# Report on the activities of ElCom 2023

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# Imprint

# 1 Foreword by the President

**Werner Luginbühl**
President of ElCom

## Security of supply

After the energy crisis and fears over shortages last year, the supply situation has eased and the markets settled down considerably in 2023. Higher availability of French nuclear power plants, high fill levels of gas storage facilities, the expansion of liquefied gas import capacity and renewable energies in addition to lower demand for electricity and gas in Europe have all contributed to an improved situation.

In Switzerland, the winter reserve – thanks to the hydropower reserve and the thermal power plants – improved the resilience of supply short-term. Does this mean the crisis is over? Can we now focus on day-to-day business again?

No, we are not completely out of the woods just yet. We still face unpredictable factors in the short term, such as geopolitical tensions and their impact on the global market for liquefied natural gas (LNG). In combination with sustained and extremely low temperatures, the situation could deteriorate again.

Gas will remain a key factor in European security of electricity supply and price-setting on the electricity market in the foreseeable future. Gas-fired power plants make up the backbone of security of supply. While their hours of operation may decrease with the ongoing expansion of renewable energies, they still play a vital role in flexibly meeting demand peaks as well as during periods of less wind and sun. The predicted increase in European LNG import capacity and anticipated growth in global LNG export capacity from the mid-2020s will help to further stabilise the supply situation.

Switzerland clearly stands to benefit from this development as cross-border electricity trading currently contributes significantly to security of supply and looks set to continue to do so in future. However, action is still needed: While demand for electricity will increase substantially over the coming years due to decarbonisation, there is great uncertainty over the extent and speed at which the expansion of renewable energies in Switzerland will take place.

To ensure a minimum degree of resilience and to keep imports at a reasonable level, Switzerland has to increase its production capacity during the winter half of the year significantly and rapidly. This must primarily be achieved through expansion of renewable energies at a much faster pace. The omnibus legislation and accelerated authorisation procedure for solar and wind power plants lay the foundation for reaching this goal. This must be followed up with effective legislation on accelerated procedures for production facilities and networks.

ElCom updated its analysis on medium and long-term security of supply during the year under review. The analysis on security of supply for

2025 was recalculated with adjusted scenarios and the calculations on winter production capacity up to 2035 were updated with new forecasts on the lifespan of nuclear power plants, demand for electricity and the expansion of renewable energies. On this basis, ElCom recommends – in addition to the expansion of renewable energies – the use of gas-fired power plants (which can also be run on oil as an alternative) to provide a safety net over the medium term. In view of the high level of uncertainty, a gradual approach and continual re-evaluation of development is advisable so that the increase in reserves can be adjusted if necessary.

Gas-fired power plants are clearly not ideal from a climate policy perspective, but they are necessary and represent an appropriate solution in view of the high degree of uncertainty. On the one hand, they can be constructed reasonably quickly at relatively low investment costs, and, on the other, they would only be deployed as a back-up in the event of critical supply situations, minimising their use and emissions generated. A subsequent, gradual conversion to hydropower operation is also conceivable. Today, Switzerland's reserve power plants are actually located abroad. They are often fired by coal or gas and it is uncertain what they would actually contribute to the stability of the Swiss grid and system in the event of a critical supply situation. This means it would be more effective – and honest – to use reserve power plants located in Switzerland to improve security of supply.

**Market Surveillance**

Swiss wholesale electricity prices also reverted to their usual structure in relation to Switzerland's neighbouring countries on the futures market in 2023, even though prices are still higher than before the energy crisis. For the full year, Switzerland lies between high-priced Italy and the low-priced countries of France and Germany.

ElCom also carried out liquidity monitoring of systemically critical electricity companies in accordance with the Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (FiRECA) for the first time this year. The development of short-term liquidity is monitored based on the liquidity data submitted by the companies and the stress tests performed, with particular emphasis on the current market environment compared with August 2022.

In this regard, the Federal Council adopted the dispatch on the Federal Act on Supervision and Transparency in the Wholesale Energy Markets (GATE) at the end of the year. The new legislation contains provisions prohibiting insider trading and market manipulation. It aims to improve transparency, strengthen supervision and establish trust in the integrity of these markets.

**Pricing and Tariffs**

Despite falling market prices, consumers saw a further increase in tariffs for the 2024 tariff period. There are various reasons for this. Firstly, basic supply tariffs are fixed for a year, which means the effect of positive market developments is delayed. Secondly, network usage remuneration has gone up for the 2024 tariffs – on the one hand due to DETEC's decision to increase the interest rate for operating assets from 3.83 to 4.13 per cent, and, on the other, due to the winter reserve. ElCom has expressed various criticism of the method used and the level of this interest rate (WACC) and reaffirms these views in this report on its activities. The fact that the production and sales of electricity in Switzerland are diverging is also having a major impact on energy tariffs. Many energy providers generate little or no electricity themselves and have to purchase it for their customers on the wholesale markets. The term of procurement

or time of procurement and the prices applicable at this point also have an effect on current electricity tariffs for consumers.

By enabling preference to be given to electricity from Swiss renewable energy sources, in accordance with Art. 6 para. 5$^{bis}$ Electricity Supply Act (ESA), in basic supply provision at cost price, lawmakers have provided the industry with a tool, during times of low market prices, for offsetting the low profitability of production at the expense of basic supply customers. The same instrument can now be used to mitigate the impact of high wholesale prices on end users' tariffs. Some companies have actually used this option. Others have turned the tables and relinquished the opportunity for prioritisation, instead generating higher profits by applying market prices. However, any resultant tariff increases must at least be made transparent. Unfortunately, the opportunity to redress the situation long-term has been missed in the new regulations under the omnibus legislation.

Once again this year ElCom received numerous enquiries from citizens about tariffs and responding to them tied up a significant share of the Technical Secretariat's resources. There were a considerable number of complaints from customers who felt they had not been provided with sufficient information by their energy providers. At this point it is important to note that the provision of information for consumers about tariffs, pricing elements, reasons for price increases, questions about general terms and conditions of business and similar matters is unequivocally a matter for the provider. It must also be clearly pointed out that ElCom does not approve tariffs in advance, but instead assesses the legal validity of tariffs and their cost basis if requested to do so, or in an ex-officio capacity, and has no authority to reduce tariffs if they comply with the law.

For the 2024 tariffs, ElCom reduced the maximum limit for profits which network operators can include in energy sales from CHF 75 per invoice recipient to CHF 60. This may already have had a positive impact on the 2024 tariffs. Through a broad-based campaign on coverage differentials, it also reduced the risk of future tariff increases due to contaminated sites in relation to coverage differentials by over CHF 1 billion.

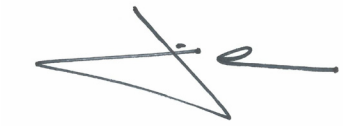
**Legal proceedings**

In the year under review, ElCom decided that a smart meter with a circuit breaker was classified as a smart control system and that its use required consent because it enabled the electricity supply to be interrupted remotely. For reasons of proportionality, in the case of a consumer who rejected the measuring system, ElCom did not instruct the provider to replace the system, but instead prohibited the use of the circuit breaker without consent for purposes other than risks to safe network operation. ElCom also decided that the processing of the measurement data by the network operator was generally carried out on a sufficiently valid legal basis and was proportionate. It ruled that modifications had to be implemented in a few cases of data processing.

As part of a decision, ElCom also had to rule for the first time on whether the costs for a new machine transformer with an on-load tap changer had to be met by the power plant operator or Swissgrid. It decided that the additional costs incurred for the on-load tap changer were not transmission network nor system services costs, which meant they had to be met by the power plant operator.

Other decisions concerned the recoverable costs of the winter reserve, priority on the transmission network in the case of sup-

plies from power plants in border regions, the question of whether the supply of major consumers should be provided under basic supply or on the market, the party rights of a community for self-consumption, the average price method, the supplementary declaration of capital costs, the use of auction proceeds and requests by third parties to inspect records in network capacity increase procedures and the non-disclosure of the identity of these third parties. Finally, in the year under review ElCom dealt with various enquiries from the media and the public requesting the inspection of official documents.



**Werner Luginbühl**
President of ElCom

# 2 Interview with the Director

**After a turbulent year in 2022, the electricity market calmed down noticeably in 2023, and the risk of a shortage was no longer as much of a focus of public interest. The crisis led to some changes in ElCom's supervisory work.**

***The markets have settled down and security of electricity supply has now been secured. Can ElCom now focus on day-to-day business again?***
ElCom continued performing its supervisory role during the crisis. Day-to-day activities went on, albeit with a reduced level of resources and different priorities. As a result of the measures implemented to address the crisis, ElCom was also given new tasks which still have to be performed now, even though the markets have settled down. They include the tender procedure for the hydropower reserve and the inspection of systemically critical companies that come under the federal government's financial backstop. The monitoring of security of supply and market developments was also stepped up. In a sense, we're back to 'business as usual', but this is now more broadly defined.

***In the end, there was no shortage of electricity during the crisis. However, the surcharges on the market were extreme, and there were some considerable surcharges for basic supply too. Has ElCom looked at whether they were justified?***
Yes, ElCom is looking at these price and tariff developments. Firstly, we are specifically analysing market price developments in summer 2022 when trading briefly exceeded EUR 1,000 per megawatt hour on the power exchange for baseload for the year ahead of 2023. By comparison, the price for the year ahead for 2025 stood at around EUR 95 per megawatt hour in early 2024. This kind of analysis is time-consuming and complex as large amounts of trading data have to be evaluated. The interpretation of developments is also very challenging, especially as there are no such extreme events to compare with. Secondly, we began preliminary investigations on around 100 network operators with exceptionally high surcharges. We also asked network operators with very high procurement costs questions about their procurement strategy and procurement management. We are still evaluating the data and responses. From both an economic and legal perspective, it is extremely difficult to determine whether the strategies and processes actually applied are compatible with the appropriateness of tariffs required very generally under the law.

***In addition to the omnibus legislation, a whole host of new laws are currently being discussed which are a result of the crisis to some extent. What major factors will influence ElCom's future tasks?***
First of all, the implementation of the omnibus legislation is of major importance for ElCom. This is set to begin in early 2025. The new regulations on basic supply provided for by lawmakers represent a major challenge. The more detailed provisions on product quality and the nature of energy procurement make supervising the tariffs of around 600 network operators a more complex and time-consuming task for ElCom. Additional draft bills are being discussed in Parliament which are likely to result in new tasks being assigned to ElCom too. These include the Gas Supply Act, which represents a key element of effective (partial) deregulation of the market, the Federal Act on Supervision and Transparency in the Wholesale Energy Markets (GATE) and an act on the annulment of subsidiary financial aid (FiRECA).

***Can the financial backstop actually be removed? Doesn't experience in the banking sector show that systemically critical companies still benefit from an implicit state guarantee?***
Ultimately, there is a risk that systemically critical companies would still be bailed out by the state in an extreme situation.

**Urs Meister**
Director of ElCom

« The companies must be made to bear greater responsibility. »

This state guarantee was effectively made explicit under FiRECA. It also comes at a cost for the companies concerned – which is appropriate from a regulatory perspective – especially as they benefit financially from this guarantee. FiRECA only applies until the end of 2026, which means a follow-up solution is needed. If this state guarantee is abolished, then the companies and their owners must be made to bear greater responsibility to minimise the likelihood of financial rescue by federal government using taxpayers' money.

***Which instruments can be used to make the companies and the owners assume greater responsibility?***
Provisions on liquidity and equity capital are being discussed. While they may improve the resilience of companies, they don't exclude the possibility of companies facing illiquidity or going into bankruptcy, nor do they guarantee that electricity operations and sales will definitely continue and contribute to the stabilisation of the system. In ElCom's view, supplementary instruments are needed to ensure business continuity management. Experience from the crisis shows that sufficient liquidity – particularly for the marketing of electricity on organised exchanges – is a key factor. ElCom has proposed a fund solution. The law could require companies to set up a fund providing liquidity for systemically critical companies in the event of a crisis situation. This would reduce the likelihood of state intervention and make the companies and their owners primarily responsible – they would effectively have to provide their own safety net.

# 3 Security of supply

*With its energy production of 110 GWh, the Hagneck hydropower plant makes an important contribution to the electricity supply in the Seeland region.*

## 3.1 Introduction

Under the Electricity Supply Act (ESA, Art. 22 paras 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.

As in the previous year, security of supply during the reporting year was negatively impacted by Russia's war of aggression against Ukraine and the record-low availability at French nuclear power stations in the winter of 2022/2023, resulting in high price levels and peaks on the European and Swiss electricity markets. Compared to the extremely tense situation in the previous year, the situation eased significantly over the course of 2023 although it remained under pressure.The tense market and supply situation meant ElCom monitored supply developments closely with the involvement of other federal authorities and Swissgrid, also within the Supply Security working group.

## 3.2 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 are presented in the following sections:

### 3.2.1 Review of winter 2022/2023

The political tension triggered by Russia's invasion of Ukraine caused great turmoil on the (European) energy markets in 2022. The sanction-related cuts to gas and oil imports from Russia resulted in considerable surcharges on the energy markets, both in the oil and gas sectors as well as on the electricity markets. In response to this situation, measures were taken throughout Europe – including in Switzerland – to secure energy supply, particularly for winter 2022/2023. The measures implemented to mitigate the impact of the energy crisis are outlined below. The list focuses on measures in which ElCom was involved either directly or indirectly.

#### Supply-side measures

*Hydropower reserve*

The Ordinance on the Establishment of a Winter Electricity Reserve (WResO) came into force on 1 October 2022.[1] Based on Articles 9 and 30 ESA in conjunction with Articles 5 and 38 of the National Economic Supply Act (NESA), it was decided to set up a hydropower reserve for the winter of 2022/2023. The operators of reservoirs were to be paid to store energy, to be called up when needed. The size of the hydropower reserve would be sufficient to cover any extraordinary, unforeseeable critical shortage situations. This was to bridge a period with less import opportunities and lower availability of domestic production for a few weeks towards the end of winter. Energy of around 500 GWh plus/minus 166 GWh was to be procured and made available during the period from 1 December 2022 to 15 May 2023. In total, 400 gigawatt hours (GWh) were procured. The hydropower reserve was not required as the situation eased over the course of the winter and was dissolved in May 2023.

*1 This ordinance came into force again on 15 February 2023 as a result of a revision.*

*Reserve power plants*

On 24 September 2022 the Ordinance on the Provision of a Temporary Reserve Power Plant in Birr came into force. This provided for the acquisition of a reserve power plant to provide an additional back-up solution in the event of extraordinary shortages. In August 2022, the Federal Council adopted an ordinance to bring forward the procurement of this plant so that it would be available by the end of winter 2022/2023. This ordinance governed the operation of reserve power plants and emergency generators until 31 May 2023. In September 2022, the first contract was signed with GE Gas Power for a temporary reserve power plant in Birr. In December that year, the Confederation signed a contract for the existing Cornaux 1 thermal power plant in Cornaux (NE) and in February 2023 for the Thermatel natural gas-fired combined cycle power plant operated by Compagnie industrielle de Monthey SA in Monthey. These three reserve power plants had a total capacity of 326 MW.[1]

*1 Retrofitting measures enabled total output to be increased to 336 MW.*

*Pooled emergency power groups*

In 2023, on behalf of the federal government, three companies, acting as aggregators, provided the national, virtual reserve power plant made up of emergency generators and with capacity of over 135 megawatt (as at December 2023). The aggregators are certified by Swissgrid and combine the emergency generators. This energy reserve can be accessed by Swissgrid by means of remote control. Owners of emergency generators with output of at least 750 kW (standard, technical requirements) interested in participation can register with one of the aggregators. The aggregators then deal with all subsequent steps, including contractual details. A standard contract is available for this purpose. ElCom supported this process in an advisory capacity.

*Reduction in residual water levels*

The Ordinance on the Temporary Increase in Electricity Production at Hydropower Plants entered into force on 1 October 2022. This provided for a temporary increase in electricity production at hydropower plants and enabled certain hydropower plants to use more water for power production for a five-month period because they could reduce residual water levels. This emergency ordinance was revoked prematurely in March 2023. 100 GWh of additional production was initially estimated. However, an analysis carried out by the Federal Office for the Environment (FOEN) concluded that this measure could only provide 26 GWh of additional energy. On 30 November 2023, the FOEN publish a report on its analysis.[1]

*1 See in german: "Auswirkungen der Verordnung über die befristete Erhöhung der Stromproduktion bei Wasserkraftwerken" (FOEN publication)*

**Demand-side measures**

*Appeals to save energy*

On 24 August 2022, the Federal Council adopted a voluntary savings target of 15 per cent for gas for the winter half of the year (1 October 2022 to 31 March 2023). This was part of the Federal Office for National Economic Supply's (FONES) measures and initially aimed to avoid intervention measures. The aim was to cut energy consumption through savings (e.g. by reducing heating temperature). While consumption fell compared with 2021, the saving target of 10 per cent was not achieved for electricity. However, no intervention measures were introduced thanks to the mild winter. The EU member states set themselves the target of collectively consuming 15 per cent less gas between August 2022 and March 2023; this target was reached.

*Energy-saving campaign*

At the end of August 2022, the federal government launched an energy saving campaign designed in cooperation with the industry. This campaign provides the public and businesses with simple ideas on how they can use electricity and gas more efficiently and economically. A website (https://www.nicht-verschwenden.ch/de/startseite/) with monitoring tools was created as part of this campaign. This explained the situation to consumers and outlined the measures for energy saving on an individual basis. It is not possible to assess and determine

the success of this campaign. However, the campaign's main goal is communication with the public to provide a better understanding of development and general measures.

*Demand-side reserve*

The WResO also stipulated that the creation of a consumption reserve should be assessed and incorporated into the ordinance in 2023 if appropriate. DETEC – in collaboration with the Federal Department of Economic Affairs, Education and Research (EAER) – evaluated a project proposal. However, the idea of obliging major consumers to make targeted savings in return for remuneration was not imposed by government regulations due to the complexity involved and potential deadweight effects. Major consumers on the market generally already have the option of cutting their usage short-term by restricting economic output, for example by returning already procured electricity to the market short-term (e.g. day ahead). During periods of shortage and extremely high electricity market prices, this can result in financial compensation for their own production loss. For this reason, subsidiary, private sector approaches should be assessed as an alternative to a consumption reserve imposed by government regulations.

**Other measures**

*Preparations for a possible gas or electricity shortage*

The FONES is responsible for the preparatory measures that will ensure the country has the economic supplies it needs in the event of an imminent severe shortage. It supervises compulsory stockpiling and coordinates cooperation with the federal authorities, the Armed Forces and the civil protection service. Close coordination with ElCom took place in the Supply Security working group. The Federal Council has completed the formulation of various ordinances for demand-side measures to address an electricity shortage situation and submitted them for consultation (restriction and prohibition of consumption, immediate quotas, a quota system and network shutdown). However, supply-side measures were also partly prepared. They have not yet been published:

- Ordinance on Restrictions on the Export of Electricity
- Ordinance on the Control of Electricity Supply

*Early procurement of system services*

Swissgrid was encouraged to extend the procurement of system services over a longer period of time to reduce price risks and to improve planning certainty for power plant operators. This proposal has been implemented and the process established.

*Coordination between industry and the authorities*

Various exchange platforms were set up to improve coordination between all parties concerned and to provide information flows.

*Increase in operating voltage on strategic lines*
The Ordinance on Increasing the Operating Voltage on the Electrical Transmission Network also entered into force on 1 October 2022. In order to cope with shortages on the transmission network, it was decided to temporarily increase the voltage from 220 kV to 380 kV on the two major power lines Bickingen-Chippis (Gemmi line) and Bassecourt-Mühleberg on the basis of the National Economic Supply Act (NESA). The increase in transmission capacity towards Valais, where large storage power plants such as Nant de Drance are connected, strengthens the security of supply, increases operational flexibility in grid control, reduces grid losses and increases import capacities.

**Costs and benefits of the measures implemented**
The implementation of the supply-side measures resulted in significant costs for electricity consumers. The costs for the thermal reserve power plants and the hydropower reserve are particularly relevant. Investment costs of around CHF 500 million were incurred for the thermal reserve power plants with total production output of 336 MW. The distribution of the investment costs to the individual plants is set out below:

| Power station | Investment costs | Power | Costs / kW |
|---|---|---|---|
| Birr | CHF 470 million | 250 MW | CHF 1 880 |
| Monthey | CHF 21.5 million | 50 MW | CHF 430 |
| Cornaux | CHF 9.15 million | 36 MW | CHF 254 |

*Table 1: Fixed costs of the thermal reserve power plants*

In addition to investment costs, there are also additional ongoing costs involved in the operational readiness and maintenance of the thermal power plants. However, as they are only back-up plants, which do not normally produce any electricity or use any fuel, these operating costs are limited. The second highest cost item is expenditure on the 400 GWh hydropower reserve. This was procured as part of a tender procedure amongst the operators of existing storage facilities. These procurement costs totalled EUR 296 million for the 2022/2023 winter of the supply crisis. The cost of the thermal plants was so high due to the extremely rapid procurement and implementation process during the crisis period. This applies in particular to the plants in Birr, which had to be completely newly procured or constructed, while implementation was based on existing plants in Monthey and Cornaux, which also means the costs per kilowatt of power were well below those of Birr (see Table 1). The extraordinary situation meant comparison by benchmarking against the costs of alternative projects could not be carried out. Reserve planning with longer

preparation time would clearly have reduced costs significantly. In its peak load gas-fired power plant concept in 2021, ElCom estimated costs of around CHF 690 million for 1,000 MW of installed reserve capacity.

No new hydropower capacity was created with the costs for the hydropower reserve. The EUR 296 million only represent compensation for loss of revenue (opportunity costs) for the power plant operators as a result of retaining water and, in turn, energy in their plants. By participating in the hydropower reserve scheme, they undertake to retain a minimum level of water in the plants during the winter – when prices are relatively high – and not to sell the capacity on the market. This ensures the storage facilities maintain a minimum fill level, which is available in the event of an unforeseeable critical situation, until the end of winter. If the reserve is not used during the winter months, then the water is available to the operators in spring to be sold without restriction. The residual value of this water is then determined based on the (lower) market prices in spring. However, if the reserve is used beforehand in the event of shortage, then the power plant operators receive compensation for this energy in the same way based on the subsequent market value in spring. If competition works in the tender procedure for the reserve, the storage facility operators will offer the provision of the reserve volumes at a price that reflects their estimated opportunity costs – in other words, the anticipated loss of revenue due to the later marketing of the storage volumes in spring instead of during the winter months when more attractive prices can be achieved.

