# Report on the activities of ElCom 2017

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# 1 Foreword by the President

**Carlo Schmid-Sutter**
President of ElCom

A high level of supply security, stable electricity prices for end consumers, energy policy decisions within Switzerland, energy policy queue in relations with the EU: this is how 2017 can be summed up from the point of view of the regulator.

The supply of electricity was assured at all times during 2017 on both the energy and the network side. Studies by ElCom have shown that the supply situation can be expected to remain stable in the foreseeable future, even if incisive stress scenarios are assumed. ElCom therefore does not see any reason to petition the Federal Council to take measures to ensure supply security under Article 9 of the Federal Electricity Supply Act. However, a close eye should be kept on Switzerland's supply security situation during the winter. Switzerland has been a net importer of electricity every winter for the past 14 years. Its import requirement has constantly risen and reached a new high in the 2016/2017 winter. A net quantity of electricity amounting to around 9 terawatt hours (which is equivalent to the annual output from Leibstadt nuclear power plant) was imported during the year under review.

Switzerland's dependency on imports will increase in the wake of the planned withdrawal from nuclear energy in the next two decades. This means that our country's supply security will increasingly depend on the capacity and readiness of producers in our neighbouring countries to export power. Against this backdrop, the regulator welcomes the fact that issues relating to supply security, dependence on imports and the degree of self-sufficiency required with respect to the electricity supply are to be addressed in the energy policy debate.

The development of electricity tariffs was relatively stable in the year under review. Basic supply tariffs for households will increase slightly in 2018. The typical household will pay 20.4 cents per kilowatt hour, which is equivalent to an increase by 0.3 cents per kilowatt hour, or almost 1.5 percent. While network costs and energy prices are falling, the levy for feed-in remuneration at cost is to increase with effect from 1 January 2018 by 53 percent.

Fixed end consumers still do not have access to the free market and lower tariffs. The applicable legislation stipulates that suppliers

must also pass on the benefits of procurement on the free market to their fixed end consumers, but, unfortunately, Parliament blocked the application of this "average price method". This means that the disadvantages of the partial liberalisation of the market were reinforced, to the detriment of fixed end consumers and producers without fixed end consumers.

During the parliamentary debate, ElCom had the opportunity to express its reservations concerning this solution and to point out that there is no "missing money" problem in the industry. "Missing money" problems are limited to those companies that do not have either a network or fixed end consumers. Market models that give rise to industry-wide subsidies are inappropriate from the point of view of supply security and for economic reasons.

With respect to domestic policy, the referendum on Energy Strategy 2050 resulted in the initial decisions on Switzerland's future energy supply. The regulator welcomes the decisions concerning the measures to be taken to increase energy efficiency and promote the use of renewable energy. These measures now have to be resolutely implemented in order to partially offset the impacts of Switzerland's withdrawal from nuclear energy. Other domestic policy issues were addressed within the scope of the consultations on the Electricity Networks Strategy. It is pleasing to note that, with respect to the liberalisation of metering, no hasty decisions were taken and the basic debate on this issue can be carried out within the framework of the planned revision of the Federal Electricity Supply Act.

At the foreign policy level, it should again be emphasised that, due to its close ties with the electricity markets of its neighbouring countries, Switzerland is dependent on stable and predictable relations with the European electricity industry. This is difficult because in physical terms Switzerland forms part of the European electricity network, but at the political level it is not treated as such. While Switzerland's exclusion from European market mechanisms "only" gives rise to economic disadvantages, the fact that Switzerland is unable to participate in the operation of the European networks could represent a risk for our network stability, and thus for our electricity supply. Clearly, an electricity agreement would be beneficial in this regard and would support Switzerland's electricity industry as well as its supply security. Without such an agreement, Switzerland may have to take precautionary measures in the future to ward off any harmful impacts.

With this report on its activities for the attention of the Federal Council, the Swiss Federal Electricity Commission (ElCom) is duly meeting its legal obligation to provide the public with a comprehensive report on its activities and those of its Technical Secretariat. I hope you will find it interesting and informative.

# 2 Focus on supply security

*Hydropower plants make a valuable contribution towards Switzerland's electricity supply. Photo: Wynau run-of-river power plant.*

**Supply security was once again a key focus of ElCom's in 2017. At the beginning of the year, the supply situation in Europe was somewhat stretched. In our interview with Reto Tami, head of the Technical Secretariat, he explains what the situation was like in Switzerland and how ElCom expects it to develop in the future.**

***Problems relating to electricity supply increase during the winter. As compared to the previous year, however, the network was not the cause of problems in the 2016/2017 winter. What was different from the previous year?***

In the 2015/2016 winter, we experienced network problems, mainly due to transformer congestion between the 380 kV and 220 kV levels. Last year this was different. The problem was the energy situation in Europe. In January, the situation was tense, especially in France. The reasons for this were that several nuclear power plants were disconnected from the grid and energy consumption was high due to the cold weather. In France, the majority of households are heated with electricity. As temperatures began to rise in February and several nuclear power plants were reconnected to the grid, the situation in France eased again.

