 TWh | 2021 64 TWh | 2022 63 TWh (inkl. Verbrauch Speicherpumpen)
Electricity imports: 2020 27 TWh | 202131 TWh | 2022 33 TWh
Electricity exports: 2020 32 TWh | 2021 29 TWh | 2022 29 TWh

ElCom possesses wide-ranging powers 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 for via network use remuneration. ElCom monitors the legality of the remuneration levied.
- Supervising electricity tariffs for fixed end users (basic supply, i.e. households and other end users with an annual consumption below 100 MWh) and all those end users who have not opted for network access.
- Deciding on disputes over 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.

9.1 Organisation and personnel

ElCom is made up of 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 21: ElCom organisational chart

9.1.1 Commission

ElCom's 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 Supply Security, Legal Affairs, International Relations and Market Surveillance.

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

President:

- Werner Luginbühl (since 2020): Altständerat

Vice President:

- Laurianne Altwegg (since 2015): Political science graduate, responsible for energy, environment and landscape at the Consumers Association of Western Switzerland (FRC)

Members:

- Katia Delbiaggio (since 2020): PhD in political science, Professor of Economics at the School of Business, Lucerne University of Applied Sciences and Arts
- Dario Marty (from 2018 to 31.08.2022): Degree in electrical engineering (university of applied sciences), former Head of 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
- Jürg Rauchenstein (since 01.09.2022): Degree in electrical engineering (ETH)
- Andreas Stöckli (since 2019): Attorney-at-law, Professor of Constitutional and Administrative Law at the University of Fribourg
- Felix Vontobel (since 2020): Degree in electrical engineering (University of Applied Sciences)

Committees
In the year under review, the Commission's committees were as follows:

Pricing and Tariffs
- Katia Delbiaggio (chairperson)
- Laurianne Altwegg
- Sita Mazumder
- Andreas Stöckli

Legal Affairs
- Andreas Stöckli (chairperson)
- Werner Luginbühl
- Lauriane Altwegg
- Jürg Rauchenstein (since 01.09.2022)

Networks and Supply Security
- Dario Marty (chairperson until 31.08.2022)
- Jürg Rauchenstein (chairperson since 01.09.2022)
- Werner Luginbühl
- Laurianne Altwegg (until 30.04.2022)
- Katia Delbiaggio
- Felix Vontobel

International Relations
- Felix Vontobel (chairperson)
- Werner Luginbühl
- Laurianne Altwegg (since 01.05.2022)
- Dario Marty (until 31.08.2022)
- Jürg Rauchenstein (since 01.09.2022)

Market Surveillance
- Sita Mazumder (chairperson)
- Katia Delbiaggio
- Andreas Stöckli
- Felix Vontobel

Resignations and new appointments
Dario Marty resigned from the Commission at the end of August 2022. The Federal Council appointed Jürg Rauchenstein as his successor; he joined the Commission at the beginning of September.

Representation of gender and language regions
There were three female and four male ElCom Commission members during the year under review, which corresponds to a ratio of women to men of 43:57. In terms of representation of language regions, the ElCom Commission members are as follows: German-speaking region: five persons; French-speaking and Italian-speaking regions: one person each.

9.1.2 Technical Secretariat
The Technical Secretariat provides the Commission with technical and specialist 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 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 2022, the Technical Secretariat

employed 44 personnel and four interns in full-time or part-time positions. This corresponds to 38.6 full-time equivalents (FTE), not including interns. The employees are made up of 18 women and 26 men, which represents a female proportion of 40.9 per cent. The average age of all employees is 45. Breakdown by national language: (excl. interns):

- Italian: 4 employees
- French: 8 employees
- German: 32 employees

Head of the Technical Secretariat (44 employees)

Urs Meister
Dr. oec. publ. (Doctorate in political science)

Networks and Europe (9 employees)

Michael Bhend
Degree in engineering, ETH Zurich

Pricing and Tariffs (10 employees)

Barbara Wyss
PhD in economics

Legal Affairs (10 employees)

Nicole Zeller
lic. iur., attorney-at-law

Market Surveillance (7 employees)

Cornelia Kawann
Degree in engineering, Doctor of Technology, MBA

Administrative Secretariat (7 employees)

Simon Witschi
M.A.

9.2 Finances

In the year under review, ElCom had a budget of CHF 15.2 million at its disposal. Its effective expenditure amounted to around CHF 14.4 million. This amount covered ElCom's entire personnel and operating costs, including the additional expenditure associated with the replacement of existing IT systems (in particular the new EDES data submission system). On the income side, ElCom received a total of CHF 4.6 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.

9.3 Events

ElCom Forum 2022

The 12th ElCom Forum was held on 18 November 2022 at the SwissTech Convention Center in Lausanne. Around 300 guests from the energy industry attended presentations and discussions on the issues surrounding risk management. Eminent speakers from the industry, government and the academic community reviewed the current situation and discussed current and future challenges. The ElCom Forum 2023 is scheduled for 17 November.

Information events for network operators

ElCom held a total of seven virtual information events for network operators during 2022. They addressed current issues from the Pricing and Tariffs section, high market prices, legal changes and the latest energy policy news from the SFOE. Around 600 people overall took part in the seven events held in three languages. Both the participants and employees of ElCom and the SFOE once again welcomed this opportunity to share professional experience.

Market surveillance workshop

As in previous years, the Market Surveillance section held a workshop in May 2022. The 2022 workshop focused on the latest developments in market surveillance in Switzerland, the Swiss Market Transparency report, and high prices on the electricity markets.