The amount of compensation for the storage facility operators can be seen as appropriate if it reflects the anticipated opportunity costs for the marketing of the storage volume at the time of the tender procedure – and therefore the difference in the value of the storage volume between winter and spring. It is important to note that flexible storage facilities can usually be used specifically during the hours with the highest potential prices. However, the storage facility operators can still achieve the most attractive prices during the winter months with their remaining marketable storage capacity – this means the opportunity costs of the reserve storage capacity are not based on the top prices in winter.

To avoid paying inappropriately high compensation to the storage facility operators, ElCom carried out its own calculations on the value of the reserve storage capacity procured in parallel with the tender procedure. In addition, it also had calculations carried out by the consultancy firm SwissEconomics in cooperation with the Swiss Federal Institute of Technology Zurich (ETH). Based on this analysis, ElCom decided to limit the procurement of the reserve capacity to 400 GWh instead of the 500 GWh originally planned. This meant the procured volume was within the parameters determined beforehand which estimated 500 GWh with an allowance of +/- 166 GWh. The analysis carried out in parallel with the tender procedure indicated that the total cost for provision of the reserve amounting to EUR 296 million was explained by the tight situation on the market at the time when the tender procedure was held and the related extraordinary price expectations on the electricity market. In contrast, the total costs and, in turn, the financial burden on electricity consumers would have risen extremely sharply for a higher reserve capacity due to the bid structure and could not have been explained by price expectations or anticipated opportunity costs.

The compensation for the storage provision would not have been deemed efficient if it had created deadweight effects. These effects would have become apparent if the provision of residual storage at the end of the winter could have been achieved without the reserve mechanism and a separate tender procedure and compensation. This could happen, for example, because it may be advisable for market participants to retain their own reserves on a similar scale until the end of winter to cover financial risks. However, the development of the storage curve in winter 2022/2023 does not indicate any deadweight effect. The storage fill level stood at around 2,519 GWh at the end of April 2023 (as at 24 April 2023 according to the Swiss Federal Office of Energy's (SFOE) weekly report), which is more than 1,300 GWh above the long-term median value for the end of April of around 1,200 GWh (analysis of the development of the storage reserves in Switzerland, Swissgrid).

ElCom expressly supported the Federal Council on the decision to procure this reserve to improve Switzerland's security of supply. However, the weakness of this instrument is its lack of additivity. The hydropower reserve is simply a reserve capacity outside of the electricity market which cannot provide any additional energy overall – in fact the opposite is true as it takes energy from the market. The added value provided by the hydropower reserve is that it prevents storage facility operators from aggressively emptying their storage capacity when prices are very high in early winter so that the storage facilities are largely empty by late winter in the event of an unexpected critical supply situation (long, cold winter), thereby creating a shortage of supply.

The measures concerning the thermal and hydropower reserves aimed to directly secure energy supply and prevent an electricity shortage situation and to extend Switzerland's own supply capability in the event of (unforeseeable) critical supply situations. ElCom published two reports on 28 July 2023 on Switzerland's own supply capability.[1] In view of the high degree of importance of storage power plants, the number of days of self-supply capacity at the end of winter can be used as a reliable indicator for supply resilience in Switzerland. Depending on the situation (lower level or complete lack of imports, power plant outages in Switzerland), the combination of the thermal and hydropower reserves can extend self-supply capacity by several days, or even weeks, having a significant impact on Switzerland's security of supply.

The cost of the winter reserve has to be weighed against actual benefits. The benefits of a reserve are essentially measured in terms of the prevention of power outage and the consequent economic costs. These potential costs are of course difficult to calculate as the probability of a power outage without reserves has to be calculated, on the one hand, and the costs incurred in the event of a power outage have to be estimated, on the other. The winter reserve ultimately represents an insurance policy, aiming to prevent costs to society as a whole in the event of power shortage or outage. In 2017, the federal government estimated the cost of a day of supply outage in Switzerland at CHF 2 billion.[2] The costs of a shortage situation – in the broadest sense, the cost of unmet demand for electricity – are also significant. The cost of partial power outages or of 'unsupplied electricity' are expressed as the value of lost load in science. Studies also show that these costs can be extremely high for industrial and service-based economies and generally bear no relationship to possible

protective measures (the outage of 1KWh costs companies EUR 17 and industry EUR 113 on average in Europe).[3] Considering the importance of power supply to the entire economy, the costs can be seen as appropriate to secure Switzerland's short and medium-term security of supply.[4]

The market situation was extremely tight when the decision was taken to procure the hydropower reserve and to establish the thermal reserves. The extent to which Russia's war of aggression on Ukraine and the sanctions imposed would impact energy supply in winter 2022/2023 were not foreseeable in summer 2022.[5] As Switzerland is dependent on imports in winter and the market situation was extremely tight throughout Europe, measures to secure production had to be undertaken to overcome this critical period. The main reason fears of shortages did not materialise was the weather: there was a high level of rainfall in autumn and winter was unusually mild. Gas supply in Europe was then secured more quickly than anticipated and consumption fell significantly – this was not evident before the start of winter and the situation could have led to major problems with electricity generation and imports.

*1 See report "Aktualisierung der Berechnung zur Sicherstellung der Versorgungssicherheit 2025" and "Winterproduktionsfähigkeit - Einschätzungen der ElCom bis 2035", available under www.elcom.admin.ch > Dokumentation > Berichte und Studien > Versorgungssicherheit und Internationales (in german)*

*2 "Blackout-Kosten: 2 Milliarden Franken pro Tag" | Handelszeitung, Michael Heim (in german)*

*3 CEPA study on the Value of Lost Load in the electricity supply in europe | ACER*

*4 ElCom has previously communicated that ensuring security of supply is a top priority and additional investment is required to achieve this over the medium and long-term (see report "Konzept Spitzenlast-Gaskraftwerk der ElCom vom 30. November 2021" (Peak load, gas-fired power plant concept of ElCom of 30 November 2021), which can be viewed under Documentation -> Report and studies).*

*5 The opportunity to import power was also limited by unexpected outages of French nuclear power plants.*

### 3.2.2 Incidents in the course of the year

As in the previous year, the ElCom-led Supply Security working group met continually throughout the summer to closely monitor the tense electricity supply situation and its evolution, which was also still being reflected in prices.

The situation with gas supplies remained a major driver here, but gas storage volumes were increased according to plan to reach and even exceed their target levels. This – in addition to considerable improvements across LNG supply chains – made a significant contribution to easing the situation.

Alongside gas supplies, reduced generation capacity at French nuclear power stations owing to problems with stress corrosion was still a major factor. The search for solutions continued in 2023. However, operational capability normalised in the second half of the year and led to normal or even increased availability of French nuclear power stations again from September 2023. Persistently high summer temperatures can also affect operations at Swiss nuclear power stations, which may have to reduce or halt production to avoid high river water temperatures. ElCom constantly monitored the situation during the summer months for the Beznau nuclear power plant. However, favourable weather patterns meant production only had to be restricted on a few days due to temperatures.

A variety of measures were adopted during the year under review to shore up energy supplies for the winter. These include the hydropower reserve (see Section 3.3.1 Hydropower reserve) and the additional reserves (see Sec-

tion 3.3.2 Additional reserves), whose total output (thermal reserve power plants and emergency power plants) came to around 500 MW at the end of the year. In addition, preparations for a temporary voltage increase from 220 to 380 kV for winter 2023/24 were finalised in the transmission network to support the security of supply. Tests of the general increase in voltage on the Bickingen–Chippis and Bassecourt–Mühleberg lines were carried out in January and February 2023. These measures are therefore fully operational.

To estimate requirements for the tender procedure for replacement plants in the supplementary reserves, in addition to ElCom's[1] own estimates for DETEC, the adequacy study on security of supply in 2025 was updated by Swissgrid with support from ElCom.[2]

*1 See report "Winterproduktionsfähigkeit - Einschätzungen der ElCom bis 2035", available in german under www.elcom.admin.ch > Dokumentation > Berichte und Studien > Versorgungssicherheit und Internationales)*

*2 See report "Aktualisierung der Berechnung zur Sicherstellung der Versorgungssicherheit 2025", available in german under www.elcom.admin.ch > Dokumentation > Berichte und Studien > Versorgungssicherheit und Internationales)*

## 3.3 Winter reserve

In order to prevent a winter electricity shortage, the Federal Council already initiated the construction of a reserve power plant in Birr (AG), the provision of further reserve power plants (Cornaux and Monthey) and emergency generators as additional reserves for the winter of 2022/2023. The opportunity to procure a hydropower reserve was also created. This measure was not relinquished for winter 2023/2024 either. ElCom had provided for the use of the reserves with Directive 5/2023 'Abrufordnung der Kraftwerke der Winterreserve 2023/2024' (Order on access of the power plants for the winter reserve 2023/2024) of 10 November 2023.

### 3.3.1 Hydropower reserve

For winter 2023/2024, ElCom approved the procurement of a hydropower reserve of 400 GWh ± 133 GWh for the period from 1 February 2024 to 13 May 2024 with the Directive 3/2023 'Eckwerte für die Errichtung einer Wasserkraftreserve im hydrologischen Jahr 2023/2024' (Key figures for the establishment of a hydropower reserve in the hydrological year 2023/2024). The procurement took place in staggered partial tender procedures over the period from May 2023 to September 2023. The first round of the tender procedure was completed on 25 May 2023. In the first partial tender procedure, bids for a capacity of 165 gigawatt hours (GWh) were accepted. The cost of the first round came in at EUR 27 million. The second round of the tender procedure for the hydropower reserve for winter 2023/2024 was concluded on 6 July 2023. In the second partial tender procedure of 5 July 2023, bids for a capacity of 152 gigawatt hours (GWh) were accepted. The cost of this second round amounted to EUR 23 million. In the third and final round of the tender procedure for the hydropower reserve on 13 September 2023, bids for a capacity of 83 gigawatt hours (GWh) were accepted. The cost of this third round was EUR 5.5 million. Together with the two previous tender procedures, the capacity procured amounted to 400 GWh at a total cost of EUR 55.5 million.

### 3.3.2 Additional reserves

The three reserve power plants have a total capacity of 326 MW, which is available for winter 2023/2024. ElCom played a leading role in supporting the relevant testing. Over the course of 2023, contracts were also concluded with aggregated emergency generators with a capacity of 164 MW (as at January 2024) which are also available for use in emergency situations in accordance with the order governing access.

## 3.4 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, 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 of Swissgrid and ElCom over many years 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 net transfer capacity (NTC) method. Historically, cross-border net transfer capacity had only been optimised jointly in this region in the import direction to Italy. Since the end of 2023, the export direction (i.e. in the direction IT>CH) is also being optimised in the intraday time period. The optimisation for the day-ahead time period is to be implemented during the first quarter 2024. This will provide additional security for grid operations.

Swissgrid and ElCom also continued their efforts aimed at achieving a cooperative solution on Switzerland's northern borders with the 'Core' capacity calculation region. Significant progress was made at technical level in 2023, but the validation of the solution by all 'Core' regulators still has not been concluded and remains uncertain until completion. If the validation procedure is completed on schedule in spring 2024, the solution will be implemented at the end of 2025 at the earliest. 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 expla-

nations on the 70 per cent minRAM in Section 7.1 Congestion management).

The EU also plans to extend flow-based market coupling to Italy over the medium term. This was driven forward by the Agency for the Cooperation of Energy Regulators (ACER) in 2023 and the first steps for the merger of the 'Italy North' and 'Core' regions into a 'Central CCR' were undertaken. ACER's formal decision is expected in March 2024. The merger will initially be limited to the capacity calculation method for the day-ahead time horizon. Balanced mutual inclusion in the capacity calculations between Switzerland and its EU neighbour is now even more important to network stability in the region in view of the merger. 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 reserve power supply, 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.

## 3.5 Cybersecurity

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 the availability[1], integrity[2] or confidentiality[3] of data 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. Cybersecurity is therefore a key issue in ensuring security of supply.

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 also includes IT risks, which means ElCom also pays the due level of attention to the status of network operators' cybersecurity.

Cybersecurity 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 the FOCP's Critical Infrastructure Protection (CIP) guidelines. In the year under review, the SFOE continued its work on cybersecurity requirements in the ESA. With Parliament's adoption of the revised Information Security Act (ISA), an article was included in the ESA that obliges

network operators, generators and storage operators to protect themselves adequately against cyber threats. This legislative article will be defined more precisely by an article in the Electricity Supply Ordinance (ESO). A binding minimum standard is a key aspect. The consultation procedure on this article was initiated at the end of 2023. The new regulatory provisions are set to enter into force in mid-2024. ElCom has held discussions with the SFOE and in the ASEC working group as well as with the relevant stakeholders regarding the concrete implementation of supervision of the new legal requirements. These talks improved the mutual understanding of future regulation on cybersecurity and also helped to define ElCom's new supervisory strategy more clearly. ElCom refined this supervisory strategy during the reporting year and started the first steps of implementation. In collaboration with the National Cyber Security Centre (NCSC), a questionnaire for structured awareness-raising discussions was drawn up and the first companies for implementation were identified. Risk-based supervision and thus also the key questions for awareness-raising discussions focus on improving physical cybersecurity. When implementing the new regulations and supervision, compatibility with the EU's new Network Code on Cybersecurity must be ensured. This is also due to come into force in mid-2024.

*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.*

## 3.6 Quality of supply

### 3.6.1 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 consumer, while SAIFI indicates the average frequency of interruptions per consumer. 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 91 largest Swiss network operators. These account for 88 per cent of the country's energy turnover via their networks. In 2022, the 91 biggest Swiss network operators recorded 4,853 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 consumers affected that a meaningful indication of network availability can be provided.

| | 2019 | 2020 | 2021 | 2022 | 2023[1] | Unit |
|---|---|---|---|---|---|---|
| Interruptions | 5 780 | 5 176 | 5 136 | 4 853 | | Number |
| SAIDI | 8 | 12 | 8 | 7 | | Minutes per end user |
| SAIFI | 0.17 | 0.21 | 0.16 | 0.14 | | Interruptions per end user |

*1 The figures on supply quality for 2023 will be published in June 2024 and will be made available on ElCom's website.*

*Table 2: Supply quality in Switzerland from 2019 to 2023 (unscheduled interruptions only)*

In 2022, the average duration of unscheduled interruptions per end user was seven minutes. This meant this indicator fell by one minute nationwide compared with the previous year. The average frequency of unscheduled interruptions per consumer in 2022 was 0.14, which was lower than in the previous year. Network availability remains very good in Switzerland. The high quality of supply in Switzerland is also confirmed by international comparisons. According to the CEER 7th Benchmarking Report on the Quality of Electricity and Gas Supply, Switzerland is among those countries with the highest quality of electricity supply in Europe.

### 3.6.2 Import capacity

In addition to network availability, the available import capacity is also a key factor in ensuring Switzerland's electricity security of supply. 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) | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **Total** | **6 657** | **6 982** | **6 562** | **6 838** | **6 297** |
| of which northern border (AT, DE, FR) | 4 936 | 5 260 | 4 841 | 5 117 | 4 576 |
| France | 2 678 | 2 944 | 2 923 | 3 018 | 2 691 |
| Germany | 1 343 | 1 264 | 1 347 | 1 341 | 1 124 |
| Austria | 915 | 1 052 | 571 | 758 | 761 |
| of which Italy | 1 721 | 1 722 | 1 721 | 1 721 | 1 722 |

*Table 3: Available import capacity (NTC) for Switzerland, 2019 to 2023 (average of hourly NTC for the year)*

Lower import capacity from France and Germany resulted in an overall decrease in import capacity in 2023.

Average import capacity from Switzerland's northern neighbours was therefore only slightly over 4,500 MW. Total import capacity remained below 6,300 MW and thus far below the average figure for 2020, which, as in 2017, was just under 7,000 MW.

Since 21 November 2023, Swissgrid has been operating the line between Bassecourt (JU) and Mühleberg (BE) at 380 kV instead of 220 kV. This higher voltage enables more electricity to be transported on this key north-south connection. This is vitally important during winter in particular when Switzerland is dependent on electricity imports from neighbouring countries. The line between Bickigen and Chippis (the Gemmi line) was operated temporarily in winter 2022/2023 at 380 kV to improve short-term security of supply as part of various Federal Council measures between January and April 2023.

### 3.6.3 Export capacity

Due to high transit flows through Switzerland from north to south, the capacity available for export to Italy and France, in particular, but also to Germany and Austria, will be important for network and supply security of Switzerland and its neighbouring countries as long as the Russian war of aggression against Ukraine and the political tensions with Russia continue to present further supply risks for Switzerland, its neighbouring countries and the EU as a whole (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) | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **Total** | **7 933** | **8 658** | **8 289** | **8 845** | **8 985** |
| of which northern border (AT, DE, FR) | 5 415 | 5 928 | 5 497 | 6 023 | 6 075 |
| France | 1 163 | 1 136 | 1 209 | 1 194 | 1 131 |
| Germany | 3 491 | 3 708 | 3 629 | 3 946 | 3 924 |
| Austria | 761 | 1 084 | 659 | 883 | 1 020 |
| of which Italy | 2 518 | 2 730 | 2 792 | 2 821 | 2 910 |

*Table 4: Switzerland's export capacity (NTC) 2019 to 2023 (average of hourly NTC for the year)*

Overall export capacity rose in 2023 due to an expansion in export capacity to Austria and Italy. As in 2022, it reached almost 9,000 MW. To Germany, it remained just under the 4,000 MW of 2017, as in 2022, and reached slightly over 1,000 MW to Austria. 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 slightly below the 3,000 MW achieved in 2017. For these reasons, aggregate export capacity also remained below the 9,129 MW of 2017.

### 3.6.4 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 website. A retrofit programme was also initiated in a letter sent to distribution network operators on 15 June 2018, which addresses the issue of existing PV systems shutting down in response to over-frequency. This was initially limited to PV systems with a connected capacity of ≥ 100 kVA (Retrofit 1) because this enabled a major impact to be achieved quickly and relatively inexpensively.

The target set by ElCom of a maximum connected capacity of 200 MVA 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 network operators reported completion of the Retrofit 2 programme. By the end of 2023, four-fifths of distribution network operators reported completion of Retrofit 2. The remaining distribution network operators have either been granted an extension or have not yet provided feedback.

## 3.7 System services

Sufficient electricity production capacities must be available to guarantee security of supply, 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 all deviations 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 flexible 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 users via the system services tariff. This is used for charging for other services required for safe operation of the grid, including balance management, black 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 471 million in the year under review. This is a decrease of CHF 21 million in comparison to the previous year. The steep rise in wholesale electricity prices in 2022, as described in greater detail in the next section, is a key factor here. One of the knock-on effects is that balancing capacity also trades higher. Figure 1 shows the price trend for balancing capacity over the past five years.

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 security of supply, risk management and for the players involved to gain a better understanding of their specific roles. In winter 2022/2023, advance procurement of balancing capacity for the critical winter weeks was carried out in five tranches in order to procure 80 per cent of secondary balancing capacity for January 2023, 100 per cent of secondary balancing capacity for the months of February to May, and 50 per cent of tertiary balancing capacity for the months of January to May. This procurement was staggered from September 2022 to January 2023 and meant that just under 77 per cent of the annual costs were spent on the advance procurement of balancing capacity (CHF 361 million). A further CHF 110 million was spent on the months of June to December.

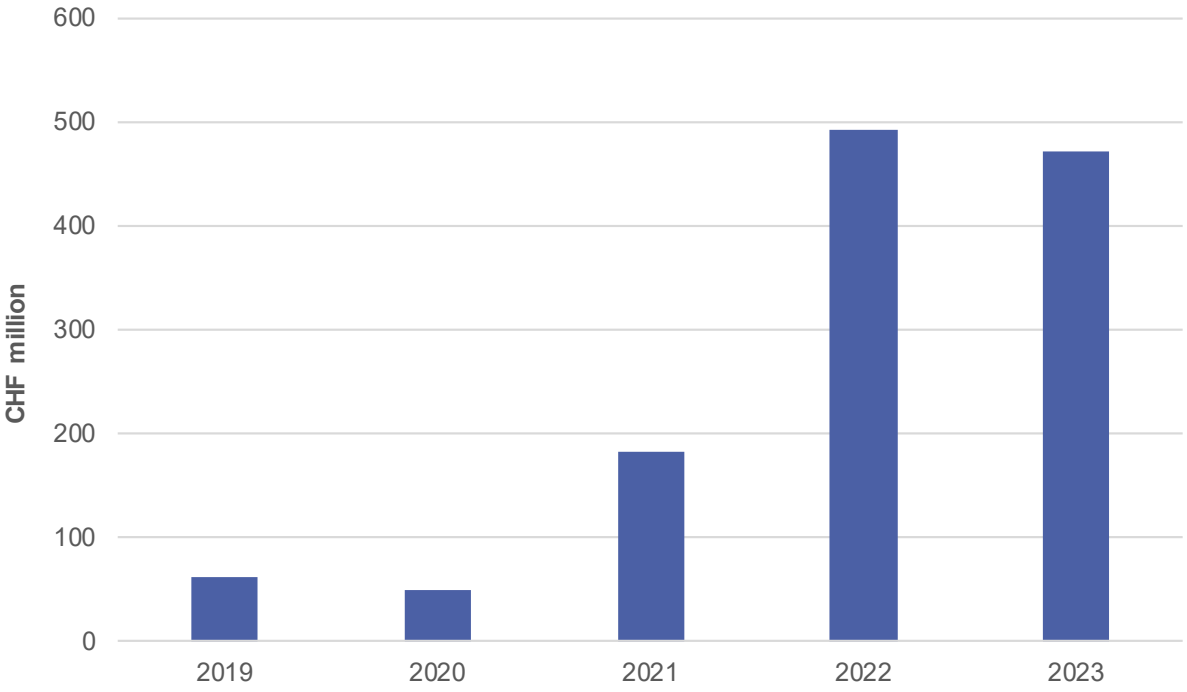



*Figure 1: Balancing capacity price trend from 2019 to 2023*

Swissgrid regularly develops balancing products to improve liquidity. The procurement of secondary balancing capacity was adjusted in 2019. Secondary balancing power had been purchased as a symmetrical product until mid-2018, meaning that the provider had to offer the same amount of positive and negative secondary balancing capacity. The switch to an asymmetrical product now allows providers to offer only 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 and since October 2020, also tertiary balancing energy (replacement reserve).

# 4 Networks

*Every year, around CHF 1.5 billion is invested in the expansion and modernisation of the distribution networks. Shown here is the Gemmi line, which runs over the pass of the same name from Valais to the canton of Bern.*

## 4.1 Facts and figures about the Swiss electricity grid

As part of annual cost accounting reporting , ElCom surveys the Swiss electricity grid according to various equipment classes. The Swiss electricity network (i.e. distribution and transmission network) extends over a total length of 233,000 kilometres, which is almost six times the circumference of the Earth. Of this, the local distribution networks (network level 7) account for 75 per cent, while Swissgrid's national transmission network (network level 1) accounts for just over three per cent with around 6,760 kilometres. The remaining kilometres are made up by the medium-voltage levels (network levels 3 and 5). As expected, the number of overhead lines and mast transformer stations has fallen as a result of progress in cabling work, while the number of cables and transformer stations has increased.