The situation in Switzerland was less drastic. The relevant players did their homework and learned their lessons from past winters. Network availability and thus import capacity were very high thanks to the appropriate planning of maintenance work in the transmission network and the construction of additional transformers between the 380 kV and 220 kV levels in Beznau. Furthermore, Swissgrid procured reserve energy in advance to optimise planning certainty and concluded agreements for calling up redispatch energy. On the energy side, last winter Beznau Block 1 was not connected to the grid and Leibstadt was at times disconnected. However, thanks to excess production in Germany and the high degree of network availability, it was possible to import the energy to cover the shortfall. So, I can safely say that the situation in Switzerland was stable at all times.

***In the context of the energy situation in Switzerland, what is your assessment of the low water levels in the reservoirs at the beginning of 2017?***
On the wholesale electricity markets, the tense situation in Europe manifested itself: prices rose and the market reacted quickly. After a lengthy period with relatively low energy trading prices, traders were suddenly able to sell electricity at higher prices. As a consequence, very high levels of Switzerland's reserves were drawn on and the water levels in the reservoirs fell to a historical low at the end of January. For this reason, and due to the tense situation in Europe, at the beginning of February 2017 we convened the Winter Workgroup and analysed the situation together with Swissgrid and the various market players. In addition, with respect to the issue of storage management we reminded the involved market players of the fact that stress scenarios such as suddenly occurring import restrictions also have to be taken into account.

***What is your assessment of the supply situation for future winters in Switzerland and Europe?***
As Mark Twain once so aptly put it, "Prediction is difficult, particularly when it involves the future." This is especially applicable when it comes to the electricity supply, given that the situation in the interconnected network depends on numerous parameters. Basically, it is very difficult to assess the potential effects of new technologies, new storage methods and more economical energy consumption (for example in view of e-mobility). In the short term, at least as long as Mühleberg nuclear power plant is still connected to the grid (i.e. until 2019), under normal circumstances we do not anticipate any unusually strained situations. Our adequacy study, which analysed the supply security situation for 2020, came to the same conclusion. In the medium and longer term, however, following the disconnection of other nuclear power plants from the grid, we expect the challenges in the winter months to increase. From today's perspective it will not be possible to compensate the loss of energy from nuclear power plants with renewable energy alone. In other words, we will have to import larger quantities of energy, which in turn will give rise to increased import risks. We can only import electricity if our neighbouring countries are able and willing to export it to us.

***In order to prevent a nationwide blackout as the consequence of a crisis, ElCom has addressed the issue of manual load shedding. What does this practice entail?***
The term "manual load shedding" refers to the temporary targeted disconnection of individual load or network sections. Because this would have significant consequences for the affected end consumers, it is regarded as a "last resort" measure, or ultima ratio.

" We can only import electricity if our neighbouring countries are able and willing to export it to us. "

**Renato Tami,** Head of the Technical Secretariat

This means that manual load shedding would only be resorted to if all other measures for restoring safe network operation have been exhausted. It is therefore essential to make adequate preparations in advance for such extreme scenarios. Our clarifications have revealed that manual load shedding is admissible in accordance with the provisions of the Federal Electricity Supply Act. It is part of the duty of due care on the part of the network operators and Swissgrid to make the necessary organisational preparations for manual load shedding, since such preparations are necessary for securing the stable operation of the networks.

## 2.1 Introduction

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

In the 2016/2017 winter, supply security came under pressure in Europe, especially in France. In Switzerland, sufficient reserves were available on both the network and the energy side (cf. section 2.2).

ElCom comprehensively monitors medium- to long-term supply security in the areas of networks, production, prices and tariffs, as well as the general situation. For this purpose it collects data on the quality of supply, network availability and frequency of interruptions. In addition to monitoring supply security, ElCom also keeps a close eye on the available import capacity at Switzerland's borders with France, Germany, Austria and Italy (cf. section 2.3).

Supply security also depends on production capacity and the availability of electricity, and in view of this, ElCom also monitors foreign markets and the activities of foreign regulators with respect to capacity mechanisms (cf. section 2.4).

Adequate production capacities and sufficiently dimensioned transmission and distribution networks cannot guarantee the security of supply on their own. Because electricity cannot be stored in the network, the quantity of energy fed into the grid has to always be the same as the quantity that is taken out of it. This equilibrium has to be maintained through the use of balance energy (cf. section 2.5).