10 Annex

10.1 Facts and figures

A total of 303 new cases were received in 2022 and 154 cases were brought forward from the previous year. Of these cases, 188 cases were concluded in the reporting year. General enquiries are those submitted via the contact form on the ElCom website or via email 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. In 2022, 1,026 such general enquiries were received. This is double the number in 2021, and is explained primarily by the considerable interest in tariffs and security of supply during the reporting year. All but 32 of the general enquiries received could be dealt with in full (97 per cent).). A total of 42 decisions were pronounced in the year under review.

Type of transaction	Brought forward from previous years	Received in 2022	Dealt with in 2022	Carried forward to 2023
Specific matters relating to tariffs	28	81	13	96
Increases in network capacity	28	65	62	31
Other cases	98	157	113	142
Total	**154**	**303**	**188**	**269**
General enquiries	23	1 026	1 017	32
Total including general enquiries	**177**	**1 329**	**1 205**	**301**

Table 7: ElCom activities: statistics for 2022

10.2 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 12 full-day and 15 half-day meetings within Switzerland. Once a year, ElCom organises a retreat during which its members visit local grid operators. In 2022 the Commission had its retreat in Zug.

10.3 Publications

Directives

01.03.2022	WACC production
08.03.2022	Annual financial statements for grids
07.06.2022	60-franc rule
20.09.2022	Cost accounting: submission and subsequent adjustment
03.10.2022	Benchmarks for establishing a hydropower reserve in the 2022/2023 hydrological year

Notifications

24.01.2022	Consultation on parliamentary initiative 16.498 'Placing strategic energy industry infrastructures under the Lex Koller'
25.01.2022	Revision of Spatial Planning Act, ElCom consultation
08.04.2022	Revision of Energy Act, ElCom consultation
03.05.2022	Revision EnO and ESO, ElCom consultation
22.08.2022	ElCom consultation on the Federal Act on the Examination of Foreign Investments
23.08.2022	Hydropower reserve factsheet
26.08.2022	Participation of basic supply customers in production facilities – distribution system operator models
06.09.2022	FAQ Rising energy tariffs for households 2023
28.09.2022	Recoverability of cyber security costs
18.11.2022	ElCom consultation on the Ordinance Establishing a Winter Reserve
01.12.2022	Explanatory note on the initiation of proceedings in connection with shortfalls
15.12.2022	ElCom consultation on changes to ordinances under SFOE authority, entering into force in mid-2023

Reports and studies

01.02.2022	Study on the security of electricity supply in Switzerland, 2025 (frontier study)
03.02.2022	Cross-border capacities in trading: developments 2018–2021
20.05.2022	Market Transparency 2021 – report by ElCom
25.05.2022	Trading volumes and price volatility on the day-ahead and intraday electricity markets with delivery to Switzerland, Germany and France
02.06.2022	Electricity supply quality 2021
02.06.2022	Report on the activities of ElCom 2021
01.09.2022	Report on balancing capacity and balancing energy 2021
25.11.2022	Findings of the ElCom and SECO survey of energy companies

10.4 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.
CBCA	Cross Border Cost Allocation
CEER	Council of European Energy Regulators
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)
CRF	Cost-covering remuneration for feed-in to the electricity grid
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
ECC	European Commodity Clearing is a clearing house specialising in energy and commodity contracts

EDES	ElCom data delivery system EDES
EEX	European Energy Exchange
EGP	Energy generation plant
ElCom	Swiss Federal Electricity Commission
End users	Customers who buy electricity for their own consumption. This does not include power plants that buy electricity for their own consumption or to power pumps at pump storage power plants
EnO	Energy Ordinance
ENTSO-E	European Network of Transmission System Operators for Electricity
EPEX / EPEX Spot	European Power Exchange
ESA	Electricity Supply Act
ESMA	European Securities and Markets Authority
ESO	Electricity Supply Ordinance
ESTI	Swiss Federal Inspectorate for Heavy Current Installations
EU	European Union
European Green Deal	EU growth strategy for a sustainable economy
FCR	Frequency controlled normal operation reserve
FINMA	Swiss Financial Market Supervisory Authority
FiRECA	Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry
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
IN	Imbalance Netting
kVA	Kilovolt ampere
kWh	Kilowatt hour
kWp	Kilowatt peak
LV	Low voltage
Margin calls	A margin call is a request for additional surety. It refers specifically to the requirement for an investor to deposit additional funds in their account so that the value of that account increases to a set minimum amount. A margin call is generally an indicator that the trading contracts held in the margin account have lost value (the investor is a net seller and prices have risen, or they are a net purchaser and prices have fallen)
Median	Value in the middle of a data series arranged by size, i.e. half of all the observations are less than or greater than the median value (unlike mean value, 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
PGV	Plangenehmigungsverfahren (planning approval procedure)
PPA	A contract between two parties, one of which generates electricity (the seller), and the other of which wishes to purchase it (the buyer). The PPA stipulates all of the business terms and conditions for the sale of electricity between the two parties, including the point in time at which the project will begin to operate commercially, the schedule of electricity deliveries, contractual penalties in the event of failure to deliver, payment terms, and termination
PV	Photovoltaic
PVA	Photovoltaic system
Refinitiv	One of the world's largest providers of financial market data and infrastructure
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

SIX	The company that provides the infrastructure for the Swiss financial marketplace and operates SIX Swiss Exchange
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).
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
UREK	Commissions for the Environment, Spatial Planning and Energy
VSE	Association of Swiss Electricity Companies
WACC	Weighted Average Cost of Capital
ZEV	Zusammenschluss zum Eigenverbrauch (merger for own consumption)

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