*1 The network operators submit their data annually on 31 August of the year following the last completed financial year. The figures in the 2023 report on activities therefore reflect the actual values for 2022.*

| Type of installation | 2018 | 2019 | 2020 | 2021 | 2022 | Unit |
|---|---|---|---|---|---|---|
| Conduit length HV (NL3), MV (NL5) and LV (NL 7) | 122 616 | 124 941 | 130 205 | 131 705 | 148 824 | km |
| HV cable (NL3) | 1 906 | 2 053 | 1 968 | 2 099 | 2 028 | km |
| MV cable (NL5) | 35 307 | 36 433 | 36 428 | 37 725 | 40 221 | km |
| LV cable (NL7) | 80 029 | 82 179 | 81 264 | 82 653 | 94 104 | km |
| LV building connection cable (NL7) | 57 091 | 58 891 | 59 108 | 62 518 | 68 285 | km |
| HV overhead lines (NL3) | 6 777 | 6 788 | 6 658 | 6 773 | 6 623 | Strand km |
| MV overhead lines (NL5) | 9 458 | 9 346 | 8 818 | 8 751 | 8 307 | Strand km |
| LV overhead lines (NL7) | 7 663 | 7 899 | 6 972 | 6 760 | 6 276 | Strand km |
| NL2, NL3, NL4, NL5 substations | 819 | 825 | 823 | 862 | 833 | Number |
| NL2 transformers | 145 | 147 | 149 | 152 | 144 | Number |
| NL2 switching fields[1] | 167 | 163 | 168 | 178 | 163 | Number |
| NL3 transformers[2] | 76 | 76 | 87 | 86 | 85 | Number |
| NL3 switching fields[1] | 2 586 | 2 680 | 2 431 | 2 506 | 2 363 | Number |
| NL4 transformers | 1 143 | 1 153 | 1 143 | 1 186 | 1 133 | Number |
| NL4 switching fields[1] | 2 163 | 2 929 | 2 246 | 2 333 | 2 230 | Number |
| NL5 transformers[2] | 73 | 74 | 77 | 74 | 77 | Number |
| NL5 switching fields[1] | 30 685 | 39 486 | 39 411 | 40 068 | 40 516 | Number |
| NL6 transf. stat. | 53 730 | 54 850 | 54 142 | 55 546 | 54 862 | Number |
| NL6 mast transformer stations | 5 265 | 5 487 | 4 993 | 5 049 | 4 751 | Number |
| LV cable distribution cabinets (NL7) | 177 430 | 182 325 | 191 488 | 199 412 | 181 967 | Number |
| Measurement points (all consumers) | 5 635 760 | 5 779 344 | 5 715 085 | 5 951 287 | 5 817 870 | Number |
| Number of network operators | 630 | 632 | 623 | 610 | 604 | 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 Art. 2 para. 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 50 kV).*

*Table 5: Installations on the Swiss electricity grid – all details are based on information reported by the network operators themselves*

The total value of the Swiss electricity grid stands at just under CHF 21.8 billion. The distribution network accounts for around 90 per cent of this figure. The largest 100 network operators own around 85 per cent of the declared assets, of which the 10 largest network operators in Switzerland alone own a good 43 per cent of all assets. The approximately 500 small and micro operators therefore only own just under 15 per cent of the assets. This is around the same as five years ago.

Figure 2 shows the evolution of the various components of network costs. The distribution network operators declared total network costs (including fees and charges as well as surcharges on the transmission network) of just about CHF 5.4 billion for 2022. The network costs make up the largest part of this: these are based on the operating and capital expenditure of a secure, high-performance and efficient network in accordance with electricity supply legislation. The biggest components of the network costs on the distribution network are the operating and capital expenditure, making up a share of 67 per cent, which equates to around CHF 3.6 billion. Of this figure, a good CHF 1.7 billion is attributable to capital expenditure and CHF 1.8 billion to operating expenditure (33 and 35 per cent respectively). Direct taxes account for CHF 72 million, or 1.4 per cent.

In addition to the network costs are almost CHF 1.7 billion in public charges: fees and payments to the state including licences amounting to a good CHF 452 million or 8.5 per cent as well as over CHF 1.2 billion or 22.6 per cent surcharges on the transmission network to promote electricity production from renewable energies and water remediation in accordance with Article 35 of the Energy Act (EnA).

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.

After regular increases up to 2018, the share of fees and payments (including the network surcharge in accordance with Art. 35 EnA) changed very little in the last five years, reaching 1 per cent compared to the previous year in 2022 (see Fig. 2, Direct taxes). 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. Fees and payments are the responsibility of the communes, cantons and the federal government and are therefore not reviewed by ElCom with regard to their amount.

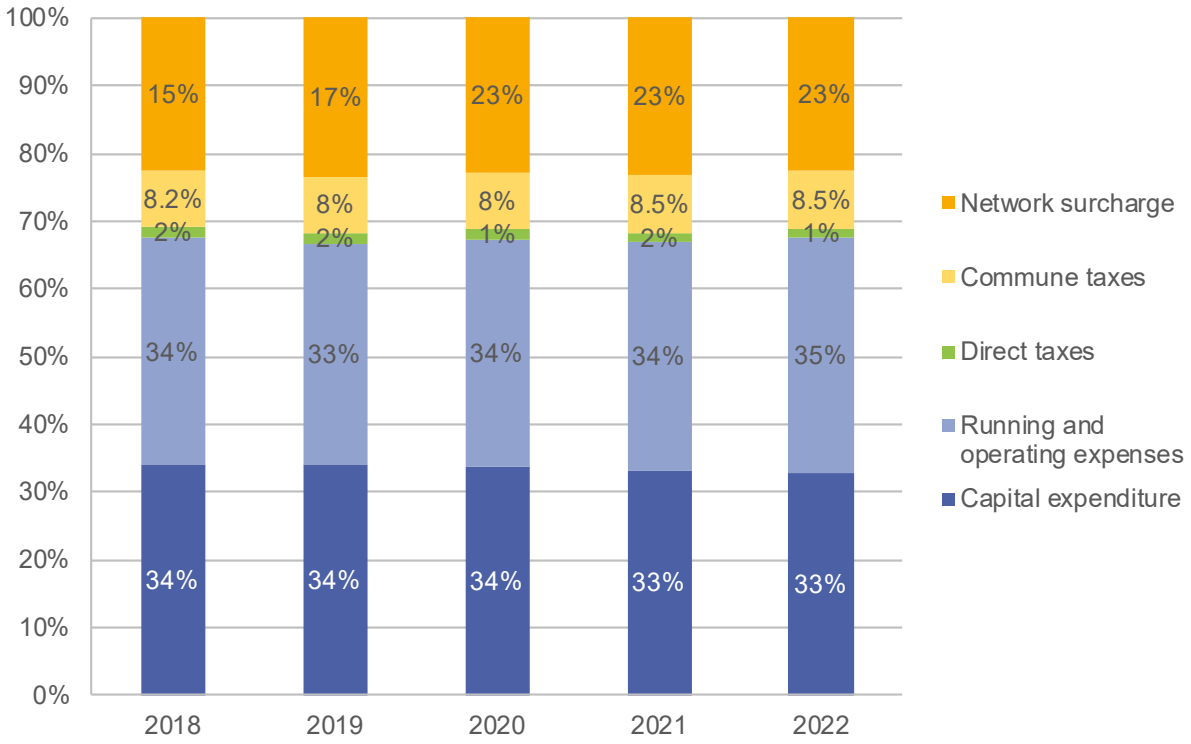



*Figure 2: Composition of distribution network costs*

In its 2022 Annual Report, Swissgrid reported network usage costs of CHF 467 million, system services costs of CHF 670 million and now also power reserve costs of CHF 0.6 million. The high energy prices since 2022 have had a significant effect on system services (see Section 3.7 System services). The costs for 2022, estimated and factored in during spring 2021, were much lower which meant there was a considerable shortfall for 2022. The effect of this means there will be a further increase in tariffs over the following years.

If the distribution network costs of just over CHF 5.4 billion are added to these cumulative costs of just under CHF 1.2 billion, the overall costs for the Swiss electricity grid come in at just under CHF 6.6 billion. Figure 3 shows how these are distributed among the individual network levels (NL). The local distribution network (NE7) accounts for over half of the costs at around CHF 3.0 billion. At CHF 1.2 billion, almost another fifth of the costs are incurred on NL5. The cost shares of the transformation levels (NE2, NE4, NE6) – the linking element between the various connection levels – are relatively low overall. The high-voltage network (NE1 network usage incl. NL1 system services and now also power reserve) operated by Swissgrid makes up a share of 18 per cent of the total costs for the Swiss electricity grid.

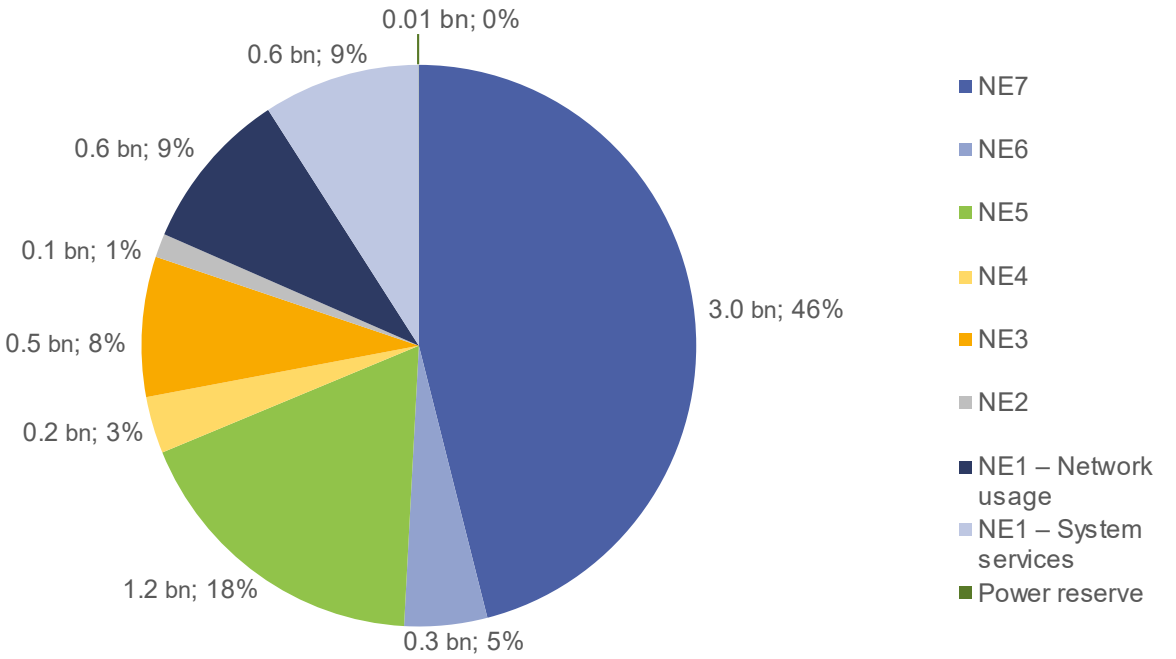



*Figure 3: Costs in CHF billion and breakdown of the cost shares of the Swiss electricity grid (including fees and charges as well as surcharges on the transmission network) by transmission network (NL1) and distribution network (NL2 to NL7)*

## 4.2 Network expansion and planning

### 4.2.1 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 2024. 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 Report 2025 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 (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 cost allocation (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.

### 4.2.2 Multi-year planning of the distribution network

Under Article 9b ESA, every network operator must determine grid 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 grid 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 networks 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 6a paragraph 2 ESO, the Federal Council must draw up multi-year plans for distribution networks with a nominal voltage of over 36 kV within nine months of approval of the most recent set of scenarios.

### 4.2.3 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"). In practice, the basis for the technology decision (overhead line or cable line) is often verified. 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 2023, 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 – Mettlen (SÜL 202), Marmorera – Tinzen (SÜL 701.1), Flumenthal – Froloo (SÜL 900). ElCom also issued several opinions on projects as part of planning approval procedures.

*1 available in german at www.elcom.admin.ch > Documentation > Information*

## 4.3 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.

### 4.3.1 Investments in the transmission network

The actual amount invested in the transmission network in 2022 stood at CHF 212.2 million. During the period 2018 to 2022, the average annual level of investment in the transmission network stood at CHF 163 million.

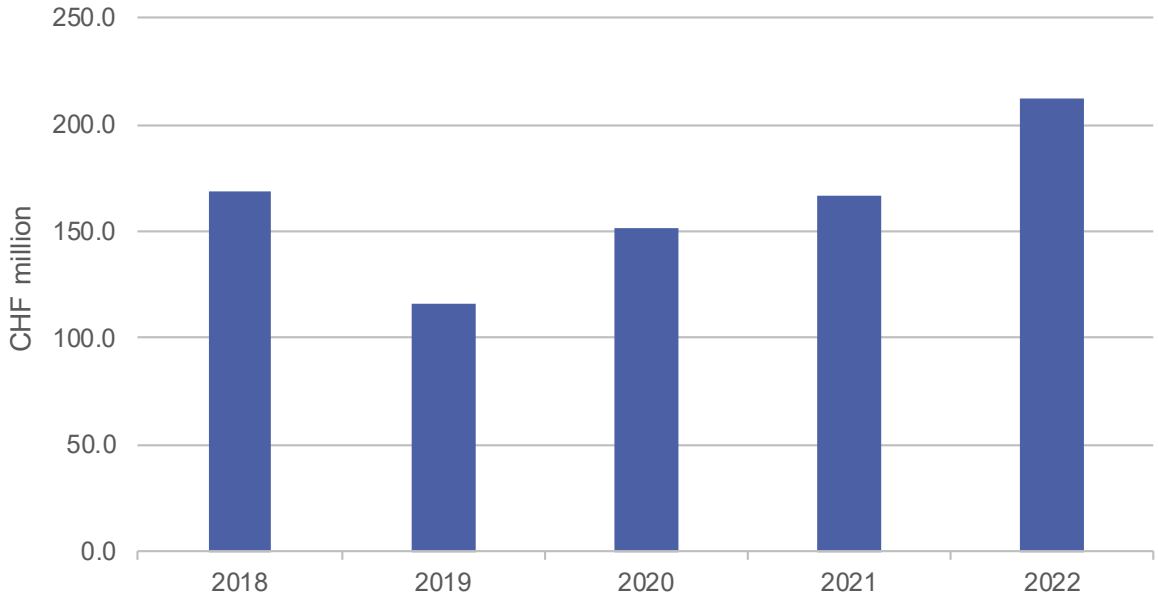



*Figure 4: Investments in the transmission network*

### 4.3.2 Investments in the distribution network

Between 2018 and 2022, the distribution network operators invested around CHF 1.4 billion annually (Figure 5). During this period, write-offs increased from CHF 943 million to just over CHF 956 million. The Swiss network reported an investment surplus of just under CHF 474 million, which is virtually unchanged compared to 2018.

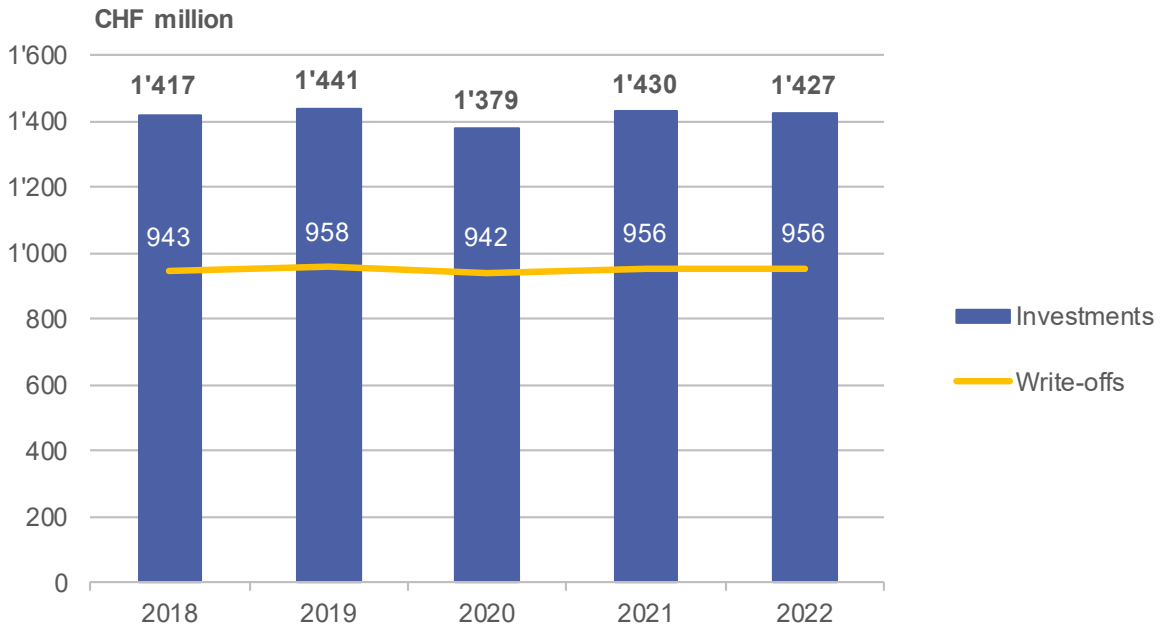



*Figure 5: Investments and write-offs in the distribution network*

On account of Switzerland's efforts to cut greenhouse gas emissions to net zero by 2050 – like most European countries – the SFOE estimates, as part of Switzerland's Energy Strategy 2050, that much greater pressure will be placed on the distribution networks in future, both on the demand side (electromobility and heat pumps) and on the supply side (e.g. expansion of photovoltaics). The SFOE estimates total real investment requirements of between CHF 45 and 84 billion by 2050.

In terms of the sheer number of kilometres of lines, the electricity network was expanded by 14 per cent between 2018 and 2022. However, considering the SFOE's expected expansion, the regulatory asset values alone cannot be used to define whether the rate of expansion is sufficient. For example, the increases in network capacity (see Section 4.4 Increases in network capacity) – as they are financed by third parties – cannot be included in the regulatory fixed assets and are therefore not included in the above information. 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.

*1 see SFOE report in german 'Auswirkungen einer starken Elektrifizierung und eines massiven Ausbaus der Stromproduktion aus Erneuerbaren Energien auf die Schweizer Stromverteilnetze' (Effects of a high level of electrification and a large-scale expansion of electricity production from renewable energies on Swiss power distribution networks) of November 2022*

### 4.3.3 WACC imputed interest rate for the network

In the past, ElCom has expressed the view several times that the current WACC (Weighted Average Cost of Capital) calculation method has weaknesses. In particular, it has highlighted the overestimated risks (due to an unsuitable peer group in the determination of the beta factor and, in turn, the interest on equity capital) and the technical lower limits used for the risk-free interest rate in the interest-rate environment at the time. Both factors tend to result in an excessively high WACC. ElCom has expressed this criticism during the office consultation procedures and on the advisory groups as well as in its reports on its activities. In part based on this input, the SFOE decided to evaluate the current WACC method used for the electricity network, to correct any parameters that could result in miscalculation of the WACC and to define specific amendment proposals.

This work was carried out in autumn 2023. This was concluded with a stakeholder meeting in December 2023, attended by representatives from industry, consumer protection organisations, the electricity industry, the cantons, the pension funds, the Price Supervisor, the State Secretariat for Economic Affairs (SECO), the SFOE and ElCom. The provisional results of two expert opinions were presented at the meeting. During the technical discussions, ElCom and consumer representatives highlighted the ongoing issue of distorted risk determination. There is still a risk of presenting excessive interest on equity capital in WACC owing to the selection of an unsuitable peer group with a systemically higher business risk.

Opposing arguments contend that a high WACC is necessary to enable sufficient network investment. ElCom does not share this view. The WACC must be set at the 'right' level to create sufficient incentive to invest in the maintenance and expansion of the network, on one hand, but also to ensure no deadweight effects are created, on the other, placing an unnecessarily high burden on electricity consumers. Figure 6 shows the development of annual investment in the distribution network and the capital costs (depreciation/amortisation plus interest on equity/debt capital and net current assets.

The consultation procedure on the amendment to the Electricity Supply Ordinance (ESO) is set to begin in June 2024. The SFOE, together with the experts, will produce a WACC concept by that date.).

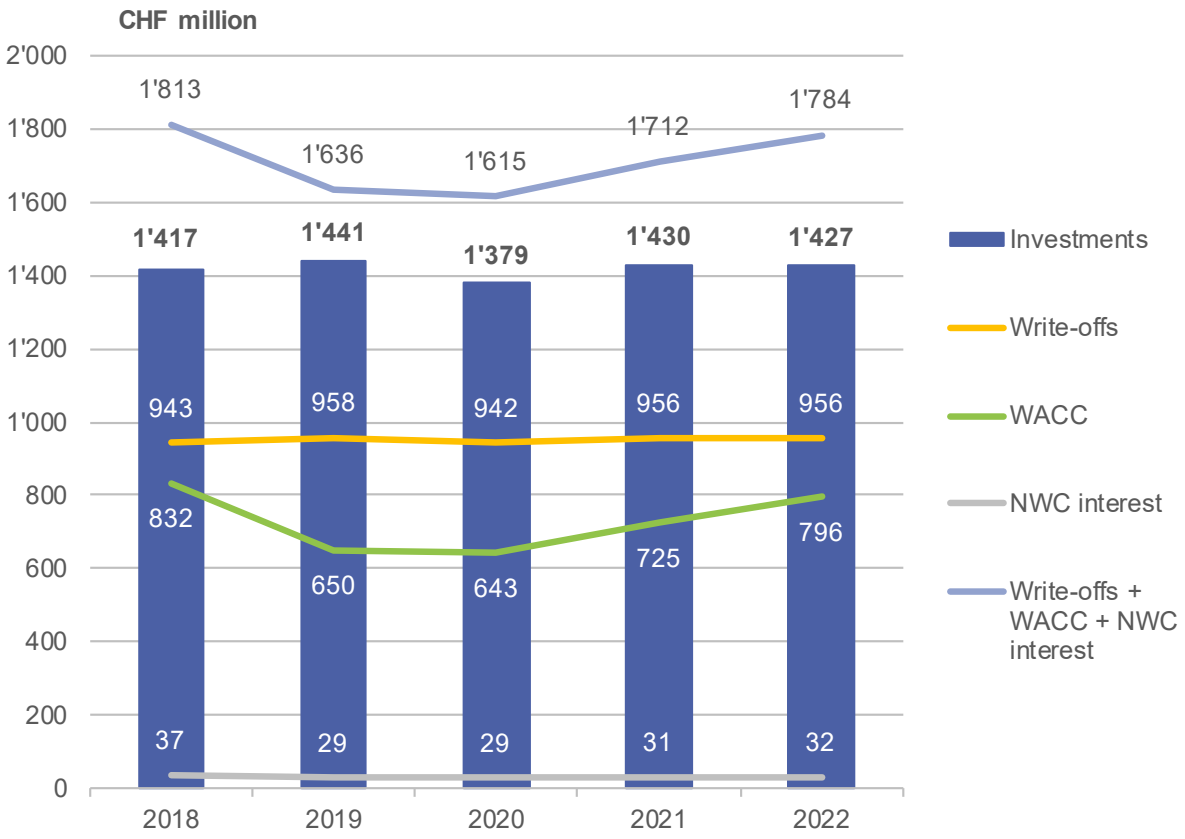



*Figure 6: Development of investment and the imputed interest based on the WACC of recent years*

## 4.4 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 in 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 46 applications for the remuneration of costs associated with increases in network capacity.