## 2.2 Supply security: review and outlook

### 2.2.1 Review of 2016/2017 winter

The 2016/2017 winter was characterised by a very cold January in most of Europe. On the northern side of the Swiss Alps, for example, the average temperature was -2.9° C, compared with the long-term average of around 0° C. This was the coldest January in 30 years. Lower temperatures mean higher electricity consumption. The increase was particularly pronounced in France due to the widespread use of electrical heating systems. The French transmission system operator, RTE, estimates that consumption increases by around 2,400 megawatts (which is equivalent to twice the output of Leibstadt nuclear power plant) with every additional degree below zero.

On the production side, in addition to Leibstadt and Beznau I, various French nuclear power plants were also disconnected from the grid in January 2017. Due to the cold and dry weather, the hydropower plants also supplied above-average quantities of electricity. Together with the high level of consumption, this caused a tense situation, especially in France, which in turn resulted in extraordinarily high prices, not only in Switzerland but also in much of Europe and particularly in France.

In January 2017, for example, the highest price for peak energy[1] in Switzerland was 138 euros per megawatt hour, compared with 80 euros

per MWh in January 2016 and 82 euros per MWh in February 2017. Because of these high prices, production from reservoirs was extremely high in January 2017, as a result of which water levels fell to historical lows at the end of the month. Once again, advance procurement of reserve energy proved to be wise: this important instrument was secured at all times, despite the low water levels in the reservoirs. In February 2017 the situation eased significantly and the price level returned to normal. Production from reservoirs was reduced and replaced by increased imports. The maximum import capacity was frequently utilised in February, and water levels in the reservoirs were already back to normal at the beginning of March.

*1 Epex Spot day-ahead auction for supply between 8 a.m. and 8 p.m.*

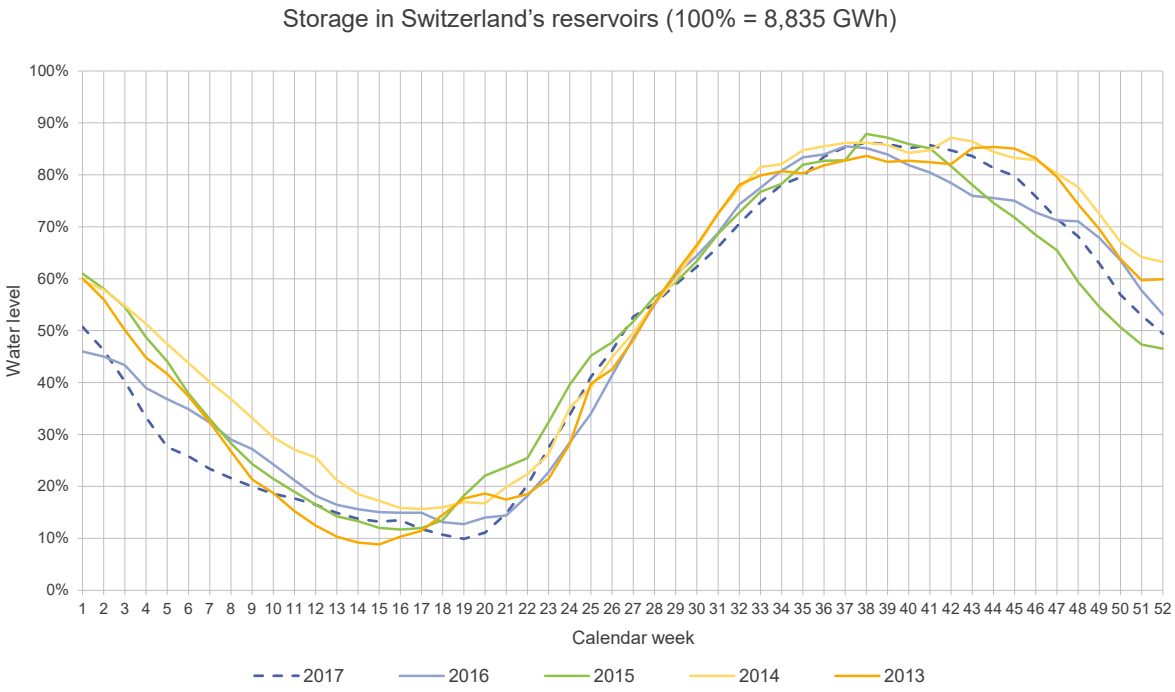



*Figure 1: Five-year comparison of water levels in Switzerland's reservoirs (data source: Swiss Federal Office of Energy SFOE)*

The 2016/2017 winter demonstrated that the cross-border electricity market functions smoothly. During the supply shortage in France in January and as a consequence of the high price level, production in neighbouring countries increased (e.g. from hydropower plants in Switzerland and fossil-fuelled power plants in Germany). The prerequisites for the electricity market to overcome shortages are the general availability of power plant capacities (output and energy) and the existence of the necessary transport facilities. Both of these conditions were met in the 2016/2017 winter, as evidenced by the fact that the availability of imports for Switzerland was high, especially in comparison with the critical situation in the 2015/2016 winter.