ElCom has issued a total of 1,069 decisions over the past 15 years (cf. Figure 7, Table 6).

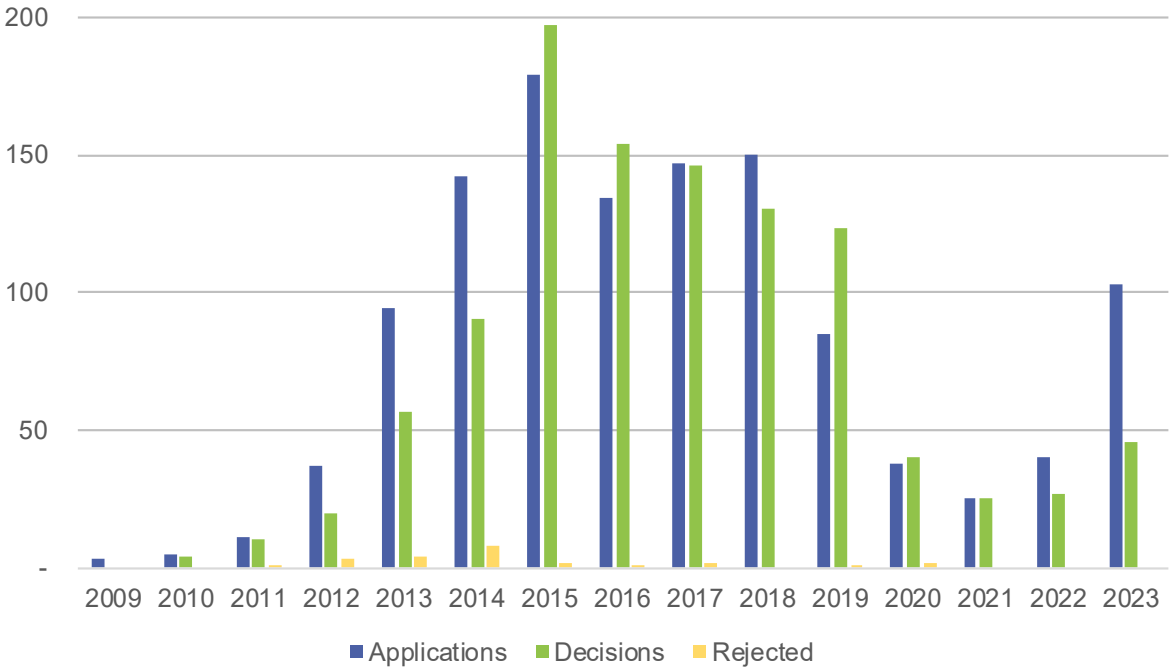



*Figure 7: Number of submitted and rejected applications and decisions concerning remuneration for increases in network capacity*

Total costs for network capacity increases stood at around CHF 130.35 million at the end of 2023 and the related power plant output amounted to 392 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 2023.

| | Total | PV | Hydro-power | Wind | Other [1] |
|---|---|---|---|---|---|
| Number of decisions | 1'069 | 998 | 38 | 4 | 29 |
| Minimum generator output [kW][2, 3] | 4 | 4 | 29 | 1'500 | 22 |
| Maximum generator output [kW][2, 3] | 74'000 | 8'303 | 14'726 | 16'000 | 74'000 |
| Total plant output [kW][3] | 392'204 | 167'749 | 76'542 | 30'000 | 117'913 |
| Minimum costs [CHF][2] | 3'500 | 3'500 | 12'277 | 1'151'165 | 12'277 |
| Maximum costs [CHF][2] | 9'262'389 | 746'912 | 3'117'452 | 9'262'389 | 3'117'452 |
| Total costs [CHF] | 130'350'857 | 76'133'586 | 28'027'193 | 19'853'343 | 6'336'735 |
| Average costs [CHF][4] | 121'937 | 76'286 | 737'558 | 4'963'336 | 218'508 |

| | | | | | |
|---|---|---|---|---|---|
| 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] | 332 | 454 | 339 | 662 | 177 |

*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 = ratio of costs to generator output*

*Table 6: Figures relating to decisions on network capacity increases issued between 2009 and 2023*

## 4.5 Battery storage devices

ElCom answered some key questions on storage facilities at an earlier date in the notification 'Fragen und Antworten zur Energiestrategie 2050' (Questions and answers on the Energy Strategy 2050) (Section 9). After receiving several queries, answers on questions about the connection of storage facilities have now been added. In ElCom's view, a connection obligation also applies to storage facilities. However, responsibility for assessing the connection obligation lies with the cantons and not ElCom (Art. 5 para. 2 in conjunction with Art. 30 para. 1 ESA). The connection costs – in particular, the individual fees billed (mainly connection and network cost fees) – are generally determined based on cantonal law. This is subject to Art. 16 para. 3 ESO as a minimum requirement under federal law whereby disproportionate additional costs, which are incurred on distribution networks through the connection or operation of production plants, are not part of the network costs, but must instead be met by the electricity producers to a reasonable extent. In ElCom's view, this provision applies in the same way to storage facilities without end consumption. The costs concerning the connection of storage facilities are also recoverable network costs. However, the solidarity principle in accordance with Art. 22 para. 3 ESO does not apply to costs on network capacity increases required due to the connection of storage facilities. Any compensation for network operators from the national grid operator only applies to network capacity increases concerning particular energy production plants based on the clear legal wording.

ElCom also maintains that the network operator's purchase and payment obligation in accordance with Art. 15 Energy Act (EnA) only applies for storage facilities to electricity that comes – based on clear evidence of measurement technology – from production plants in accordance with Art. 15 para. 1 EnA and is then fed into the network. This provision does not apply to other stored electricity, in particular that taken from the grid and then fed back in.

## 4.6 Distribution of costs between the various actors

At the beginning of 2023, Swissgrid decided to suspend the activities of the Association of Swiss Energy Companies' (ASEC) working group on the distribution of costs on the network with immediate effect as some participants were pushing for Swissgrid to bear the costs and liability for many technical matters. Swissgrid called on ElCom to express an opinion on the requirements, relevant basis and responsibilities to enable resumption of the work within the industry. A list of contentious points concerning the assumption of costs was drawn up by the actors involved. It was sent to ElCom in mid-April 2023, is very wide-ranging and covers: network restrictions (shutdowns), network usage (transits), measures in the event of risk to security of supply (automatic and manual load shedding) and requirements concerning power plants. ElCom aims to act as a mediator to avoid complex procedures as far as possible and to support the principle of subsidiarity. A workshop with representatives of Swissgrid and ASEC was held in June at ElCom's premises in Bern. Various points were addressed based on a position paper on the assumption of costs in the event of shutdowns. The paper was published as a notification on ElCom's website at the end of 2023. ElCom's argument is that 24/7 network availability is not efficient and that shutdowns are part of normal network operations. This means no compensation is paid for restrictions on network usage due to shutdowns (scheduled or unscheduled). Even though contentious issues have not been resolved for many points on the list, at least some of the obstacles holding back work on the assumption of costs between ASEC and Swissgrid have been overcome thanks to support from ElCom.

In one case, ElCom decided on whether the additional costs incurred by a power plant operator for the procurement of generator transformers with on-load tap chargers should be reimbursed by Swissgrid. It concluded that the additional costs incurred for the power plant operators cannot be directly attributed to the transmission network and nor can they be classified as system services. There is also no provision under power supply legislation entitling actors to compensation for the costs incurred for taking preparatory measures to ensure secure network operation in accordance with Art. 5 para. 1 ESO by way of derogation from Art. 14 f. ESA. The power plant operator's application for compensation of the costs was therefore rejected.

# 5 The Swiss electricity market

*Only around a third of the energy sold in the basic supply comes from the energy supply companies' own production.*

## 5.1 Structure of network operators in Switzerland

There were around 604 active network operators in Switzerland in 2022. They supply a total of approximately 5.6 million invoice recipients, serving around 5.8 million measurement points. The sector is very diverse: while the largest network operators supply over 300,000 end users, average network operators serve just 1,650 each, and the smallest only 23. Of the total, only 77 network operators supply more than 10,000 end users, with 14 having a customer base of over 100,000 end users (Figure 8).

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 four per cent to 604 between 2018 and 2022. 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 2,145 (more than four per cent) during the period 2018 to 2022.

*1 The network operators submit their data annually on 31 August of the year following the last completed financial year. The figures in the 2023 report on activities therefore reflect the actual values for 2022.*

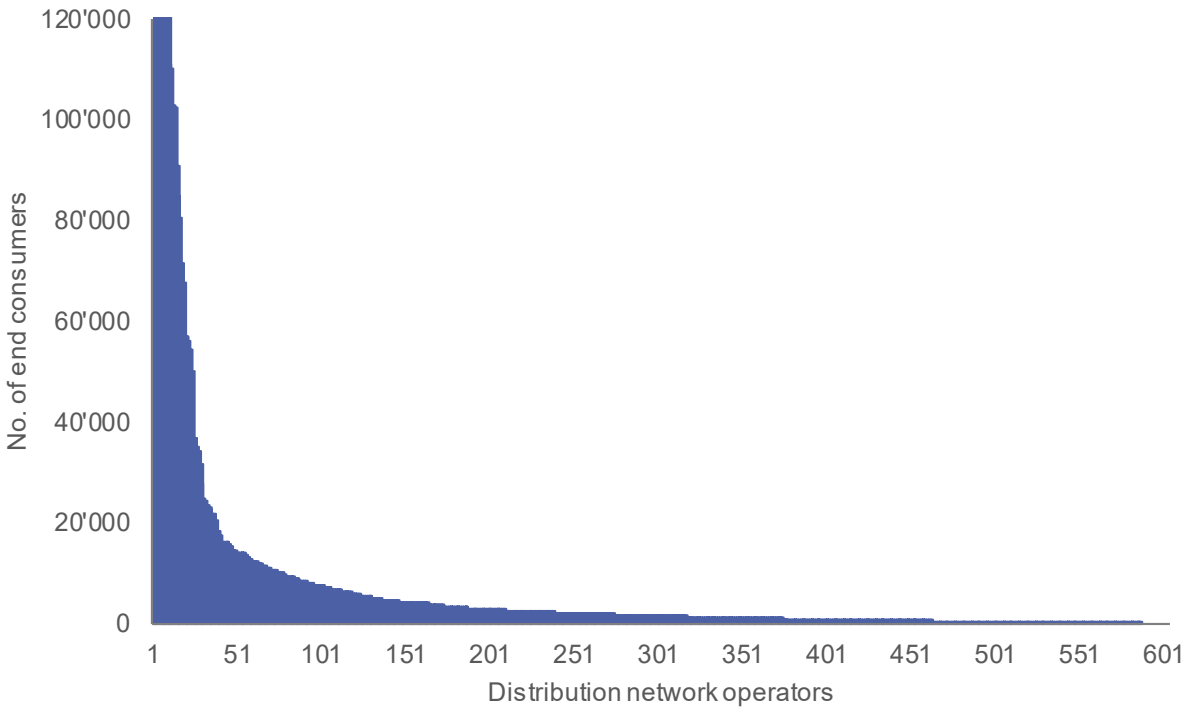



*Figure 8: Number of end users per distribution network operator. To improve readability, the vertical scale has been cut off at 120,000 end users; the data cut off concerns nine distribution network operators.*

Network operators declared a total offtake of around 55,000 GWh for 2022. The pro-rata offtake of the network operators out of the total offtake in Switzerland reflects the ownership structure and network usage revenues (see Section 4.1 Facts and figures about the Swiss electricity grid): The largest 100 network operators supply around 83 per cent of the energy sold, of which the 10 largest network operators in Switzerland supply a good 44 per cent . The approximately 500 small and micro operators together supply only just under 17 per cent of the energy consumed by end users.

The Swiss network operators are tasked with operating the networks, but also ensuring the supply of electricity for customers who cannot use the free market. It is therefore interesting to look at the energy procurement and production of Swiss energy providers – not least in the context of energy prices. ElCom collects information on self-generated energy and the procurement method in connection with the cost calculation data submitted annually.

The production and sales of electricity for Swiss basic supply customers diverge significantly. Around 34,000 GWh of electricity a year is provided for basic supply customers in Switzerland according to the declarations of network operators. Of the around 600 network operators, 411, or just under 70 per cent, indicated that they do not produce their own electricity. These network operators have a total requirement of around 7,700 GWh per year or 14 per cent of the total offtake of 55,000 GWh per year (basic supply and unrestricted consumers incl. active power

losses). Around 130 network operators (22% of all network operators) indicated a maximum of 10 GWh of self-generated electricity (requirement of 5,000 GWh per year or 9% of the total offtake) and just 20 network operators (3%) stated that they generate electricity of over 100 GWh themselves (requirement of 13,700 GWh or 24% of total offtake).

Most of the Swiss providers procure the electricity through comprehensive contracts or by means of structured procurement on the market.

## 5.2 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 Art. 11 para. 2 last sentence ESO).

ElCom conducts an annual survey on the switching behaviour of companies that could enter the market. This survey is conducted among the 80 largest network operators – these serve four million invoice recipients and supply a total of just under 37,000 GWh or just under 67 per cent of the total electricity supplied in Switzerland (excluding public transport).[1]

Of this basic population, a good 34,000 end users or 0.6 per cent of all invoice recipients have the right to free market access. Although this share is quite small in absolute terms, these end users consume over 19,900 GWh, or around 36 per cent of the total electricity supplied in Switzerland.

In the years since the electricity market was opened up, a good 22,400 end users, or 66 per cent, have actually made use of market access up to and including the planning year 2024, according to the energy supply companies involved. These 'free' end users purchase a total of 16,400 GWh of electricity, which accounts for 82 per cent of the total electricity purchased by end users with potential market access or 45 per cent of the total electricity supplied by the 80 largest network operators, totalling 37,000 GWh.

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 9). As market prices fell, the number of end users choosing to exercise this right rose sharply in the years that followed. Since 2023, the share of end users in the free market has stagnated; this has also continued in 2024.

*1 This currently includes each of the network operators with offtake of over 100,000 MWh. The figures in this survey come directly from the energy supply companies and are not examined in any detail by ElCom.*

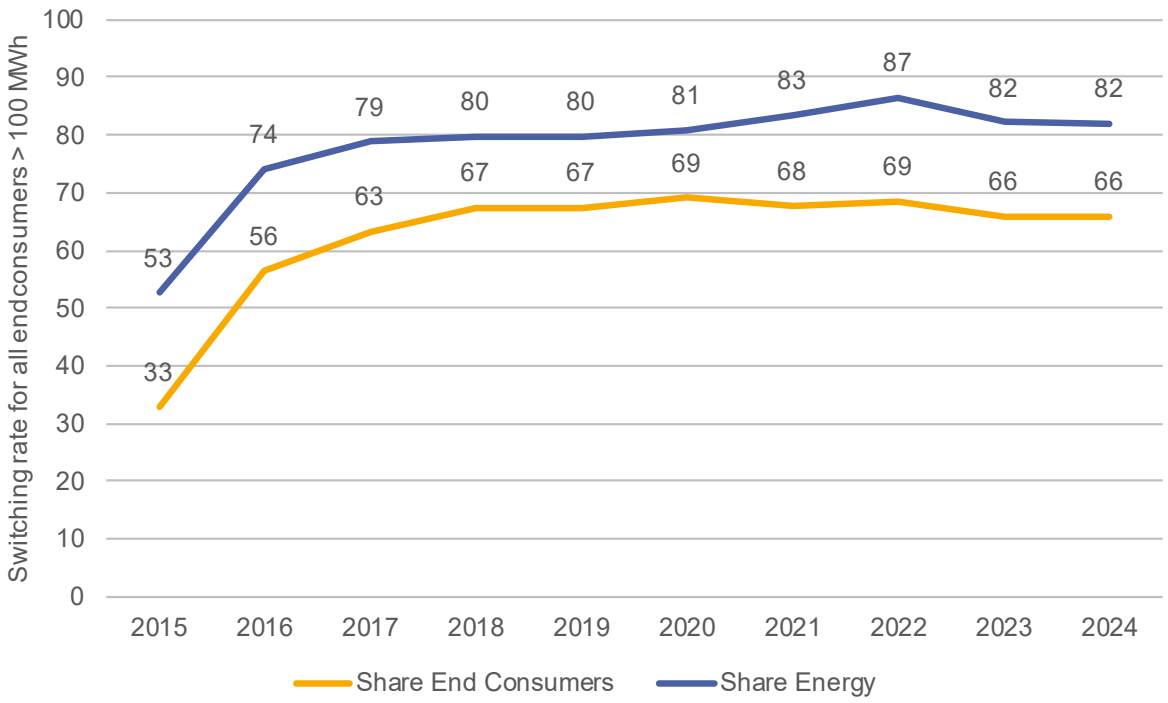



*Figure 9: To date, 66 per cent of all market-eligible customers have switched to the market (blue line). These consume 82 per cent of the energy consumed by all market-eligible customers (orange line).*

## 5.3 Basic supply and self-consumption

In one case ElCom dealt with a claim of entitlement to basic supply from a community for self-consumption. The community for self-consumption, made up of a landowner and various tenants, obtained electricity from a third-party provider on the free market after its foundation. The network operator only charged it for network usage and it settled the invoices without objection. It was only after a year that it submitted its first complaint against the network operator that it fell under basic supply provision and that an error appeared to have been made. ElCom agreed with the community for self-consumption on the point that as a new entity it generally comes under basic supply after its foundation. However, ElCom decided that the community for self-consumption had made use of its entitlement to network access by implication through its actions (Art. 13 para. 1 ESA). The principle of 'once free, always free' (Art. 11 para. 2 ESO) was therefore applied, which excludes the possibility of switching back from the free market to basic supply. This means the community for self-consumption is no longer entitled to be supplied with electricity under basic supply by the network operator. ElCom also decided that a community for self-consumption does not have a legal personality and is not afforded the capacity to be a party or to take legal action under federal law. In the

case of a community for self-consumption that means the party to proceedings is the participants, or in the case of a tenant community for self-consumption, as in the case decided upon, the landowner. As the rights and obligations of the tenant parties were directly affected from the start of the proceedings, they were given the opportunity to participate in the proceedings.

Another case also concerned entitlement to basic supply: A company under cantonal ownership (subsequently referred to as the consumer) concluded a market agreement with an energy provider for three consumption sites and requested network access for them. The energy provider was also a canton-controlled enterprise which also acted as the network operator. At a later date, the Cantonal Council of the canton concerned adopted a confidential resolution that "the cantonal participations will initially remain under basic supply for their electricity supply". The consumer decided against holding a tender procedure and considering competitive bids for its requirements. It then continued concluding contracts for many years with the energy provider under conditions that deviate from those of basic supply. ElCom initially decided that the consumer had made a legally valid application for network access. Due to the principle of 'once free, always free' confirmed by the Swiss Federal Supreme Court, the Cantonal Council resolution only adopted subsequently could have no effect on the status as a consumer on the market under power supply legislation. As a result, ElCom rejected the application for basic supply provision.

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 are published on the ElCom website under the continuously updated FAQ sections on basic supply, replacement supply and feed-in remuneration and on the Energy Strategy 2050.[1]

*1 available in german at www.elcom.admin.ch > Documentation > Information*

## 5.4 Transmission network tariffs

As the overview in Table 7 shows, the tariffs for system services have risen sharply again while network usage tariffs have stabilised in 2024. However, the cost burden from the transmission network reached an historic high level overall. In addition to transmission network tariffs, Swissgrid also passed on the costs of federal government's electricity reserves onto consumers for the first time in 2024. Overall, this resulted in significant additional costs for all consumers.

| | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|
| **Network usage** | | | | | |
| Working tariff [centimes per kWh] | 0.18 | 0.20 | 0.25 | 0.27 | 0.27 |
| Power tariff [CHF per MW] | 28 800 | 33 600 | 43 920 | 48 660 | 46 380 |
| Fixed basic tariff per exit point [CHF] | 269 400 | 319 800 | 413 040 | 443 700 | 443 400 |
| **General system services tariff** [centimes per kWh] | 0.16 | 0.16 | 0.16 | 0.46 | 0.75 |
| **Individual system services tariff** Active power losses [centimes per kWh] | 0.25 | 0.15 | 0.14 | 0.30 | 0.64 |
| **Power reserve** [centimes per kWh] | - | - | - | - | 1.20 |

*Table 7: Trend in transmission network tariffs for network usage and general system services for distribution network operators and end consumers (source: Swissgrid AG)*

As in the previous year, Swissgrid also anticipates significant additional costs for the general system services in 2024. The situation on the European electricity markets remained considerably tense compared to pre-crisis levels, particularly at the beginning of 2023, meaning that Swissgrid expected significantly higher procurement costs for the provision of balancing power. 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. Significant shortfalls also previously accumulated in this tariff segment – not least due to the energy crisis – the reduction of which is now also resulting in an increase in tariffs and has seen the general system services tariff rise once again by just under 0.3 centimes to 0.75 centimes/kWh recently. A similar situation exists for the individual system services tariff 'active power losses'. The cost of this rose from 2023 to 2024 by over 0.3 centimes to 0.64 centimes/kWh (also see Section 3.7 System services).

In contrast, the network usage costs were barely affected by the turmoil on the energy markets – they primarily reflect the expected costs for the expansion and maintenance of the transmission network. The allocation of transmission network costs is governed by Art. 15 para. 1 to 3 ESO. In accordance with para. 3, the costs not charged individually are billed at 30 per cent as working tariff, 60 per cent as power tariff and 10 per cent as basic tariff. Although the imputed permitted rate for interest on assets for 2024 was raised by DETEC, the working tariff remained constant, while the power and basic tariffs have actually fallen slightly. All network usage tariffs nevertheless remain at a high level by long-term comparison.

As indicated at the beginning of this section, the new 'electricity reserve' tariff was introduced in 2024. In view of a looming energy crisis, the federal government implemented various relief measures from 2022 to ensure continued security of electricity supply in Switzerland during the winter. They include the hydropower reserve and, as a supplementary measure, a fossil-fuel reserve consisting of reserve power plants and emergency generators (see Section 3.3 Winter reserve). The federal government plans to charge the resulting costs to consumers via Swissgrid. In addition to the costs forecast for 2024, a significant proportion of the costs already in-

curred in the years 2022 and, in particular, 2023 have consequently been factored into the 2024 electricity reserve tariff, which is now being levied for the first time.

The developments outlined above are resulting in significant additional costs for Swiss consumers. A household with annual consumption of 4,500 kWh pays around CHF 92 for Swissgrid's original services in 2024 (2023: CHF 70 / Ø 2014–23: CHF 49). The newly created electricity reserve costs the same household an additional CHF 54. Due to the accumulation of extraordinary circumstances and to counteract the sharp increase in overall costs for consumers, ElCom approved Swissgrid's application to use all the auction proceeds expected for 2024 to reduce the tariffs. This relief measure is already included in the tariffs set out above. Finally, it is important to note that the tariff items indicated above are generally incorporated into the network usage tariffs of the around 600 Swiss distribution network operators. For reasons of transparency, many network operators indicate the tariffs for general system services and/or the electricity reserve separately in their tariff sheet or on the invoice.

## 5.5 Distribution network tariffs

### 5.5.1 Tariff increases in 2024

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. The average electricity price for the 2024 tariff year has once again risen significantly compared to the previous year: A typical household will pay 32.14 centimes per kilowatt hour in the 2024 tariff year (centimes/kWh). That represents an increase of 4.94 centimes/kWh, or around 18 per cent. On an annualised basis, that means total costs of over CHF 1,446 per year for typical household consumption of around 4,500 kWh, and equates to an increase of CHF 222 per year compared with the previous year, which was already at a high level. However, local prices may vary significantly.

There are several reasons why the tariffs may rise again in many places in 2024: The increase in electricity market prices from 2024 is having a greater impact on the energy tariff than in the previous year for many network operators because a large share of procurement for 2023 was carried out before the price increase on the futures market. The energy tariffs for basic supply are based on the production costs of self-generated energy and the procurement prices of electricity purchased. This means they largely depend on a provider's production and procurement portfolio. With regard to purchased power, the timing of procurement, the expiry date of procurement contracts and replenishment procurement required are all major factors as the prices on the electricity futures market have fluctuated sharply over recent months. Network operators also have a certain degree of leeway in terms of prioritising their own renewable electricity production in basic supply.

Secondly, the winter reserve costs of 1.2 centimes/kWh are passed onto consumers through a surcharge on the network usage tariff. Thirdly, the network usage tariffs are going up due to DETEC's decision to increase interest on capital (WACC) from 3.83 to 4.13 per cent.

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).

Figure 10 shows the composition of average overall electricity prices in centimes per kWh.

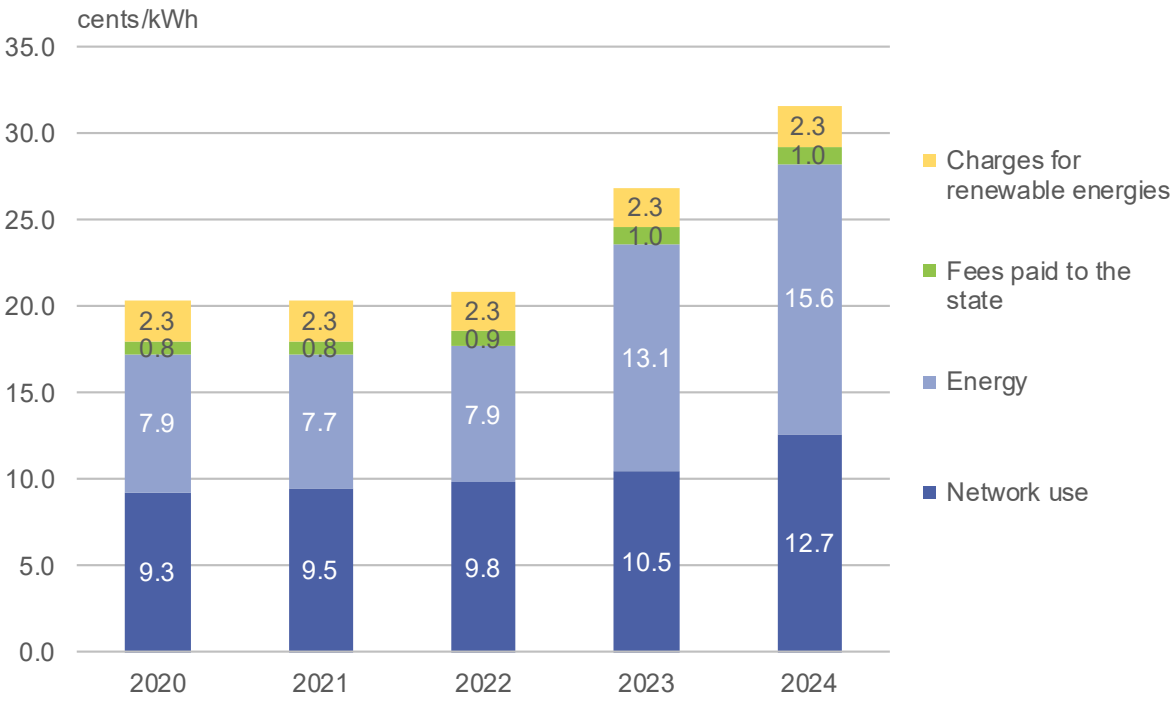



*Figure 10: Cost components of the average overall electricity price for consumer profile H4 (excluding VAT)*

Until the Report on the Activities of ElCom 2022, the data was weighted by invoice recipients rather than residents for technical reasons. This has now been adjusted and the data will now be weighted by residents as is also the case on the electricity price website.

### 5.5.2 Average tariffs for an average household in 2024

The median communal tariffs for 2024 are shown on the Swiss maps that appear below (Figures 11 to 14). 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

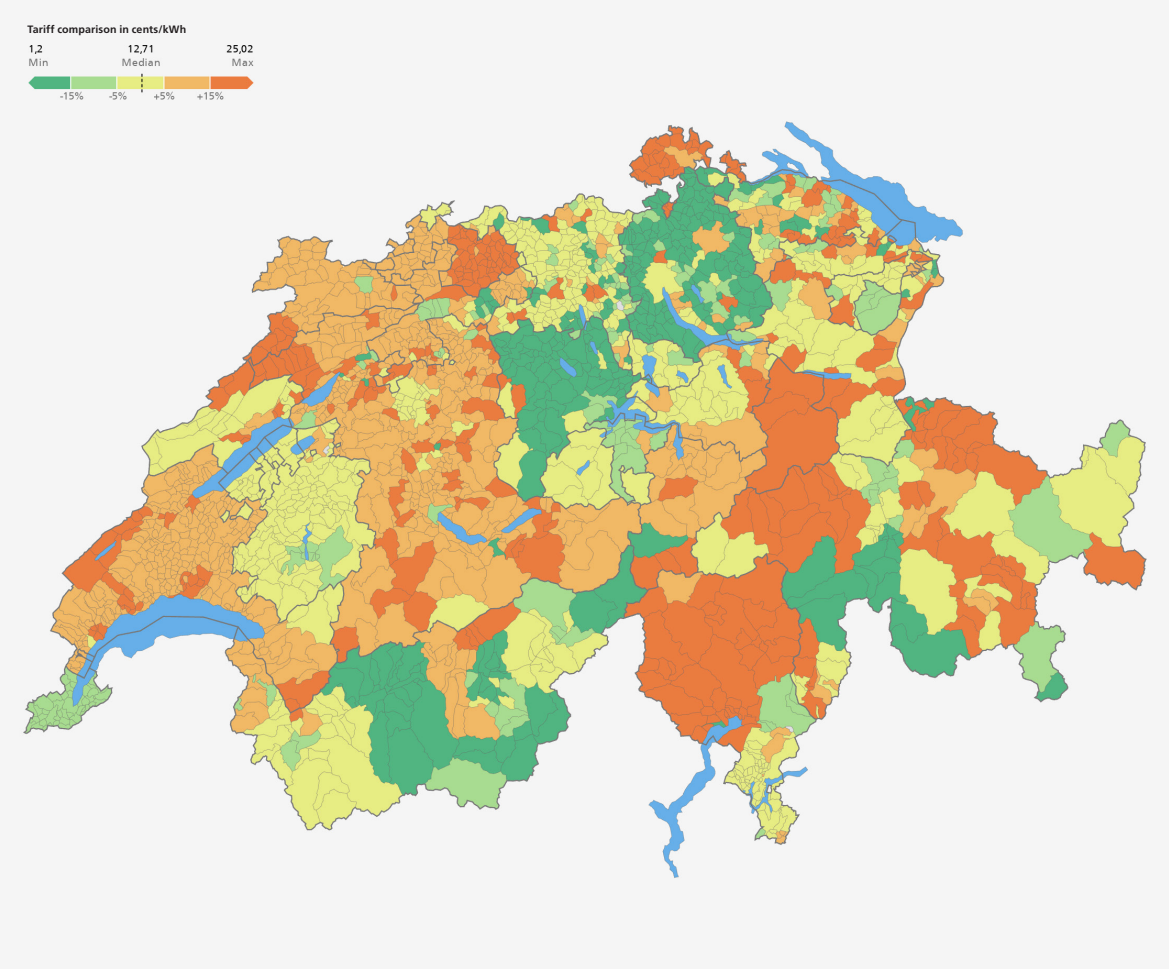



*Figure 11: Median cantonal tariffs for network usage for the H4 consumer profile in 2024*

## Median energy tariff

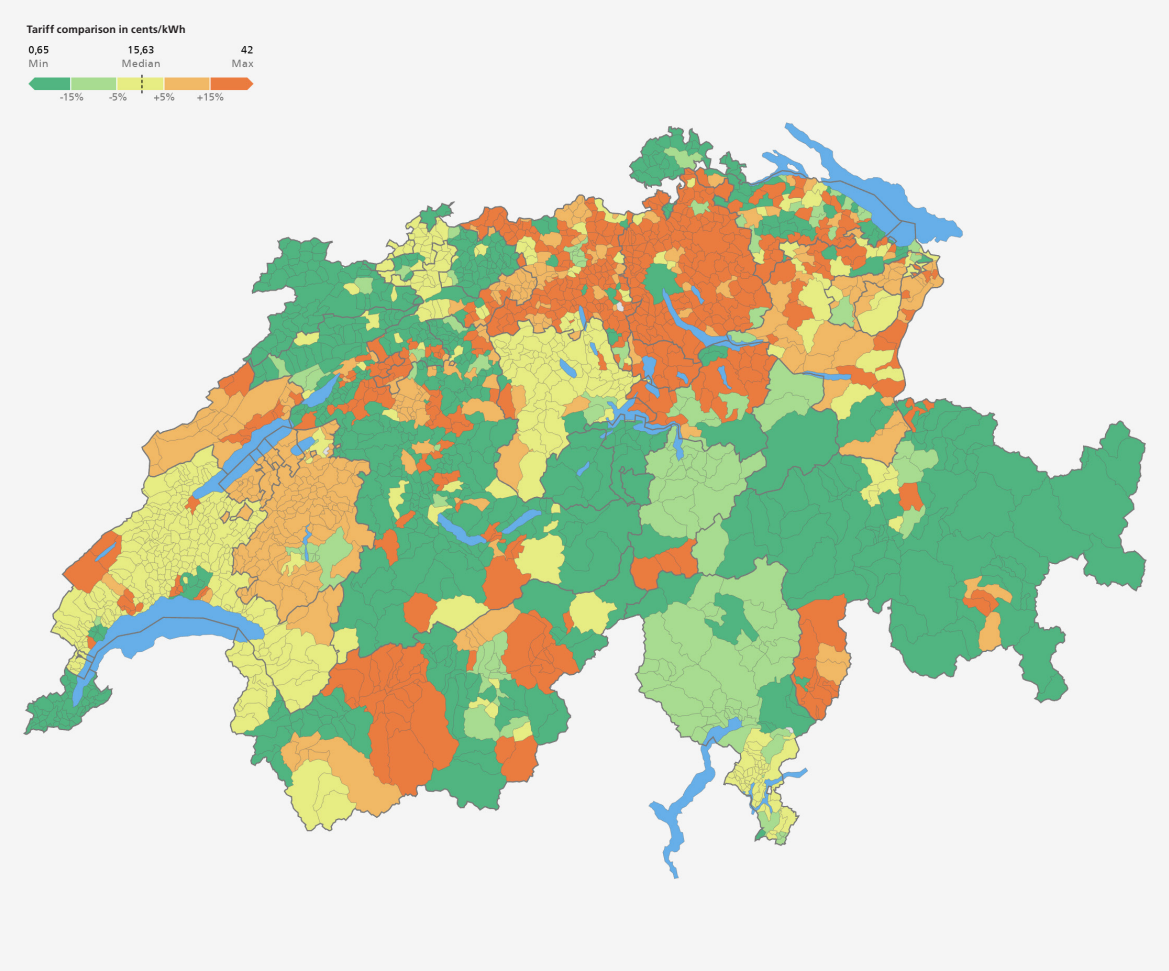



*Figure 12: Median cantonal tariffs for energy for the H4 consumer profile in 2024*

## 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 2024 are 1.0 centimes/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 2024, however (cf. Figure 14).*

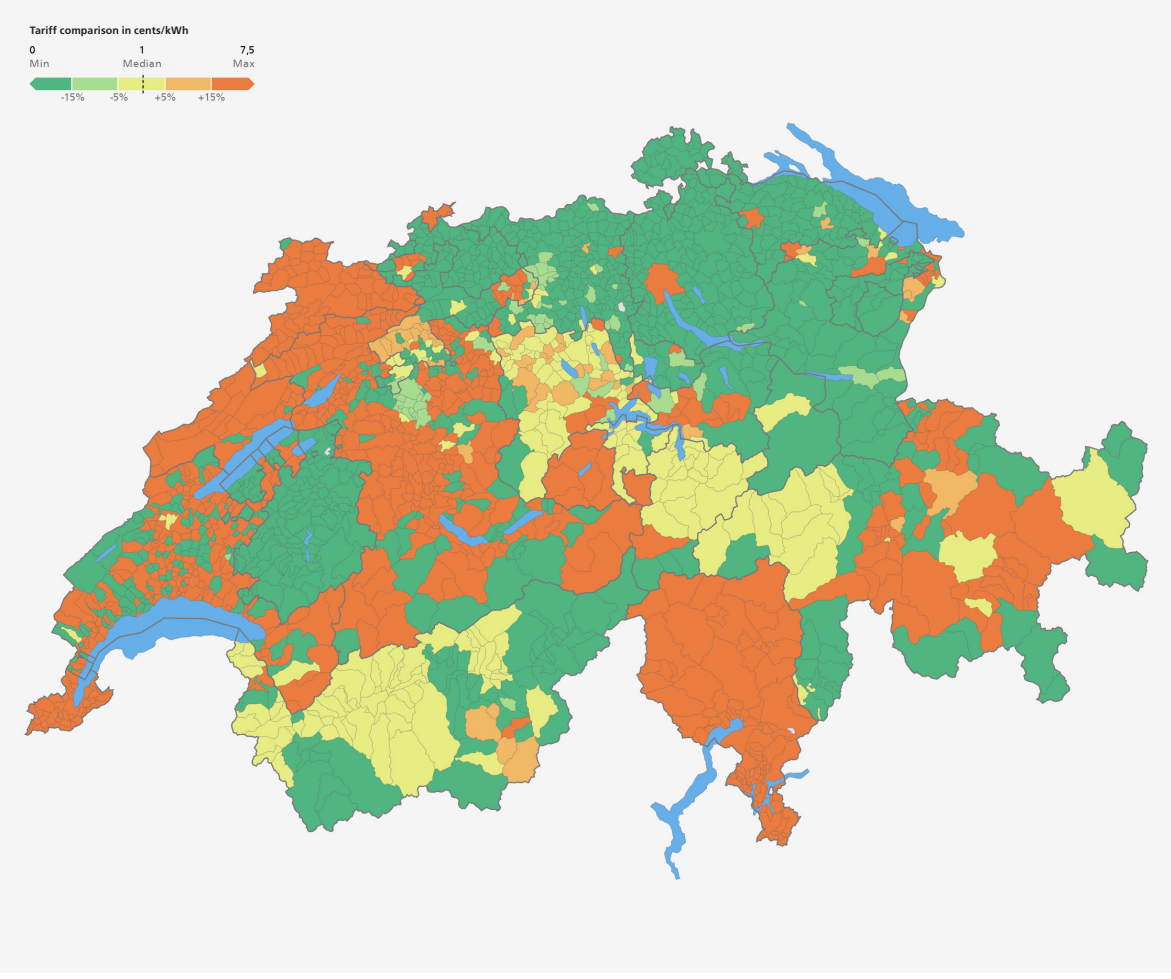



*Figure 13: Median tariffs of the Swiss cantons for cantonal and cantonal fees and payments to the state for consumption profile H4 in 2024*

## Median overall electricity tariff

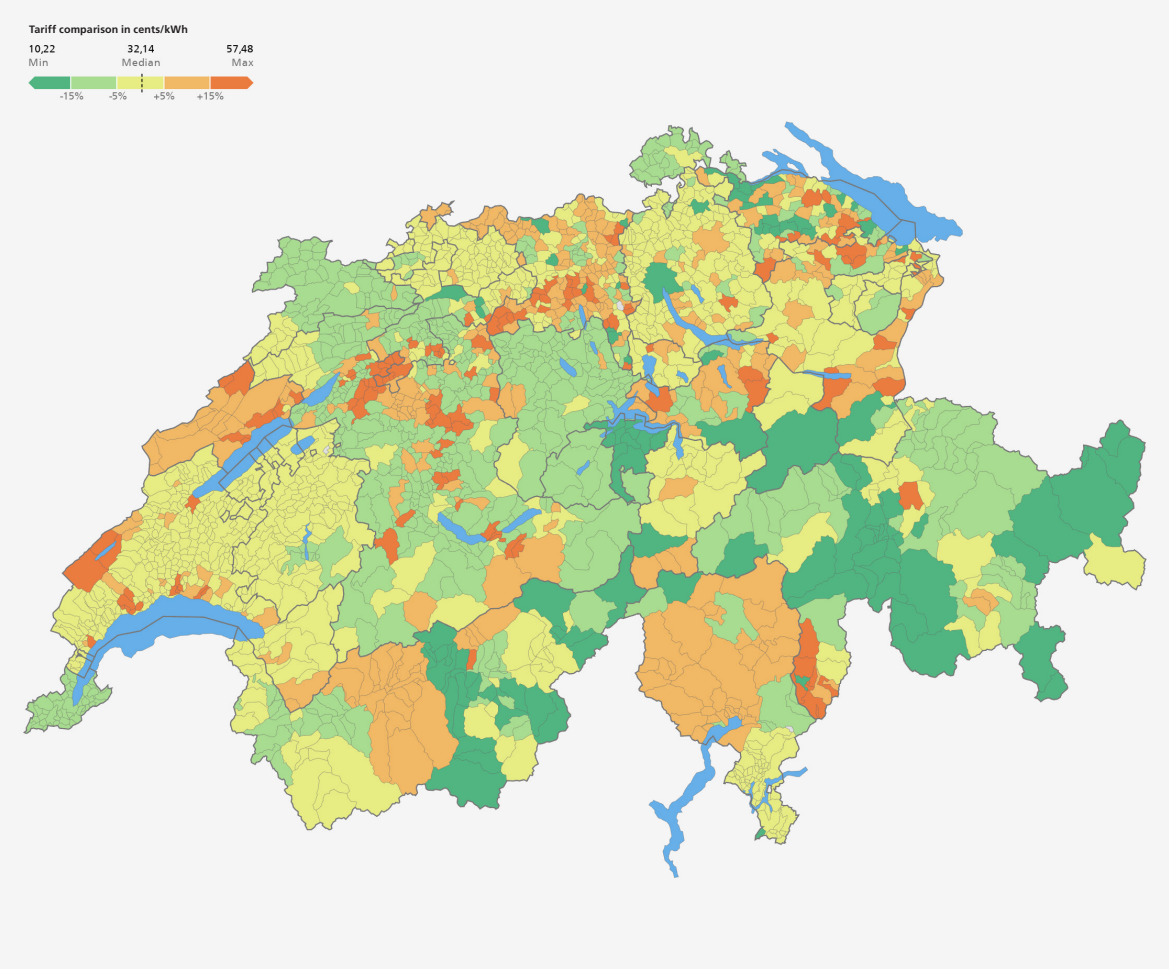



*Figure 14: Median cantonal tariffs for the overall electricity tariff for the H4 consumer profile in 2024*

## 5.6 Revenue structure of distribution network

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. Revenues are defined as the quantity of energy supplied multiplied by the applicable tariff components. They cannot exceed the costs plus a profit defined by the WACC.

The network operators may include any costs not covered by the tariff revenues during the year concerned in the following years by making additional charges in the tariffs (shortfalls). Consumers must also be refunded if excessive costs are charged (surpluses).

In 2023, the network operators declared total revenues of CHF 12.2 billion for 2022 (total of network and energy, excluding fees and payments). They are broken down as follows: CHF 4.9 billion in network usage remuneration and CHF 7.3 billion in energy.

In terms of company size, there is a similar breakdown in network usage remuneration to that of assets: The ten biggest network operators combined account for around 42 per cent of all revenues. The share of total revenue accounted for by the around 500 small and micro network operators fell slightly and now stands at 14 per cent.

## 5.7 ElCom action in connection with high electricity tariffs for 2024

The increase in electricity prices that began in the final quarter of 2021 initially affected mainly market customers and distribution network operators. Over the course of 2022, the market price trend became even more pronounced; by the time the tariffs were published at the end of August 2022, the problem had also spread widely to include end users with a basic supply, and ElCom was inundated with enquiries. ElCom once again received lots of complaints from the public in 2023, the year under review. More complaints about network operators' communication on tariffs were received in the year under review: consumers often feel they do not receive sufficient information and sometimes even believe they are fobbed off by their providers. Cases where providers had referred customers directly to ElCom were also reported. It is important to clearly note that network operators as suppliers are obliged to provide their consumers with transparent tariff information. ElCom's Technical Secretariat deals with such cases by contacting the network operators reported directly. Some providers inform their customers that ElCom has evaluated their tariffs for 2024.