### 2.2.2 Situation in 2017/2018 winter

The availability of the nuclear power plants in France and Switzerland was also not ideal at the beginning of the 2017/2018 winter. As before, Beznau I was disconnected from the grid and Leibstadt was also subject to unscheduled shut-downs in November and December 2017. On the other hand, after a coldish December the long-term weather forecast was for a relatively mild winter. Once again, reserve energy was procured in advance.

In 2017, import capacity was further increased thanks to the implementation of technical measures by Swissgrid, including the introduction of a new coupling transformer in Beznau substation in March. Switzerland's electricity supply was secured without a hitch thanks to excess production and export capacities in neighbouring countries, plus the increased import capacity in Switzerland.

### 2.2.3 Longer-term outlook

In view of the difficult situations experienced in past winters, in spring 2017 ElCom decided to carry out an adequacy study to analyse the supply security situation in 2020. Its findings were incorporated into the ongoing debate on supply security at both the Infrastructure Conference and the ElCom Forum. The study was based on the Adequacy Model that was co-developed by the Pentalateral Energy Forum and is currently being used by ENTSO-E (European Network of Transmission System Operators for Electricity) for making its medium-term adequacy forecast. At the request of ElCom, the model was further developed and refined by Swissgrid to reflect the special circumstances in Switzerland. Swissgrid then used it to make the adequacy calculations. The aim of the study was to make a precise forecast of potential supply shortages for 2020 (i.e. following the decommissioning of Mühleberg nuclear power plant). In addition to a basic (probable) scenario, ElCom defined three stress scenarios to be analysed.

The results show that, for the basic scenario, supply security is assured for 2020, and it should be possible to cope with the relatively few tense situations in the stress scenarios with the aid of the available operational measures. But, despite these reassuring findings,ElCom relativised the results of the study and the subsequent conclusions in its report. The simplifications required for making the calculations and the strong influence the assumptions in the model have on the findings make the results subject to distortion. In addition, the calculations assume that the market will react accordingly and the neighbouring countries will be able and willing to export electricity in critical situations. In the view of ElCom, in order to make a comprehensive assessment of supply security it is also necessary to take account of the import requirements during winter. It is therefore important to continue pursuing the political debate on supply security during the winter. In this context it is worthwhile examining options such as a strategic (energy) reserve or capacity mechanisms. ElCom will ensure that the advantages and disadvantages of their implementation are carefully analysed and weighed up. ElCom will extend the time frame of the adequacy study and carry out these analyses periodically in the future in order to take account of ongoing changes and provide a firm basis for the debate on the development of Switzerland's supply security.

The impacts of the decommissioning of Mühleberg nuclear power plant on the network were also examined in cooperation with the Research Centre for Energy Networks (FEN) at the Federal Institute of Technology, Zurich. The voltage increase on the Bassecourt to

Mühleberg line means that the resulting loss of energy can be replaced through imports as long as the neighbouring countries have the necessary export capacity. If the voltage increase is not implemented in time, while this will not give rise to an immediate network problem, it will intensify the energy-related problems during the winter.

ElCom envisages various risks over a longer-term time frame. Germany will be withdrawing from the use of nuclear energy by the end of 2022, and the available output from nuclear power plants will also be lower in France and Switzerland in the future. The discontinuation of production of electricity from coal-fired power plants in Germany and Italy greatly depends on the political agenda in those countries and could significantly influence the available export capacities in the medium to long term. The increase in the use of new renewable energy sources or perhaps gas-fired power plants could compensate some of the energy losses. The biggest increase in our neighbouring countries is to take place in northern Germany. However, due to internal congestion, it will not always be possible for this energy to be transported to southern Germany or exported to Switzerland. According to the plans for the German grid, any such shortfalls are to be eliminated through new high-voltage direct current power lines, though these are not expected to be ready for operation before 2025.

In addition to power plant capacity, the corresponding means of transport will also be required. In this regard, there are positive signs in Switzerland. Following a ruling by the Federal Supreme Court, Swissgrid can go ahead with the construction of the 380 kV supply line from Chamoson to Chippis. The adoption of the Electricity Networks Strategy by Parliament should result in a shortening of the licensing procedure in the future.

A worrying development is becoming apparent at the international level. With the ongoing integration of the European electricity markets with the partial exclusion of Switzerland, the number of unscheduled flows through Switzerland's transmission network is increasing. Unscheduled flows may give rise to congestion in Switzerland's electricity supply. ElCom is currently discussing this problem with other national regulators, as well as with the European regulatory authority, ACER (Agency for the Cooperation of Energy Regulators). It has also published an explanatory report and is evaluating potential remedial measures.