Under the cost-plus system, 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 increas-

es (Art. 22 para. 2 ESA). Examinations of individual tariffs are based on a review of actual costs and the applicable rules according to Art. 14 (network usage remuneration) and Art. 6 ESA (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 ESA, the share of the tariff allocated to the supply of energy to captive end users is based on generation costs for efficient production, and on the distribution network 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.

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[1] and one covering enquiries from network operators about high tariffs[2].

With regard to the high energy prices – but also due to the fact that the revision of the ESA (omnibus legislation) does not require complete deregulation of the market – more preliminary studies have been undertaken and more evaluations conducted in the energy sector. Analysis has also been carried out on transparent tariff communication, in particular whether the change in strategy from production costs to market prices – which generally drive tariffs up – in relation to the prioritisation of renewable domestic production has been communicated to consumers in a sufficiently transparent way.

ElCom responded to numerous queries about the tariff structure. Queries concerning network usage tariffs of new e-mobility charging stations are worthy of mention in particular. In some cases, the network operators, as standard practice, allocate them to tariffs which apply to larger consumers and often contain a greater power component (such as business tariffs). However, in ElCom's view, charging stations used all year around also come under the basic customer tariff in accordance with Art. 18 para. 3 ESO, provided they are connected at voltage levels of below 1 kV and their annual consumption does not exceed 50 MWh. If this is the case, then network operators must provide, in accordance with Art. 18 para. 3 ESO, a network usage tariff with a non-degressive working component (centimes/kWh) of at least 70 per cent.

*1 available in german at www.elcom.admin.ch > Die ElCom > Kontakt > Häufige Fragen*

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

## 5.8 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 the 2022 reporting year when the infrastructure was connected to the DETEC eGovernment portal. However, follow-up work was still required and this was carried out in the 2023 reporting year. This included the adjustment of back-office processes in eGov, the final integration of the forms in eGov and the transfer of all end-to-end processes concerning the tariff survey, including the provision of the forms, the monitoring of the survey, the publication of the data on ElCom's electricity price website and on eGov as well as on the federal government websites opendata.swiss, Lindas and Visualize. While every effort is being made to ensure these activities do not interrupt normal survey activities, unfortunately there were various disruptions during office hours in the year under review. However, the processes and systems were stabilised overall during the course of 2023, which means operations can run as scheduled for the forthcoming survey period.

ElCom underlined the importance of the cost calculation in 2020 and provided a clarification concerning submission and subsequent amendment.[1] 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.

*1 see Directive 5/2022 at www.elcom.admin.ch > Documentation > Directives*

## 5.9 Examination of tariffs

### 5.9.1 Reduction in shortfalls

In addition to high electricity prices, ElCom continued to focus on the issue of shortfalls in the reporting year. These were 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. These activities were completed in 2023, 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. Of these proceedings, all but two were concluded without a decision before the end of 2023.

On an cumulative basis, the campaign for the network and energy business areas cut shortfalls and, in turn, the risk of future tariff increases by around CHF 1 billion. The work in this area also resulted in an amendment of the relevant legal basis in the ESA and associated ESO. The incentive for accumulating shortfalls and failing to eliminate them sufficiently has been significantly reduced – additional interest costs for consumers were also avoided to a large extent.

### 5.9.2 Examinations of network tariffs

After around 15 years 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.

As indicated several times already, monitoring of network operators also focused heavily on the increase in energy tariffs, which were very sharp in some cases, in 2023. With regard to network tariffs, only the above-mentioned shortfall proceedings were concluded in the year under review, but no new proceedings were initiated. The Federal Administrative Court ruled on the matter of individual tariff evaluation.

In 2021, ElCom issued a decision for the first time in a dispute between a consumer and a network operator on network usage tariffs (individual tariff evaluation). An appeal against this decision was completely rejected by the Federal Administrative Court in its judgement of 22 November 2023 (A-4303/2021). The main issue in the dispute was the evidence to be provided for evaluation of the costs. ElCom deemed the regulatory cost calculation and the target costs contained in it to be a suitable basis. The complainant wanted to use the basic accounting figures as the basis for evaluation. The FAC concluded that the cost calculation improved transparency and was a suitable basis for an individual tariff evaluation. In dispute proceedings, ElCom can also carry out further investigations and request additional documentation – e.g. from the network operator's accounting department – or more detailed explanations about cost items. The basis of the contested evaluation was not incorrect overall. The individual evaluation steps carried out by ElCom were not contested by the complainant which is why the court did not rule on them. An appeal against the FAC's judgement was submitted to the Federal Supreme Court.

### 5.9.3 Examinations of energy tariffs

As indicated above (see Section 5.5 Distribution network tariffs) the public, but also ElCom, paid close attention to the development of energy tariffs. After record-high increases in these tariffs in 2023 in some cases, the level also remains high in 2024 overall. As outlined above, ElCom's activities will focus even more heavily on this area in future. This essentially concerns the evaluation of procurement activities in the energy sector and the appropriateness of the tariffs in accordance with Art. 6 para. 1 ESA. These investigations concern the procurement of electricity in general, but also procurement and pricing, for example within group company structures and cross-participations. Preparations were also carried out for investigations concerning cost declarations for certificates of origin. Other-

wise, the average price method was a key priority again during the year under review.

The average price method concerns the issue of how electricity procurement costs are divided between the basic supply end users covered by the monopoly and free market customers. In accordance with the ESA, distribution network operators are obliged to pass on price advantages due to their unrestricted network access to fixed consumers on a pro-rata basis. In specific terms, it aims to ensure trading activities and own production are adequately taken into account in the calculation of the recoverable energy costs. This can have a significant impact on energy tariffs during periods of relatively low or high electricity market prices. In 2018 and 2019, lawmakers introduced new provisions which have since given network operators the choice of deviating from the average price method and including power generated themselves as a priority in the basic supply tariffs.

In proceedings against several network operators associated under a group company structure (subsequently referred to as the parent company), ElCom issued a partial decision in November 2023 concerning energy costs and tariffs in the 2017 financial year. The decision mainly concerned the correct implementation of the average price method. It warned that power-plant-specific allocation of production costs to basic supply based on the ESA was not permitted. Instead, the average of all production plants is relevant for use as a cost basis. Contrary to ElCom practice, the parent company had not included trading activities and price advantages arising from its unrestricted network access in the energy portfolio used to calculate the basic supply tariffs. EICom also had to determine whether the conditions set out in a framework agreement, under which the subsidiaries purchased energy from the parent company, were appropriate. Due to the lower-price market environment when the contract was concluded, the obligations undertaken by the subsidiaries to purchase energy at production costs for their basic supply consumers were not appropriate. Provision at market-based prices was then agreed for their own market customers. The subsidiaries, as independent network operators, could have procured energy for their basic supply consumers from a third party at similar prices. As a result, ElCom only accepted market-based prices for all the energy procured from the parent company. Other areas covered by the decision were WACC production and interest on shortfalls. The network operators concerned use their own individual interest rate (WACC energy) to determine the imputed interest costs on their production plants and other items. ElCom does not consider this appropriate and applies its published 'WACC production' to determine the interest. This amounts to a maximum of 4.98 per cent for the 2017 tariff year. In accordance with ElCom's directive, 'WACC network' (2017: 3.83%) is applied, as a maximum, to interest on shortfalls. Contrary to this regulatory provision, the network operators concerned also use their own individual, higher 'WACC energy' rate here. The network operators concerned were requested to rectify the above points based on a decision. An appeal against this decision was submitted to the FAC.

In the year under review, two distribution network operators were identified which had their own power plants, but sold all of the electricity generated from them on the market. This meant the energy required for basic supply was procured entirely from third parties. This procedure is contrary to provisions

under electricity supply legislation. Network operators which have their own power plants must include at least part of the power they generate themselves at a maximum of production costs in their tariffs. ElCom initiated proceedings against the two network operators.

In its judgement 149 II 187 of 29 March 2023, the Federal Supreme Court once again upheld ElCom's current practice on the average price method. This concerned two main issues. Firstly, the court had to decide on how structures under company law are to be considered in the context of the average price method. It decided that the choice of structure under company law should not be allowed to influence which group company benefits from a price advantage, which means that the distribution network operator, as one of these group companies, must not pass on this advantage. In the specific case, the court decided the joint inclusion of the energy portfolio of two companies was permitted due to the actual financial relationship. Secondly, the court had to decide which energy portfolio applied for the average price method. The complainants concerned divided their energy portfolio into trading and supply power plants. The court concluded that the spirit and purpose of Art. 6 para. 5 ESA excluded the direct allocation of individual costs. The pro-rata price advantages to be passed on were not limited in terms of scope nor time. The fact that the relevant energy volume exceeded that of total sales was also insignificant. All price advantages obtained on the free market must be passed on to basic supply on a pro-rata basis. This means the network operators have no discretion over which price advantages they pass on.

## 5.10 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 to 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 intervention 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 annually. In the year under review, ElCom decided not to send individual results to the network operators for the time being due to a lack of resources.

The Federal Act of 29 September 2023 on a Secure Electricity Supply from Renewable Energy Sources (omnibus legislation) was approved by the Swiss Parliament in its 2023 autumn session. The new article 22a ESA requires ElCom to carry out comparisons and publish them in a suitable way. ElCom began the work to implement these legal provisions during the year under review and will continue it.

## 5.11 Metering

In the proceedings 233-00093, ElCom issued a decision on a smart meter in accordance with article 17a ESA that the network operator uses for a basic supply consumer. The consumer rejected this smart meter, and in particular the data processing it was used to perform, and demanded the replacement of the system's electronic electricity meter with a conventional, mechanical electricity meter without a communication link. In its decision of 6 April 2021, ElCom had already ruled that the network operator could continue using the smart meter until the end of its lifespan as consumers have to accept the use of smart meters and have no entitlement to the retention of conventional electricity meters. It only became apparent during the appeal proceedings before the Federal Administrative Court that the smart meter had a circuit breaker. The court considered whether the consumer's power supply could be interrupted with the circuit breaker by remote control, whether it fell under the definition of a smart control system in accordance with Art. 17b para. 1 ESA and whether its usage required the consent of the consumer concerned (Art. 17b para. 3 ESA). In its judgement A-2372/2021 of 26 July 2022, it partly reversed ElCom's decision and referred the proceedings back to ElCom to assess whether the circuit breaker could be used to interrupt the consumer's power supply by means of remote control.

The investigations carried out by ElCom indicated that the power supply could be interrupted remotely using the circuit breaker and that this function could not be deactivated. In accordance with the court's considerations, which are binding on ElCom, ElCom therefore decided to classify the circuit breaker used in the consumer's meter as a smart control system. This means the use of this function is subject to consent. Because the network operator had installed the circuit breaker for the purpose of accounts receivable management and not to prevent immediate significant risk to secure network operation, the consent requirement cannot be waived by way of exception (Art. 8c para. 5 ESO). As the consumer refused to provide consent, there was no legal basis for the use of the smart meter's circuit breaker.

Because the consumer requested the replacement of the smart meter with a conventional electricity meter, ElCom also had to decide, in accordance with the instructions of the Federal Administrative Court, whether it had to be removed or whether the consent requirement was met in another way and whether this took precedence for reasons of proportionality. In the specific circumstances, ElCom considered prohibiting the use of the circuit breaker for purposes other than risks to secure network operation (in con-

junction with the threat of penalty for violation of this stipulation) to be a suitable measure to ensure the circuit breaker is not used without the consumer's consent. It then considered how the two options of removal of the smart meter or prohibiting activation of the circuit breaker affected the interests of the parties. ElCom concluded that the removal of the smart meter would be disproportionate. In particular, it recognised that removal would incur costs for the network operator, whereas the mere existence of the circuit breaker would not have any significant adverse effect on the consumer.

The consumer also opposed the processing of their personal data by the smart meter. They claimed they fundamental right to self-determination in information matters protected by the Federal Constitution (Art. 13 para. 2 Cst.) had been violated because the requirements of Article 36 Cst. on the restriction of fundamental rights (legal basis, public interest and proportionality) had not been met. The Federal Administrative Court instructed ElCom to evaluate the specific circumstances of the data processing carried out by the network operator on the consumer concerned using the smart meter and to assess whether it met the requirements indicated. The network operator used the smart meter to carry out various data processing. ElCom decided that the vast majority of this data processing met the requirements of Art. 36 Cst. However, in the case of a few processing procedures, it concluded that there was an insufficient legal basis without the consent of the consumer concerned and ordered the network operator to modify them in order to meet the requirements. ElCom also decided that the data processing procedures provided for under electricity supply legislation do not fall under the category of profiling in the new Data Protection Act (Art. 5 let. f FADP). The decision, which is not yet legally binding, is published on ElCom's website.

Within ten years of the entry into force of the amendment of 1 November 2017, 80 per cent of all measuring systems in a network area must meet the requirements of smart meters (smart meter rollout; Art. 31e para. 1 in conjunction with Art. 8a and 8b ESO). In its decision 212-00414, ElCom confirmed previous jurisprudence under which the installation and use of a smart meter for consumers, producers or storage facility operators does not require the consent of the party concerned and they must provide the network operator with access to the property to replace the existing conventional electricity meter with a smart meter. This legally binding decision is also published on ElCom's website. In relation to Plug&Play PV systems, ElCom was repeatedly faced with the question of whether the system operator is entitled to request that they are fitted with a smart meter before normal rollout by the network operator. Under the previous law, the network operator could decide for themselves when they installed a smart meter for consumers and producers in accordance with Art. 8a and 8b within the deadline for fitting 80 per cent of all measuring systems in a network area. However, a smart meter has to be fitted at the present stage for consumers making use of their entitlement to network access, but also for producers if they connect a new generation system to the power grid (Art. 31e para. 1 in conjunction with para. 2 let. a and b ESO; as at 1 September 2023). As Plug&Play PV systems generally only feed in low amounts of electricity and the immediate fitting of a smart meter can incur relatively high costs for network operators, the application of this provision to these systems was questionable

for reasons of proportionality. On 1 January 2024, the Federal Council therefore deleted Art. 31e para. 2 let. b ESO and created a new Art. 31n ESO. This stipulates that the network operator can still generally decide when they install smart meters for consumers and producers within a 10-year period in accordance with Art. 8a and 8b. The exception, whereby a smart meter is fitted for producers regardless of this if they connect a new generation system to the power grid, only applies if its installation is subject to approval in accordance with Art. 6 of the Low-Voltage Installations Ordinance of 7 November 2001. This means operators of Plug & Play PV systems are no longer entitled, as of 1 January 2024, to request immediate installation of a smart meter after connecting their system.

## 5.12 Feed-in remuneration

In 2022, the record-high prices in electricity trading also led to a record number of requests for remuneration under the purchase and remuneration obligation (Art. 15 EnA) for the feed-in of electricity produced by small generation systems (feed-in remuneration). In 2023, the number of these enquiries fell sharply. ElCom continued to regularly receive enquiries about whether the purchase and remuneration obligation also applies to Plug&Play PV systems. The obligation to purchase and provide remuneration for electricity only applies if it comes from systems with a maximum output of 3 MW or annual production – minus any self-consumption – of a maximum of 5,000 MWh (Art. 15 para. 2 EnA). The law provides for an upper output and production limit for the network operator's purchase and remuneration obligation, but not a lower one. This means the purchase and remuneration obligation of network operators also applies to small PV systems, such as Plug&Play PV. As explained in Section 5.11, the Federal Council created an exception to the rule that production systems have to be fitted with a smart meter immediately after connection to the grid. However, as the feed-in from these systems cannot be measured without a smart meter, the Federal Council also created a new Art. 12 para. 3 to the Energy Ordinance (EnO) under which the network operators can provide appropriate annual flat-rate remuneration for the electricity fed in in the case of such systems instead of early smart meter installation. However, complete refusal to provide remuneration for feed-in from Plug & Play PV systems would be contrary to the lawmakers' will in the Federal Council's view. That is why it decided against including a lower output limit for the purchase and remuneration obligation in the EnO in accordance with Art. 15 EnA.

It is important to note that the Swiss Federal Parliament decided to create new provisions for the purchase and remuneration obligation in accordance with Art. 15 EnA in the Federal Act on a Secure Electricity Supply from Renewable Energy Sources (amendment to the Energy Act and Electricity Supply Act; referred to as omnibus legislation). The law now stipulates that the network operators must provide remuneration for the energy at a uniform price applicable nationwide in Switzerland if they fail to reach agreement with the producers on remuneration. The remuneration for electricity produced from renewable energies will be based on the market price, which is averaged quarterly, at the time of feed-in. The Federal Council sets minimum remuneration levels for systems up to an output of 150 kW which are based on the amortisation of reference systems over their

lifespan (Art. 15 para. 1 and para. 1$^{bis}$ revEnA; also see the provisions for electricity from combined heat and power plants and renewable gas in para. 1$^{ter}$ and 1$^{quater}$).

These new provisions have fundamentally reformed the system for determining feed-in remuneration and the ordinance provisions also had to be amended, in particular Art. 12 para. 1 EnO. However, a referendum has been called against the omnibus legislation. This means it is uncertain whether the amendments will actually enter into force. The referendum will be held on 9 June 2024.

# 6 Market Surveillance

*Greater transparency on the wholesale markets reduces the risk of market distortions and price signal disruptions and ensures that consumers pay a fair price for electricity.*

## 6.1 Extraordinary wholesale market price rises in 2023

2023 was a year marked by the easing of the market situation and renewable energies. This sums up events on the wholesale markets in one sentence. Prices fell and the price structure between Switzerland and its neighbouring countries has returned to as similar situation as before the crisis. There was also a decline in the consumption of electricity and gas and a significant expansion of renewable energies.

2023 started with the first winter after Russia had halted most gas exports to Europe by pipeline. Savings and a general reduction in consumption in industry, as well as rapidly added LNG terminals in 2022, enabled the gas storage facilities to be filled in 2022, which had previously been in serious doubt. This prevented disruptions to supply and, when it became clear that Europe would get through the very mild winter comfortably, the prices of gas and, in turn, electricity dropped. An example of this can be seen in the price trend for the year-ahead in Figure 15. The French nuclear power plants were also reconnected to the grid to a large extent over the course of the year. Doubts over their availability briefly emerged, which is why the French forward price rose again in March 2023. The heavily reduced availability of the nuclear power plants had previously been a major contributory factor in the historically unprecedented price increase in 2022. At the end of 2023, a fall in electricity prices was observed again as the high fill level of the gas storage facilities and continued low gas consumption eased the gas price situation. This development occurred despite the conflict in the Middle East flaring up once more and prices initially increasing again in October in response to the situation. The continual return of the French nuclear power plants also changed the price structure between Switzerland and its neighbouring countries. At the start of the year, the Italian year-

ahead price was still the least expensive by comparison, but it has been the most expensive neighbour once again since September and France's prices fell below those of Germany towards the end of the year. From a market perspective, the crisis appears to be almost over, although prices remain at a high level by historical comparison.


*Figure 15: Futures prices of baseload electricity for delivery year 2024 (source: EEX).*

The prices on the spot market followed the development of gas prices, but short-term weather effects are also having a greater effect here in view of the ongoing energy transition. The price trend can be seen in Figure 16. Especially during the summer half of the year, the spot price in the midday hours on the weekend often fell to 0 EUR/MWh, or even below, due to the high level of feed-in from photovoltaic systems. The low point was reached on 2 July 2023 at -143 EUR/MWh due to the effect of prices of -500 EUR/MWh in the Netherlands and Germany. Prices here fell to the market minimum due to significant excess supply and an insufficient price limit. This illustrates just how important the flexible demand and sales of energy will be in future. The price peaks usually occurred when individual thermal power plants were required for just a few hours: Consumption goes up in the morning, before photovoltaic production increases and the sun has already set before consumption falls again in the evening. There is a high degree of price coupling with neighbouring countries, but due to the limited transmission network capacity these price peaks in Switzerland are only borne by countries abroad to some extent.

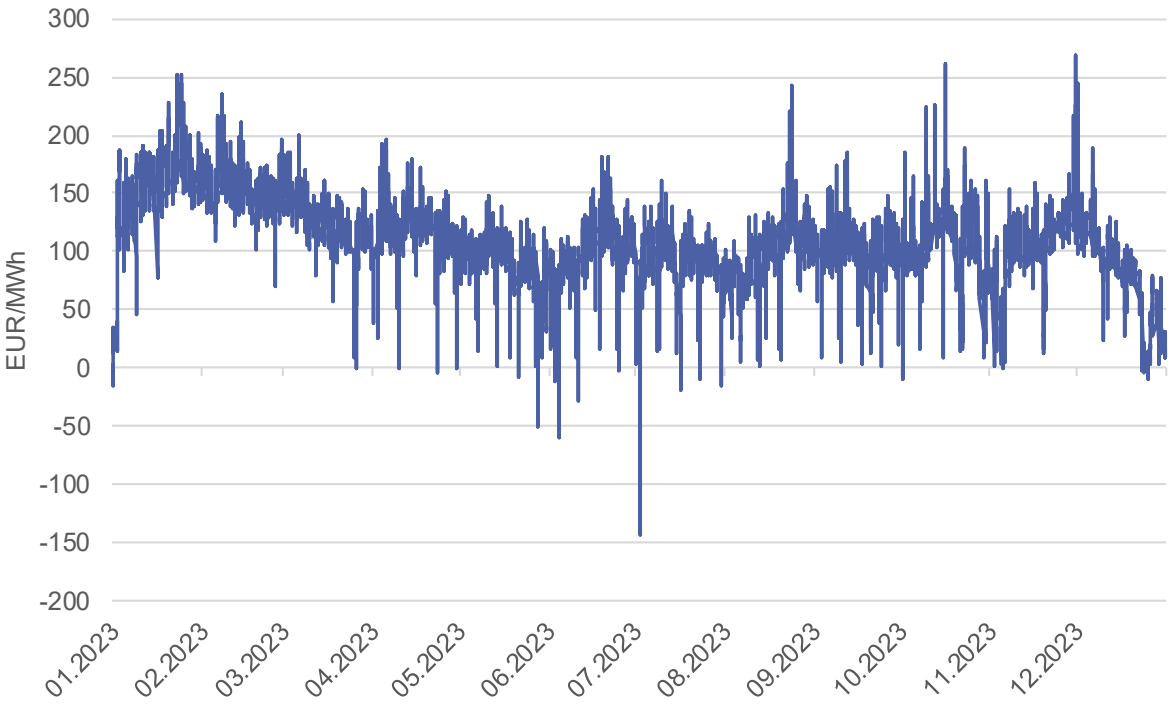



*Figure 16: Hourly prices for day-ahead delivery of electricity (source: EEX).*

## 6.2 Market transparency in wholesale electricity trading

The latest market surveillance developments in Switzerland were reported at this year's workshop held by ElCom's Market Surveillance ection. This focused on current measures being undertaken in Switzerland, such as the Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (FiRECA) and the Federal Act on Supervision and Transparency in the Wholesale Energy Markets (GATE). The key elements of the EU measures on market design and their impact on Switzerland were also outlined.