## 2.3 Quality of supply

### 2.3.1 Network availability

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

For the purpose of monitoring network availability, ElCom evaluates interruptions to sup-

ply from the 96 largest Swiss network operators, who account for 89 percent of the country's energy turnover via their networks. In 2016, the 96 largest network operators experienced 4,328 unscheduled interruptions (cf. Table 1), a slight decrease versus the previous year. However, the number of interruptions on its own is not sufficient to make reliable conclusions regarding network availability. It is only when this figure is combined with the duration of interruptions and the number of end users that are affected that such an evaluation can be made.

| | 2012 | 2013 | 2014 | 2015 | 2016[1] | Unit |
|---|---|---|---|---|---|---|
| Interruptions | 5,038 | 4,615 | 4,039 | 4,401 | 4,328 | Number of unscheduled interruptions |
| SAIDI | 22 | 15 | 13 | 11 | 9 | Minutes per end consumer |
| SAIFI | 0.34 | 0.28 | 0.22 | 0.23 | 0.20 | Interruptions per end consumer |

*Table 1: Development of supply quality in Switzerland from 2012 to 2016 (unscheduled interruptions only)*

In 2016, the average duration of unscheduled interruptions per end consumer was 9 minutes. This figure represents a nationwide improvement by 2 minutes versus the previous year. The average frequency of unscheduled interruptions per end consumer in 2016 was 0.20, which was slightly lower than in the previous year.

The development of network availability in Switzerland has been generally positive since 2012. The higher SAIDI and SAIFI figures in 2012 were primarily attributable to extraordinary natural phenomena (storms and snowfall). The high quality of supply in Switzerland is also confirmed in international comparisons. According to the "6th CEER Benchmarking Report on the Quality of Electricity and Gas Supply", Switzerland is among those countries with the highest quality of electricity supply in Europe.

*1 The data relating to supply security in 2017 will be published in June 2018 on ElCom's website.*

### 2.3.2 Import capacity

Alongside network availability, the available import capacity is also a key factor for Switzerland's electricity supply security and, for this reason, ElCom also monitors the availability of cross-border capacities (referred to as "net transfer capacity", or "NTC"). NTC indicates the level of cross-border transport capacity that is available in neighbouring countries without infringing the applicable safety standards. Swissgrid defines the level for the four Swiss borders together with the operators of the neighbouring transmission networks. The proportion of the import capacity of the Principality of Liechtenstein, which belongs to control zone Switzerland, is included in the calculation of the import capacity from Austria. Table 2 presents an overview of the trend in available import capacities.

| NTC (MW) | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Neighbours to the north | 4,537 | 4,799 | 5,225 | 5,245 | 5,265 |
| France | 3,060 | 3,093 | 3,073 | 2,974 | 3,007 |
| Germany | 965 | 1,094 | 1,373 | 1,468 | 1,501 |
| Austria | 512 | 612 | 779 | 803 | 757 |
| Italy | 1,726 | 1,722 | 1,722 | 1,717 | 1,722 |

*Table 2: Available import capacity for Switzerland, 2013 to 2017*

Because the exchange of energy with the neighbouring countries primarily takes place via the 380 kV network, but imported electricity is supplied to end consumers in Switzerland via the 220 kV network, it is above all the available capacity of the coupling transformers (380/220 kV) that determines the maximum possible import capacity. In the period from 2013 to 2017, the import capacities at the national borders remained relatively stable for Italy and were slightly higher for Germany and Austria. The increases in import capacities in 2014 and 2015 were partly attributable to the transfer and construction (Bassecourt and Bickigen respectively) of a 380/220 kV transformer (physical capacity expansions), but also to the fact that Swissgrid was able to optimise the import capacity at the German and Austrian borders in winter 2015 thanks to new planning and forecasting systems. For France, the import capacities remained fairly stable between 2013 and 2015, but were lower in 2016.

### 2.3.3 Export capacity

In view of the high transit flows through Switzerland (from north to south), the available export capacity to Italy and France is also an important factor for Switzerland's supply security. The extent of this export capacity has a significant influence on the allocation of import capacity at the borders with France, Germany and Austria. Export capacity to Italy rose in the past two years because, during this period, Italian transmission grid operator TERNA imposed fewer capacity reductions in order to maintain network stability in Italy (cf. Table 3).

| NTC (MW) | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Italy | 2,767 | 2,557 | 2,948 | 2,986 | 2,986 |
| France | 1,100 | 1,113 | 1,188 | 1,125 | 1,180 |

*Table 3: Trend in Switzerland's export capacity (NTC) to Italy and France, 2013 to 2017*

## 2.4 Capacity mechanisms in the EU

Two options are currently being examined for securing the economic viability of the existing power plants in the future. The first option would be to allow market forces to run their course at the electricity trading centres, so that in periods of short supply, electricity prices would, under certain circumstances, have to be increased by several times the average level. This solution would also enable conventional power plants to finance their full costs even though their annual operating hours would be reduced. The second option would be for the government to no longer allow free price peaks, thereby limiting electricity prices. At the same time, this would secure the provision of sufficient capacities with the aid of capacity mechanisms. The introduction of such capacity mechanisms is planned, or has already been approved or implemented, in many European countries, including within the EU.

Once again, the adequacy study has shown that Switzerland's supply security also incorporates cross-border aspects. Here, situations can arise in which Switzerland's supply security is also dependent on its European neighbours. However, situations are also possible in which supply security depends solely on domestic influences. In this context, ElCom is monitoring both domestic and foreign developments relating to capacity mechanisms.

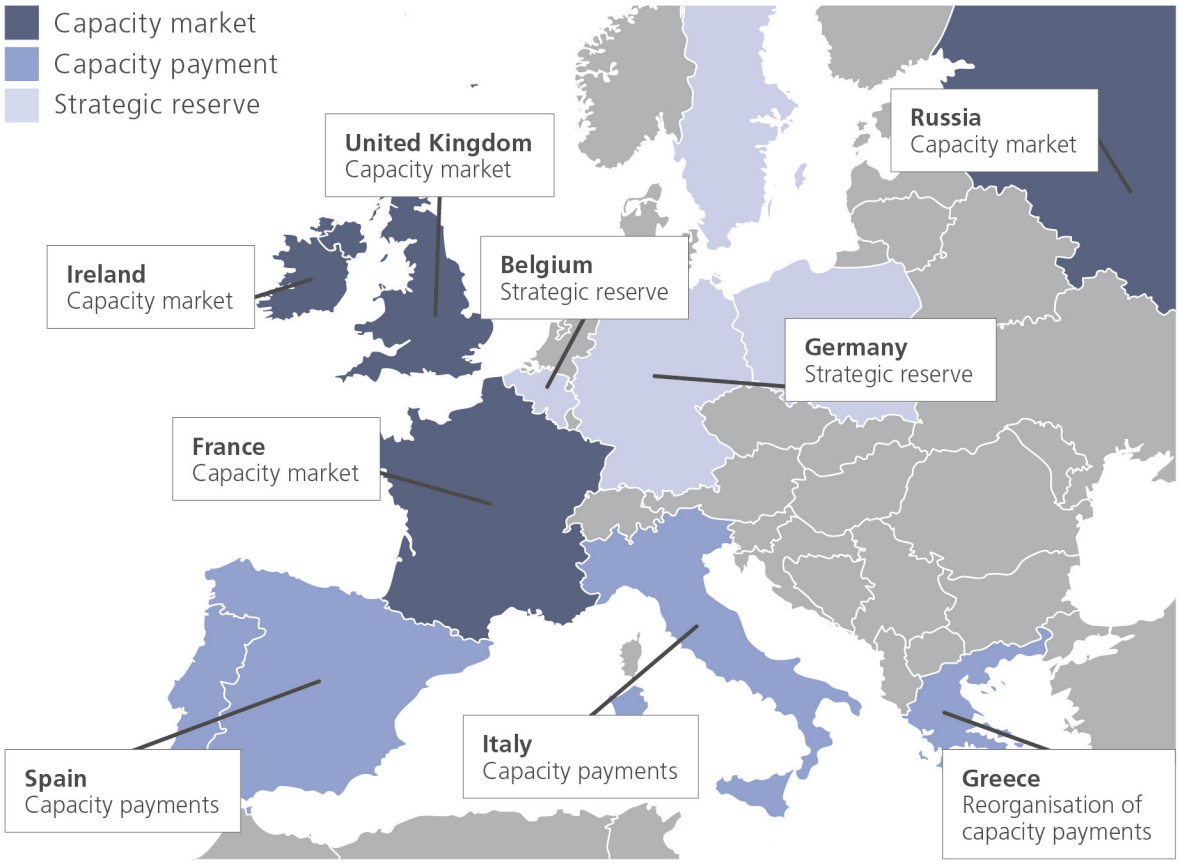



*Figure 2: Simplified overview of capacity mechanisms in selected European countries (status: 31 December 2017)*

## 2.5 System services

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

As a rule, this balancing procedure is carried out by adjusting the production of electricity to the current level of consumption. This constant balancing of production and consumption calls for power plants whose production can be efficiently regulated. The balance energy provided by these power plants is purchased in a market-based procedure, and the associated costs have to be passed on to end consumers

via the system services tariff, which is used for charging for other services that are required for the safe operation of the network, including balance management, self-contained start and independent operation capability, voltage stability and compensating active power losses. However, balance energy represents the most important segment in financial terms.