The current topic of 'Use of long-term (trading) instruments in the new market design' was explored from various perspectives during the second part of the event. This mainly concerned the various aspects of Power Purchase Agreements (PPAs). At the start, the SFOE provided an overview of current developments in the regulatory environment. Long-term hedging instruments in comparison to traditional ones and their treatment under REMIT were looked at from the EU regulator's perspective. A representative of Pexapark explained how a provider of PPAs in Europe deals with these new instruments. Finally, a presentation was given on the expectations of PPAs from the perspective of industry. A representative of the power exchange EEX outlined the six main misconceptions about the regional virtual trading platform.

As is the case every year, the annual Market Transparency report was also presented at the workshop. It offers a further comprehen-

sive 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 in the past year.

Discussions with energy regulators in neighbouring countries took place again in 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. The planned measures on the development of REMIT and the modifications to the market design in the EU were also covered. In this connection, coordination meetings were also held with SIX and EPEX Spot.

As a member of the CEER Market Integrity and Transparency Working Group (CMIT), ElCom again participated this year at European level in the preparation of a comprehensive questionnaire on the activities of the individual EU regulators regarding the implementation of REMIT. This questionnaire provides a good overview of market surveillance activities in the EU. At meetings held quarterly, ElCom provides updates on the current price developments for the various commodities and explains the reasons for them.

## 6.3 Market Surveillance: facts and figures for 2023

The number of market participants registered with ElCom is growing steadily since the registration and reporting obligation began with the entry into force of the REMIT Regulation in 2015, and subsequently under Article 26a$^{bis}$ ESO for electricity companies established in Switzerland that trade on EU markets. In 2023, 17 companies began the registration process with ElCom. Nine of them completed it by the end of the year. Two companies ceased their trading activities during the past year and were de-registered. This means the number of market participants registered with ElCom as at 31 December 2023 was 93. A list of the registered market participants is published on ElCom's official website under the 'Market surveillance' section.

The information on the energy trading activities subject to reporting obligations of these companies was still exclusively sent to ElCom via the nine registered reporting mechanisms (RRM) connected to ElCom's IT systems. A further RRM was still in the process of being connected at the end of 2023.

As in previous years, ElCom received the fundamental data and publications on insider information via its own specially created interfaces with ENTSO-E and the EEX transparency platform.

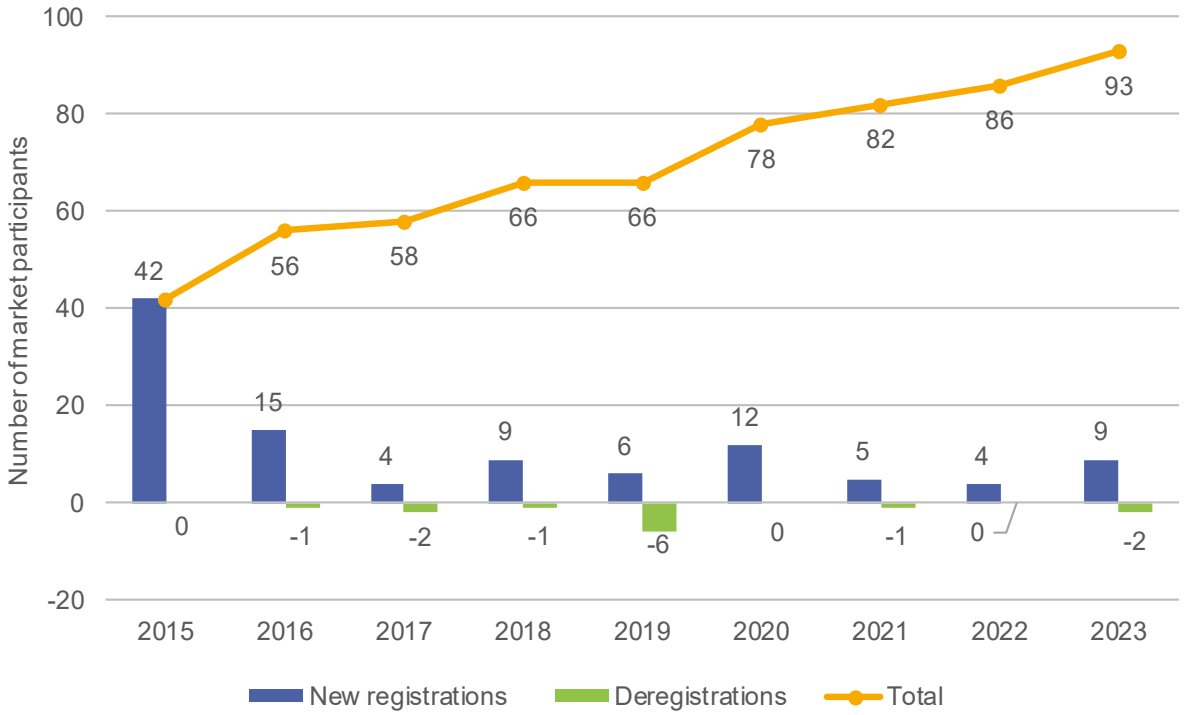



*Figure 17: Number of registered Swiss market participants*

For its monitoring and surveillance purposes, ElCom's Market Surveillance section also used information, such as the settlement prices for electricity, gas and CO2 of EEX and EPEX SPOT, the coal prices of Refinitiv and data from European Commodity Clearing (ECC) for reference in the reports and analyses produced. Data on the levels of reservoirs in Switzerland, power plant availability in neighbouring countries and other information, some from public sources such as MeteoSwiss, are also retrieved and used as a valuable supplement in various market surveillance activities.

Since the reporting obligation was introduced at the end of 2015, there has been an increase not only in the number of market participants registered with ElCom, but also in the volume of data transmitted to ElCom on their behalf via RRMs. The majority of the reports once again related to standard contracts in 2023. Compared with previous years, the upward trend was even stronger in 2023, with an increase of 37.4 million reports year on year to just under 97 million trades and orders. Reported orders alone accounted for 75.3 million of this figure. This corresponds to an increase of more than 74 per cent compared to the previous year, which can be explained primarily by the trend towards increasingly short-term trading and the associated increase in the use of automated trading algorithms. The number of trades transmitted in 2023 rose by 32 per cent compared with 2022. This is mainly due to the introduction of FiRECA and the registration of new market participants and the related provision of data.


*Figure 18: Development in the number of transactions reported*

The dominance of spot over forward transactions in the standard contracts in the previous years was maintained. They account for 84 per cent of all reported standard contracts in 2023 compared with 89 per cent in 2022. This decline is mainly due to an increase in corrections and re-sending of data which were carried out by some market participants on previously reported forward transactions for quality purposes.

The number of non-standard contracts decreased in 2023 by 22 per cent, almost falling back to the level of 2021. This is explained by the implementation of back-loading in 2022 which increased the number of non-standard contracts reported.

The fundamental data available was 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. In 2023, the volume of this data together with the insider information transmitted fell, with some 712,000 fewer reports than in 2022. This corresponds to a decrease of almost 13 per cent compared to the previous year.

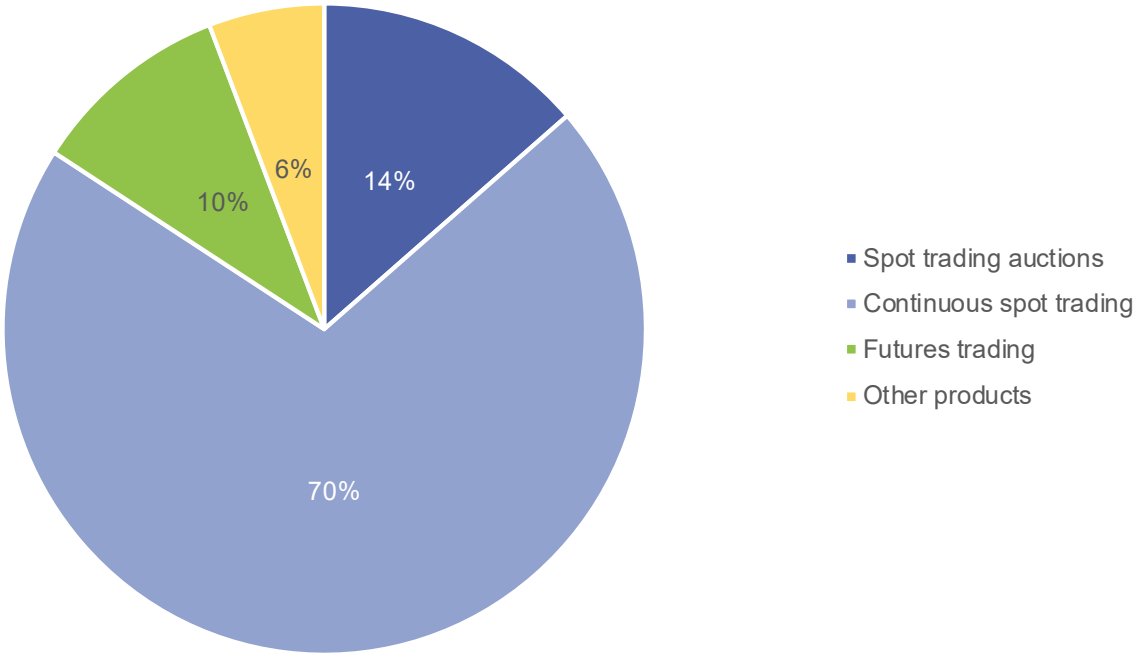



*Figure 19: Breakdown of standard contracts by spot and futures trading*

## 6.4 Experiences from a year with FiRECA

With preparations in place, the Federal Act on Subsidiary Financial Aid to support Systemically Critical Companies in the Electricity Industry (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.

The systemically critical companies are obliged to provide ElCom and the Swiss Federal Audit Office (SFAO) with the relevant data. All data is exchanged via a trust room. ElCom uses the transmitted data to produce a monthly surveillance report which it sends to the SFAO. The aim of the FiRECA supervisory report is to monitor the liquidity development of system-critical companies and anticipate the liquidity needs resulting from their trading activities.

Monthly discussions were also held with the systemically critical companies on the improvement and standardisation of the transmitted data, with particular emphasis on ensuring that the evaluation statements can be compared with one another. ElCom also tests the plausibility of the transmitted data. A further module was added to the existing market monitoring system to facilitate this. The chal-

lenge of integrating the FiRECA data sent to ElCom's applications had to be overcome.

The trading and hedging activities on various markets, open positions on exchanges and in bilateral trading for various delivery periods and the related margin exposures available are currently being analysed. The liquidity figures reported and the development of liquidity of systemically critical companies are also being evaluated in parallel. This is being carried out using the liquidity stress tests provided monthly for the margined portfolio. During quarterly meetings with the systemically critical companies, ElCom's findings are presented, discussed and then confirmed.

As market conditions have changed significantly compared with autumn 2022, Axpo AG submitted a request in autumn 2023 for re-examination of its loan application under FiRECA to DETEC's General Secretariat. Axpo AG's liquidity requirements fell significantly compared with autumn 2022. The main reason for this – as a result of lower electricity market prices for futures transactions – is the normalisation of the level of margin calls paid in cash. The lack of subsidiarity on account of the self-help measures taken also supported the case for re-examination.

In cooperation with the SFOE, ElCom analysed financial stability based on the information provided by Axpo AG and produced a summary in relevant reports. In view of the positive overall picture presented, Axpo AG's request for annulment of the FiRECA decision of 5 December 2022 was approved on 4 December 2023. This removed the credit line granted of a maximum of CHF 4 billion. However, in accordance with Art. 19 para. 2 FiRECA, Axpo AG remains subject to reporting obligations. Since December 2023, it has only been providing data in accordance with Art. 19 para. 2 FiRECA, like the two other systemically critical companies, whereas it was previously obliged to report additional information in accordance with Art. 19 para. 3 FiRECA.

FiRECA is limited in time until the end of 2026, after which it will be replaced by other legal provisions. This includes the Federal Act on Supervision and Transparency in the Wholesale Energy Markets (GATE).

## 6.5 More transparency on the Swiss marketplace – GATE

At its meeting on 16 December 2022, the Federal Council initiated the consultation procedure on GATE. This new draft bill obliges market participants to send ElCom information on their transactions and trading orders. It also contains provisions prohibiting insider trading and market manipulation. The aim is to improve transparency, surveillance of the energy wholesale markets, the stability of the system and security of supply. It is the first step in removing the financial backstop for systemically critical electricity companies (FiRECA).

The new law aims to ensure greater transparency, improve surveillance and strengthen the integrity of the energy wholesale market and system stability in the electricity and gas sectors. It will increase the legal powers for surveillance of the electricity and gas wholesale market. It will be followed up by another bill that will include equity and liquidity provisions.

The Federal Council's new GATE Federal Act aims to specifically govern the following points:

- Insider trading and market manipulation on the energy wholesale market are prohibited as under financial market regulation.

- The market participants concerned are obliged to register with ElCom and to submit information on their transactions and trading orders on the energy wholesale market.

- The information to be submitted concerns electricity and gas products which are produced, traded, stored, supplied or transported in Switzerland, including derivatives. Contracts with consumers are excluded unless they have a significant influence on energy prices.

- The data submission may be delegated by market participants. The information to be reported must be submitted via registered reporting mechanisms.

- The market participants concerned must publish insider information, such as data on capacity, scheduled and unscheduled periods of the unavailability of power plants and energy transmission networks. ElCom may publish data online to improve transparency.

- As previously the case in accordance with Art. 26a$^{bis}$ ESO, natural persons and legal entities residing or with their registered office in Switzerland, which execute transactions on the EU energy wholesale market, must also submit information, which has already been published under European law or has been submitted to the European authorities, to ElCom and register with it.

- ElCom is tasked with collecting and evaluating data, collaborating with other competent authorities in Switzerland and abroad and exchanging information.

- ElCom is authorised to enforce the obligations of market participants and to impose penalties on violations.

- Insider trading and market manipulation on the energy wholesale market may result in criminal proceedings.

The new provisions, proposed by the Federal Council in the bill submitted for consultation, concern companies operating on the electricity and gas wholesale market, including the national grid operator, gas transport network operators and major consumers. They may be exempted from reporting obligations by the Federal Council. Medium-sized and small network operators and supply companies only have to register with ElCom and are not subject to reporting obligations. These new provisions are generally in line with the EU Regulation on Wholesale Energy Market Integrity and Transparency (REMIT).

## 6.6 Impact of REMIT 2 on Swiss market participants

On 13 December 2023, agreement was reached in the EU on the amendment to the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT 1227/2011), which will be formally adopted in 2024. REMIT 2 aims to improve protection against market manipulation on the wholesale energy market in the EU.

In contrast to the current REMIT regulation, the following points, which are already covered by GATE, are to be introduced:

- Extension of the definition of market participants to the operators of distribution networks, storage facilities and LNG facilities. The definition of organised marketplaces was also extended to include energy capacity platforms.

- In this regard, the definition of products was extended to contracts on the storage of electricity and gas and related derivative products. Information on transactions and trading orders intended to maintain system stability or to balance out deviations on the Swiss electricity and gas networks must only be submitted by the national grid operator and Swiss gas transport network operators.

- All insider information platforms (IIPs), on which insider information is published, must be accredited. This also applies to the registered reporting mechanisms (RRMs) which report the data for the market participants concerned.

- Persons professionally arranging transactions (PPATs) are obliged to monitor and report any suspected violations.

REMIT 2 aims to align energy market regulation with financial market regulation. A key point is filling gaps and ensuring complete data collection. In particular, this applies to the submission of orderbook views in coupled markets by organised marketplaces. It also aims to improve market transparency through special monitoring of liquefied natural gas (LNG) by ACER.

The tighter monitoring of algorithm-based trading through the mandatory implementation of effective systems and risk controls is not currently covered by GATE. Notification of ElCom in the event of provision of direct electronic access is currently not provided for either.

Swiss market participants trading in the EU must now designate a trading representative in one of the EU states and authorise them by means of written mandate to act on their behalf. To avoid generating additional costs and creating competitive disadvantages for the market participants concerned in Switzerland, the necessary amendments are to be incorporated into GATE.

## 6.7 New EU market design

The electricity market reform is the EU's substantive response to the 2022 energy crisis. The main reason for this reform is the dependence of the short-term electricity market on price pressure from conventional power plants (particularly gas-fired plants). This mechanism is called the merit-order principle. The new provisions aim to make electricity prices less dependent on the price of fossil fuels. Various relevant measures have been implemented long-term, including pricing rules in the merit order, promoting the production of renewable energies through contracts for differences (CfD), long-term electricity supply contracts and fixed-price contracts for consumers. The overarching goals are to avoid excessive price increases in the consumer market and to secure electricity production through the use of relevant promotional instruments. By adopting the electricity market reform on 14 December 2023, the European Commission, the European Council and the European Parliament agreed on an overall package of measures that will be implemented from 2024. ElCom will monitor this development and the implications for the Swiss energy market.

# 7 International activities

*Cross-border electricity trading is extremely important both from an economic perspective and for Switzerland's security of supply. ElCom therefore welcomes the Federal Council's intention to conclude a bilateral electricity agreement between the European Union and Switzerland.*

## 7.1 Congestion management

The Swiss transmission network is connected to the networks of neighbouring countries via 41 cross-border transmission lines. These connecting lines are 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, on the one hand, supplies based on long-term contracts concluded before 31 October 2002 (this concerns several contracts with France that are still running), and on the one hand, supplies from hydropower plants on the border. 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. Transport rights are awarded separately from the energy business. 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.

Capacity at all borders within the EU can now be allocated implicitly. Flow-based market coupling (FBMC) optimises and simultaneously allocates transport capacity at each border depending on the price difference and local network situation. The gradual in-

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

However, in the absence of accords on electricity with the EU, Switzerland is unable to participate in FBMC. This means the allocation of capacity on the Swiss borders continues to vary depending on the border and time period: The Joint Allocation Office (JAO S.A.) carried out explicit auctions on all of Switzerland's borders at the year, month and day-ahead auction. In contrast, explicit continuous trading based on a 'first-come, first-served' procedure is used in intraday trading on most Swiss borders (capacity still available is allocated by Swissgrid and the neighbouring transmission network operator).

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, 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 provided up to the end of 2025. In 2023 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 2023 Germany had to achieve 40.8 per cent, Austria 39.0 per cent. More information on the inclusion of Swiss flows in the 70 per cent targets can be found in Section 3.4 Unscheduled flows.

The development of EU regulation and methods (specifically the 70 per cent 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 2025 at the earliest. Preparations at national level to enable the participation of Swiss market participants are under way and are being coordinated by Swissgrid. ElCom is supporting this work and is representing Switzerland's interests at EU level in the discussions between regulators.

## 7.2 Merchant lines

Merchant lines are cross-border transmission lines. In the event of an exemption, there is no requirement to grant network access to third parties on electricity transmission lines such as these. While the transmission capacity is managed by the network operators, its utilisation is reserved for the investors. These exemptions are limited to a specific time frame upon expiry of which the line is transferred to the ownership of the national grid operator. Switzerland currently has no merchant lines.

Discussions on the creation of a new merchant line from Switzerland to Italy on an existing, disused line have been stepped up again. In the reporting year, ElCom was asked to grant one exemption from network access as a merchant line. Assessment of the request is based on the DETEC Ordinance on Exceptions to Network Access and to Allowable Network Costs in the Cross-Border Transmission Network (NetCEO).

## 7.3 Border power plants

There are 30 hydropower plants along Switzerland's borders that produce electricity from watercourses adjacent to neighbouring countries. The distribution of electricity is often regulated by long-standing treaties between Switzerland and the respective neighbouring country in the case of these border hydropower plants. For some of these border power plants, the contractually agreed quantity of electricity is distributed to the neighbouring country via the cross-border transmission network. Capacity on the cross-border transmission network is generally allocated by means of auction (see Section 7.2 Merchant lines and the following Section 7.5 International platforms for the reserve power supply).

Since 1 October 2017, Swiss electricity supply legislation has expressly given precedence to supplies from hydropower plants on the border in the allocation of capacity on the cross-border transmission network. However, the German transmission network operators and authorities argue this granting of precedence fails to comply with European and German law, which is why priority allocation of capacity cannot be carried out on the Swiss-German border. In two proceedings during the year under review, ElCom issued decisions on how the entitlement to priority capacity allocation of the hydropower plants on the border can be exercised in this case: the operator companies initially purchase the transmission capacity required in the regular auction procedure. Then once cross-border delivery has been made, they can claim back the Swiss share of the auction proceeds from Swissgrid.

Appeals were submitted against both decisions. The appeal proceedings were pending before the Federal Administrative Court at the end of the year.

## 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 network 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. 2 let. c ESA).

Regarding the use of auction proceeds from 2022, Swissgrid requested a deviation from the utilisation ratio of 65 per cent for the

maintenance and expansion of the transmission network and 35 per cent for the reduction of 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 ratios of 65 per cent and 35 per cent respectively. This was because the special effects given had been foreseeable and the COVID-19 pandemic no longer had the same surprising effect as in 2020.

Swissgrid submitted a proposal in the year under review regarding the use of auction proceeds from 2023 in which Swissgrid deviated from the 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. 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-offs, 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 expenditure in the long term. In December 2022, 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 the application for reconsideration in its decision of 7 February 2023. On the one hand, the decision on the auction proceeds concerns a matter that has been concluded in ElCom's view. Such decisions – as established with Swissgrid – are made in advance annually for various reasons, enabling changes to the situation to be taken into account. On the other, there have been no changes to circumstances, in ElCom's view, that would invalidate ElCom's decision and justify reconsideration. On 14 March 2023, Swissgrid submitted an appeal to the Federal Administrative Court after ElCom rejected the application for reconsideration. In its judgement A-1317/2023 of 21 November 2023, the Federal Administrative Court rejected this appeal and upheld ElCom's decision not to reconsider the application. The Federal Administrative Court indicated that there are insufficient grounds – both from the perspective of consumers and in terms of Swissgrid's medium-term interests – to suggest that ElCom's decision of 22 February 2022 could have subsequently been deemed invalid due to a significant change in circumstances. The Federal Administrative Court's judgement is legally binding. This means the 2023 auction proceeds will be used based on the ratio set out in ElCom's decision of 65 per cent for maintaining and expanding the transmission network and 35 per cent for reducing the transmission network's recoverable costs.