In the year under review, the costs for balance energy amounted to around 117 million Swiss francs and were thus lower than they have ever been before. Figure 2 shows the development of the secondary reserve energy price over the past five years. In 2013 the costs for reserve energy were high due to the prolonged cold weather period. The slight increase in 2016 was attributable to the tense supply situation in Switzerland during the winter. A comparison over a period of several years indicates that the prices for reserve energy have generally stabilised.

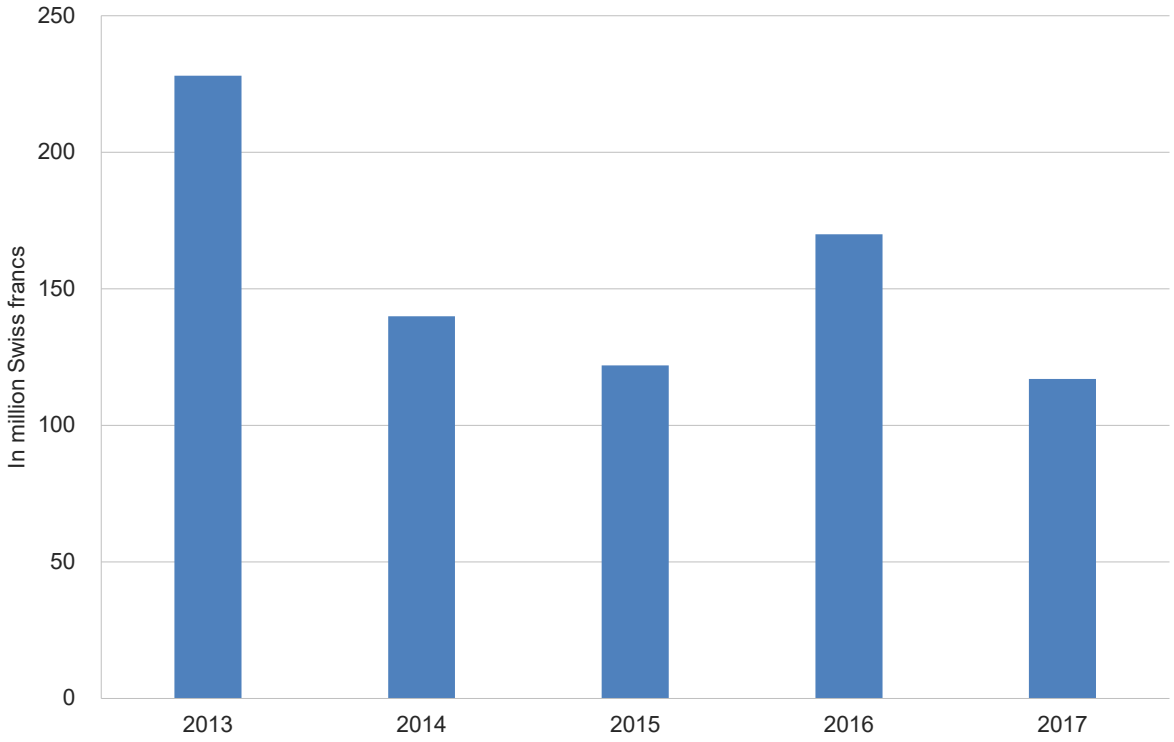



*Figure 3: Development of the price of reserve energy from 2013 to 2017*

Since 2016, Swissgrid has been procuring a portion of reserve energy for the spring. On the one hand this assures the availability of water reserves, and on the other it increases planning security for the operators of storage power plants. Advance procurement is important for risk management and for the involved players to gain a better understanding of their specific roles. In the year under review, the costs of advance procurement amounted to around 22 million Swiss francs, compared with 32 million Swiss francs in 2016. This reduction can be attributed to an optimisation of the timing of the call for tenders.

# 3 Networks

*The total length of Switzerland's electricity distribution and transmission networks is around 200,000 kilometres, which is equivalent to approximately five times the circumference of the Earth. This photo shows overhead lines on the Bernina Pass in the canton of Grisons.*

## 3.1 Facts and figures relating to Switzerland's electricity networks

The total length of Switzerland's electricity networks is around 203,000 kilometres. Local distribution networks (level 7) account for approximately 70 percent, while the often more visible national transmission network operated by Swissgrid only accounts for around 3 percent. Within the scope of its periodical reports, ElCom collects data relating to the various system components of the Swiss electricity networks. As Table 4 shows, until recently the quantity of installations increased slightly in most categories. The number of overhead lines and mast transformer stations has decreased due to additional cabling, while by contrast the quantity of cables and transformer stations has increased. Expressed in kilometres, the distribution network has expanded each year since 2012 at a rate of almost 2 percent. A similar development has been observed with respect to the number of measurement points of end consumers. There are currently around 5.5 million measurement points and 5.1 invoice recipients. According to the official statistics, there are approximately 0.6 million companies in Switzerland and the population of Switzerland is around 8.4 million (figures for 2015 and 2016 respectively). In the period under review, the average population growth was slightly higher than 1 percent.