Swissgrid submitted a proposal in the year under review regarding the use of auction

proceeds from 2024 in which Swissgrid deviated from the 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. This was justified by a sharp rise in costs compared with the previous year due, amongst other things, to the pro-rata reduction of the shortfall expected at the end of 2022, the high procurement costs owing to the high prices on the electricity markets and the additional costs transferred to Swissgrid by the regulator on account of the risk of electricity shortage. In ElCom's view, the high prices on the electricity markets and the additional costs due to the measures taken on account of the risk of an electricity shortage represent a combination of events which is not expected to re-occur in this form. On this basis, ElCom deemed the use of the 2024 auction proceeds solely to cover the recoverable costs appropriate to provide short-term relief for consumers. It therefore approved Swissgrid's applications on the use of the 2024 auction proceeds in the year under review.

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. Price advantages in procurement on the market (and ultimately for end consumers) 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, but the same mechanisms have been introduced for the local market. This situation will remain for as long as ongoing proceedings prevent participation or there is no electricity agreement. The FCR (Frequency Containment Reserves) cooperation between transmission network 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).

The general trend, which is seeing balancing activities increasingly shift towards real time, is resulting in regular new adjustments to the structure of reserve power products and their platforms. Examples include the introduction of MARI and PICASSO and the ongoing discussions on the restructuring of

TERRE, which is to be operated on a 15-minute cycle in future (96 instead of 24 gates). Another example is the introduction in July 2020 of D-1 auctions for primary balancing capacity 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. 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.

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

According to Article 22 paragraph 5 ESA, ElCom has to coordinate its activities with foreign regulatory authorities, and represent Switzerland on all relevant committees and organisations.

Since ACER terminated the memorandum of understanding with ElCom in 2021, which enabled ElCom to participate in ACER working groups, ElCom has endeavoured to make up for this lack of information at EU level by holding bilateral exchanges and continuing to represent Switzerland's interests. Meetings at commission level are held with the regulators of neighbouring countries at regular intervals. Two bilateral meetings took place in 2023, one between ElCom and the German Federal Network Agency in Bonn, the other with E-Control in Vienna.

There is regular multilateral contact with the regulators of 'Italy North' at technical level as part of the implementation of the capacity calculation (CACM GL) and system operation (SO GL) methods. ElCom and Swissgrid are fully involved in these activities, but without any official voting right. Meetings are usually convened on an ad-hoc basis.

Cooperation in 'Core' is more formal, in particular due to the much larger number of participating countries. The Implementation Group (IG) meets six times a year with repre-

sentatives of the regulators and transmission network operators. A preparatory meeting between the regulators is held one day before the IG meeting. ElCom is invited to these meetings, but only for agenda items directly concerning Switzerland.

The IG is currently addressing various matters, such as Switzerland's inclusion in the DA capacity calculation method, the implementation of the method for the coordination of relief measures (ROSC) and the preparation of the ITN/Core merger. In relation to the latter, two additional kick-off meetings were held in 2023 in Munich and Rome where ElCom and Swissgrid represented Switzerland's interests. The 'Merger Sponsor Team' was created at the end of 2023 in which the five transmission network operators of 'Italy North' (incl. Swissgrid), the national regulatory authorities (NRA) of France, Austria and Italy as well as ElCom and ACER are represented. The aim is to coordinate the preparatory work for the merger.

ElCom also has observer status on the Council of European Energy Regulators (CEER). Like ACER, CEER and its member regulatory authorities again had a particularly heavy workload in 2023 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 Lima in August 2023. ElCom decided not to participate.

The OECD Network of Economic Regulators (NER) celebrated its 10th anniversary in 2023. Since 2021, it has focused on the provision of resources, strategic planning and performance assessment of the economic regulatory authorities as well as – in a broader context – on the horizontal topics of green government and promotion of innovation, which have had a major influence on the OECD's activities as a whole since 2022. In 2023, the OECD's NER stepped up its activities and work on indicators concerning the governance of industry regulators (report expected in 2024), but also on digitisation, big data and quantitative analysis to improve the efficiency of regulatory decisions and to measure their actual impact.

For the first time since 2018, the International Energy Agency (IEA) carried out an in-depth analysis of Swiss energy policy in 2023 in cooperation with the SFOE. Its recommendations include the expansion of the electricity networks and accelerating the authorisation procedures concerning critical energy infrastructure or renewable energies to support the energy transition and to limit Switzerland's dependence on imports, especially in winter.

The IEA is also calling for Swiss regulations on the electricity market to be brought into line with EU legislation and for the establishment of the legal basis for the gas market, including the creation of an independent national regulatory authority which would carry out surveillance of this market. In the IEA's view, these reforms would prepare Switzerland for potential integration into the European internal electricity market.

The Federal Council and European Commission also intend to resume negotiations on a bilateral electricity agreement between Switzerland and the EU in 2024. In parallel, stalled negotiations on closer cooperation in various other areas (free movement of persons, research and health, etc.) are to be continued.

In view of the current crisis, the EU continued its efforts to reduce its dependence on Russian natural gas and fossil fuels in gener-

al. It extended various emergency measures to achieve this goal. Some of them were incorporated into the early reform of the EU's legal framework on the design of the electricity market with a view to accelerating the energy transition in the EU, to promote more stable and competitive energy prices and to protect the EU's security of supply, its industry and consumers through additional measures which take account of the continuing geopolitical and economic uncertainty (see Section 6.7 New EU market design).

This reform of the EU Electricity Market Design is supplemented by a reform of the EU's gas and hydrogen market which aims to harness synergies. The goal is to strengthen the gas system's resilience and to promote renewable and low-carbon gases (their share in the EU is to be increased from 5% in 2023 to 66% by 2050). This restricts the termination date for long-term contracts on fossil gas to 2049 and supports the creation of a market and special infrastructure for hydrogen (the goal is 40 GW of electrolysis output for renewable hydrogen by 2030). Trading with EU non-member states will be facilitated and a European Network of Network Operators for Hydrogen (ENNOH) set up.

Another key amendment concerns the revision of Regulation (EU) 1227/2011 (REMIT Regulation) which will transfer additional powers to ACER and provide the EU with better protection against market manipulation on the electricity and gas wholesale markets (see Section 6.2 Market transparency in wholesale electricity trading and 6.7 New EU market design).

Further EU reforms were carried out in relation to its obligations under the Paris Agreement (2015), the EU Green Deal (2019) and the goal of making the EU the first carbon-neutral economy in the world by 2050 (nuclear energy may play a role here). In particular, the EU is focusing on

- Energy efficiency: The new Energy Efficiency Directive (EU) 2023/1791 (EED III) aims to cut final energy consumption EU-wide by 2030 by at least 11.7 per cent compared with 2020 (this means a reduction of at least 40% compared with 2007 instead of the previous 32.5% target for 2030) and

- Renewable energies: The revised Renewable Energy Directive (EU) 2023/2413 (RED III) includes a mandatory requirement to achieve a 42.5 per cent renewable energy share out of total final energy consumption by 2030 (this share was just 23% in 2022). 45 per cent is the indicative target (the previous version of the Directive [EU] 2018/2001 [RED II] only provided for a share of 32%). The simplified and accelerated approval procedure for renewable energy projects should help to achieve this goal.

In 2023, the EU also defined a strategy to promote solar and wind energy and will step up its support for the energy infrastructure over the coming years. It plans to invest EUR 400 billion in the expansion of the offshore network infrastructure by 2050, to connect wind parks in the EU and in UK and Norwegian waters, thereby enabling a huge increase in wind energy between 2030 and 2050.

The EU states had to present coherent energy and climate plans and feasible reforms of their own national energy markets for the period to 2030. It is essential the EU has a robust regulatory framework in order to develop the energy markets. It must benefit energy consumers (including vulnerable consumers) and decarbonisation efforts.

Besides the energy sector, many other sectors have been affected by around 100 additional legislative reforms since 2021 (industry, construction, transport, agriculture etc. – the EU's Fit for 55 package). This brings most of European law into line with the binding target of European Climate Law (Regulation [EU] 2021/1119) of reducing net greenhouse gas emissions by at least 55 per cent by 2030 within the EU compared with 1990.

The revision of the European Climate Law will set a new climate target and adopt new intermediate targets for 2040. The revision of this law will be an issue at the next European elections (in June 2024) and will represent a challenge for the newly elected European Parliament and newly appointed European Commission during the 2024–29 legislative period.

# 8 Outlook

**Security of supply and international activities**

By the end of the year under review, the outlook in terms of security of supply for 2024 had improved significantly compared with a year ago: The availability of the French nuclear power plants is at its highest level for a long time and availability of gas appears relatively secure. This positive development is also reflected in the futures market prices and may – albeit with a lag – result in lower electricity prices for consumers again. However, there are still risks in view of the geopolitical situation. Conflicts across gas and oil supply chains could still cause the supply situation to deteriorate again. This is why there are plans to provide both a thermal and hydropower reserve for the coming winter.

Network availability will also be increasingly important in future. The following key questions must be addressed here: Can the connection of decentralised production be guaranteed? Can the installation of new lines or the replacement of existing ones be approved and completed within the timeframe required? The so-called 'Network Express' may help to improve the situation.

At international level, activities are focusing on improving coordination on the calculation of cross-border network capacity. The work required at technical level is reasonably well advanced. The goal is to ensure Swiss network security and to provide import and export opportunities with further optimisation at European level. Overcoming the conflicting objectives of optimisation and the need for unanimity amongst the transmission network operators and regulators involved will be challenging. This also involves ensuring system stability for trading transactions in almost real time. This area is becoming increasingly important due to greater volatility and optimisation over a more extensive geographical area. Preparatory work is also being carried out on an electricity agreement and negotiations between the EU and Federal Council on this matter have resumed. Legal certainty is important to ensure further optimisation of continental system operation. However, in ElCom's view, ensuring sufficient domestic production capacity is vital, regardless of the conclusion of an electricity agreement.

**Market Surveillance**

At European level, a provisional agreement was reached in 2023 on the amendment to the Regulation on Wholesale Energy Market Integrity and Transparency, which is set to enter into force in 2024. ElCom will also focus more heavily in future on the analysis of price trends on the reserve power supply markets and the efficiency and appropriateness of prices on these markets. ElCom's market surveillance activities will also continue to carry out analysis after the extreme market volatility during the last crisis. It will examine the reasons for and the transparency of short-term extreme price fluctuations on the electricity markets.

Over the course of 2024, two bills will be addressed at legislative level which are of relevance to ElCom's market surveillance activities. The first is the Federal Act on Supervision and Transparency in the Wholesale Energy Markets (GATE) which aims to prohibit insider trading and market manipulation. The other is a further bill under preparation to replace the financial backstop for systemically critical companies (FiRECA) with regulations on liquidity, capital resources and business continuity (BCM). ElCom would perform a supervisory role in both cases.

**Pricing and Tariffs**

Due to persistently high energy tariffs, ElCom will continue its increased commitment to assessing the energy costs of net-

work operators in 2024. It will focus on issues such as efficient energy procurement, procurement at appropriate prices in group company relationships and cross-participations as well as certificates of origin.

Preparations will also be carried out for the implementation of new regulatory requirements concerning the entry into force of the omnibus legislation in early 2025. In view of sustained high electricity tariffs and the fact that, even under the current revision of the ESA, consumers will not obtain the originally intended right to freely select their electricity supplier, ElCom will continue its monitoring and surveillance activities in the energy sector – in other words, energy procurement, products and costs.

The new regulations from the omnibus legislation will be assessed in relation to the required adjustments to monitoring and surveillance activities and relevant verification strategies will be set out – depending on how the implementing provisions to the omnibus legislation are defined and on the outcome of the referendum on the omnibus legislation. The area of data-analytical monitoring and surveillance activities for risk and effectiveness-oriented cost and tariff evaluations will also be developed and expanded in 2024.

**Legal proceedings**

With regard to legal proceedings, various decisions on the smart meter rollout are pending, now also including those on radiation protection and additional costs for manual readings. ElCom will also continue to address the average price method and the reduction of shortfalls. A dispute on the network usage contract between Swissgrid and a downstream entity and the question of who should cover balancing energy costs resulting from an order by Swissgrid concerning power plant usage is also pending. ElCom also has to decide on the requirements that a network operator can place on the control of a photovoltaic system.

# 9 About ElCom

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

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 usage 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:** 604
**Number of network levels:** 7
**Kilometres of electricity networks** (overhead lines and cable, incl. building connections): Total approx. 226,000km | network level 1 – approx. 6,650km | network level 3 – approx. 8,650km | network level 5 – approx. 48,500km | network level 7 – approx. 168,500km

**Number of measurement points:** 5.8 million
**Number of invoice recipients:** 5.6 million

**Annual investments:** approx. CHF 1.4 billion
**Annual end consumption Switzerland:** 2021 58.1 TWh | 2022 57 TWh

**Production:** 2021 64 TWh | 2022 63.5 TWh | incl. consumption by storage pumps
**Electricity imports:** 2021 31.5 TWh | 2022 33.1 TWh
**Electricity exports:** 2021 29.1 TWh | 2022 29.7 TWh

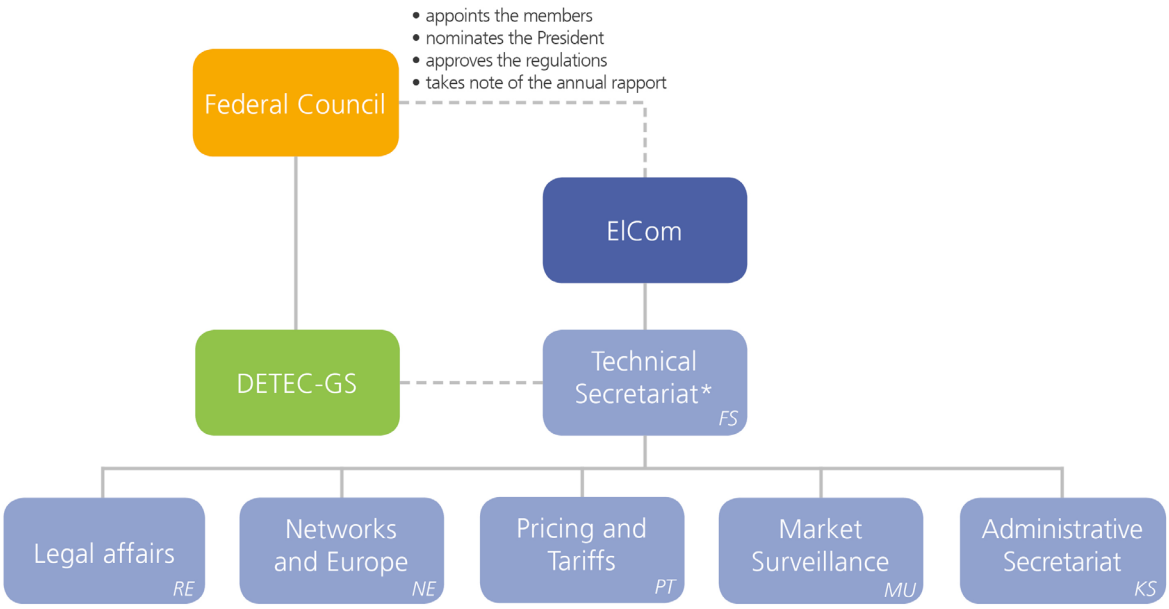
*Source: SFOE, Swiss electricity statistics 2022*

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

- Examining all network usage remuneration: In the liberalised energy market, the use of the networks for electricity transmission is compensated for via network usage 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.
- Ruling 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 20: 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): former member of the Council of States

**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
- Sita Mazumder (since 2018): PhD in economics, Professor of Economics and Computer Science at the Lucerne School of In-

formation Technology, Lucerne University of Applied Sciences and Arts
- Jürg Rauchenstein (since 2022): Degree in electrical engineering (ETH), Development Engineer at ABB
- 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 (UAS)

**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

*Networks and Supply Security*
- Jürg Rauchenstein (chairperson)
- Werner Luginbühl
- Katia Delbiaggio
- Felix Vontobel

*International Relations*
- Felix Vontobel (chairperson)
- Werner Luginbühl
- Laurianne Altwegg
- Jürg Rauchenstein

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

**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 2023, the Technical Secretariat employed 45 personnel and three interns in full or part-time positions. This corresponds to 39.5 full-time equivalents (FTE), not including interns. The employees are made up of 17 women and 28 men, which represents a female proportion of 37.8 per cent. The average age of all employees is 45.9. Breakdown by official language: (excl. interns):

- Italian: 4 employees
- French: 8 employees
- German: 33 employees

**Head of the Technical Secretariat (45 employees)**

Urs Meister
Dr. oec. publ. (Doctor of economics)

**Networks and Europe Section (10 employees)**

Michael Bhend
Degree in engineering, ETH Zurich

**Pricing and Tariffs Section (10 employees)**

Barbara Wyss
Dr. oec. publ.(Doctor of economics)

**Legal Affairs Section (10 employees)**

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

**Market Surveillance Section (7 employees)**

Cornelia Kawann
Degree in engineering, Doctor of technology, MBA

**Administrative Secretariat Section (7 employees)**

Simon Witschi
M.A.

## 9.2 The Federal Administration's communication and principle of freedom of information

As part of the Federal Administration, ElCom is subject to the Federal Act on Freedom of Information in the Administration (Freedom of Information Act; FoIA). This act provides the public with access to official documents within the defined framework. If the application for access concerns the data of third parties (e.g. a network operator), it must be consulted and always given the opportunity to appeal before access is granted. In the year under review, ElCom received several applications under the principle of freedom of information and was also consulted on applications received by other administrative units. Processing the applications submitted to ElCom generally involved significant workload. In one case, arbitration proceedings were initiated with the Federal Data Protection and Information Commissioner (FDPIC).

## 9.3 Finance

In the year under review, ElCom had a budget of CHF 13.5 million at its disposal. Its effective expenditure amounted to around CHF 12.8 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 delivery system). On the income side, ElCom received a total of CHF 4.8 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.

## 9.4 Events

**ElCom Forum 2023**

The 13th ElCom Forum was held on 17 November 2023 at the SwissTech Convention Center in Lausanne. Around 300 guests from the energy industry attended presentations and discussions on the issues surrounding market design. Eminent speakers from the industry, government and the academic community reviewed the current situation and discussed current and future challenges. The ElCom Forum 2024 is scheduled for 15 November.

**Information events for network operators**

ElCom held a total of seven information events for network operators in the spring of 2023, some virtual and some in-person events. These 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 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 June 2023. The 2023 workshop focused on the latest developments in market surveillance in Switzerland, the Swiss Market Transparency report, and the new supervisory tasks under the FiRECA.

# 10 Annex

## 10.1 Facts and figures

A total of 254 new cases were received in 2023 and 269 cases were brought forward from the previous year. Of these cases, 149 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. Very occasionally, general enquiries may lead to proceedings. In 2023, 891 such general enquiries were received. The enquiries reflect the high level of interest in tariffs and security of supply. All but 35 of the general enquiries received could be dealt with in full (97 per cent). A total of 24 decisions were pronounced in the year under review.

| Type of transaction | Brought forward from previous years | Received in 2023 | Dealt with in 2023 | Carried forward to 2024 |
|---|---|---|---|---|
| Specific matters relating to tariffs | 96 | 15 | 26 | 85 |
| Increases in network capacity | 31 | 138 | 22 | 147 |
| Other cases | 142 | 101 | 101 | 142 |
| **Total** | **269** | **254** | **149** | **374** |
| General enquiries | 32 | 894 | 891 | 35 |
| **Total including general enquiries** | **301** | **1148** | **1040** | **409** |

*Table 8: ElCom activities: statistics for 2023*

## 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 26 half-day meetings within Switzerland. Once a year, ElCom organises an off-site event during which its members visit local network operators. In 2023 the Commission had its off-site event in Neuchâtel.

## 10.3 Publications

### Directives

| | |
|---|---|
| 07.03.2023 | WACC production |
| 14.03.2023 | Power plant call-off order for the 2022/2023 winter reserve |
| 13.04.2023 | Benchmarks for establishing a hydropower reserve in the 2023/2024 hydrological year |
| 28.04.2023 | Availability period for reserve power plants and emergency power groups in winter 2022/2023 |
| 10.11.2023 | Power plant call-off order for the 2023/2024 winter reserve |

### Notifications

| | |
|---|---|
| 07.03.2023 | FAQ on basic supply, replacement supply and feed-in remuneration |
| 25.05.2023 | Fact sheet on the 2023/2024 hydropower reserve |
| 06.06.2023 | Cancellation of profit optimisation options at the expense of basic supply |
| 06.07.2023 | FAQ on the remuneration costs for necessary network capacity increases |
| 12.07.2023 | Operation of Beznau NPP |
| 21.08.2023 | Consultation on the amendment to the ordinance on the establishment of a winter reserve |
| 18.09.2023 | Consultation on the amendment to the Electricity Supply Act (power reserve) |
| 24.11.2023 | Position paper on bearing the costs of decommissioning network elements |
| 14.11.2023 | FAQ on Energy Strategy 2050 (update) |
| 14.11.2023 | 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). |

### Reports and studies

| | |
|---|---|
| 30.05.2023 | Report on balancing capacity and balancing energy 2022 |
| 05.06.2023 | Market Transparency 2022 – report by ElCom |
| 22.06.2023 | Report on the activities of ElCom 2022 |
| 28.07.2023 | ElCom study on the security of electricity supply in Switzerland up to 2035 |
| 28.07.2023 | Update of the calculation to ensure security of supply 2025 |
| 15.09.2023 | Electricity supply quality 2022 |

## 10.4 Glossary

| | |
|---|---|
| ACER | EU Agency for the Cooperation of Energy Regulators |
| aFRR, mFRR | Automatic / manual frequency restoration reserve<br>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) |
| 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 |
| EAER | Federal Department of Economic Affairs, Education and Research |
| EB GL | Electricity Balancing Guideline of the EU |
| ECC | European Commodity Clearing is a clearing house specialising in energy and commodity contracts |

| | |
|---|---|
| EDES | ElCom data delivery system EDES |
| EEX | European Energy Exchange |
| 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 |
| 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 |
| FONES | Federal Office for National Economic Supply |
| FSO | Federal Statistical Office |
| GATE | Federal Act on Supervision and Transparency in the Wholesale Energy Markets |
| 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) |
| MARI | 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 the mean value, the median is resistant to statistical outliers). |
| 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 |
| NER | OECD Network of Economic Regulators |
| NESA | National Economic Supply Act |
| 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 |
| NRAs | National regulatory authorities |
| PGV | Plangenehmigungsverfahren (planning approval procedure) |
| PICASSO | Platform for the exchange of secondary balancing capacity |
| 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 |
| SRL | Secondary balancing capacity |
| 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. |
| TERRE | Platform for the exchange of slow tertiary control balancing capacity |
| 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. |
| TRL | Tertiary balancing capacity |
| TSO | Transmission system operator |
| TWh | Terawatt hour |
| VSE | Association of Swiss Electricity Companies |
| WACC | Weighted Average Cost of Capital |
| ZEV | Zusammenschluss zum Eigenverbrauch (merger for own consumption) |

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