| Type of installation | 2012 | 2013 | 2014 | 2015 | 2016 | Unit |
|---|---|---|---|---|---|---|
| Pipe system, high voltage (NL 3), medium voltage (NL 5) and low voltage (NL 7) | 104,894 | 111,626 | 116,477 | 119,621 | 119,277 | km |
| Cable, high voltage (NL 3) | 1,980 | 1,976 | 2,031 | 1,911 | 1,924 | km |
| Cable, medium voltage (NL 5) | 32,174 | 32,833 | 33,544 | 33,870 | 34,044 | km |
| Cable, low voltage (NL 7) | 73,382 | 75,127 | 76,311 | 77,590 | 78,011 | km |
| Cable, connection to household (NL 7) | 47,957 | 50,972 | 52,569 | 53,931 | 54,240 | km |
| Supply line and cable (NL 1) | 6,750 | 6,750 | 6,750 | 6,750 | 6,629 | Line-km |
| Overhead line, high voltage (NL 3) | 6,918 | 7,059 | 7,158 | 6,904 | 6,738 | Line-km |
| Overhead line, medium voltage (NL 5) | 11,570 | 11,151 | 10,914 | 10,590 | 10,061 | Line-km |
| Overhead line, low voltage (NL 7) | 10,835 | 10,227 | 9,719 | 10,653 | 11,621 | Line-km |
| Substation, NL 2, NL 3, NL 4 and NL 5 | 1,144 | 1,097 | 1,314 | 963 | 893 | Quantity |
| Transformer, NL 2 | 154 | 155 | 152 | 146 | 148 | Quantity |
| Switching field, NL 2[1] | 185 | 163 | 177 | 165 | 159 | Quantity |
| Transformer, NL 3[2] | 97 | 82 | 81 | 78 | 79 | Quantity |
| Switching field, NL 3[1] | 2,577 | 2,49 | 2,545 | 2,606 | 2,577 | Quantity |
| Transformer, NL 4 | 1,147 | 1,144 | 1,145 | 1,143 | 1,142 | Quantity |
| Switching field, NL 4[1] | 1,906 | 1,952 | 2,110 | 2,078 | 2,011 | Quantity |
| Transformer NL5[2] | 585 | 286 | 317 | 190 | 75 | Quantity |
| Switching field, NL 5[1] | 27,366 | 29,468 | 26,727 | 28,226 | 30,836 | Quantity |
| Transformer station, NL 6 | 51,100 | 51,862 | 52,425 | 53,405 | 53,024 | Quantity |
| Mast transformer station, NL 6 | 5,716 | 5,831 | 5,685 | 5,748 | 5,402 | Quantity |
| Cable distribution box, low voltage (NL 7) | 156,839 | 170,285 | 171,712 | 174,897 | 174,377 | Quantity |
| Measurement points (all consumers) | 5,084,174 | 5,318,529 | 5,393,370 | 5,452,650 | 5,512,743 | Quantity |
| No. of network operators | 679 | 672 | 659 | 649 | 643 | |

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

*Table 4: Installations in the Swiss electricity networks*

The total value of the Swiss electricity network is in the region of 20.5 billion Swiss francs. The distribution network accounts for the majority (nine tenths) of this figure. The residual value of the installations in the distribution network is almost unchanged versus the previous year, while at the same time the revenue from end consumers for the use of the distribution network (excluding fees and payments to the state and charges for renewable energy) rose by 4.8 percent to almost 3.5 billion Swiss francs.

Figures 4 and 5 depict the distribution of ownership and the revenue from network use by size of company. In both figures, the 100 largest network operators are divided into groups of ten, and all the remaining operators are grouped together in a separate category ("Rest"). The ten biggest network operators (dark blue) account for around 43 percent of the value of all declared installations (Figure 4), which is roughly the same as the next-largest 90 companies account for together. In 2016, the numerous smaller network users comprising the "Rest" category (light blue) collectively had an ownership share of 15 percent, which was almost one percentage point lower than the same figure five years earlier.

The situation with respect to network use remuneration (Figure 5) was similar, though slightly less stable. Here, the ten largest operators (dark blue) were able to gradually improve their position by around three percentage points and ultimately accounted for around 46 percent of all earnings. The category of "smallest" operators (light blue), which is declining in numbers, received close to 14 percent of all revenue, which was three percent down compared with the figure five years earlier.

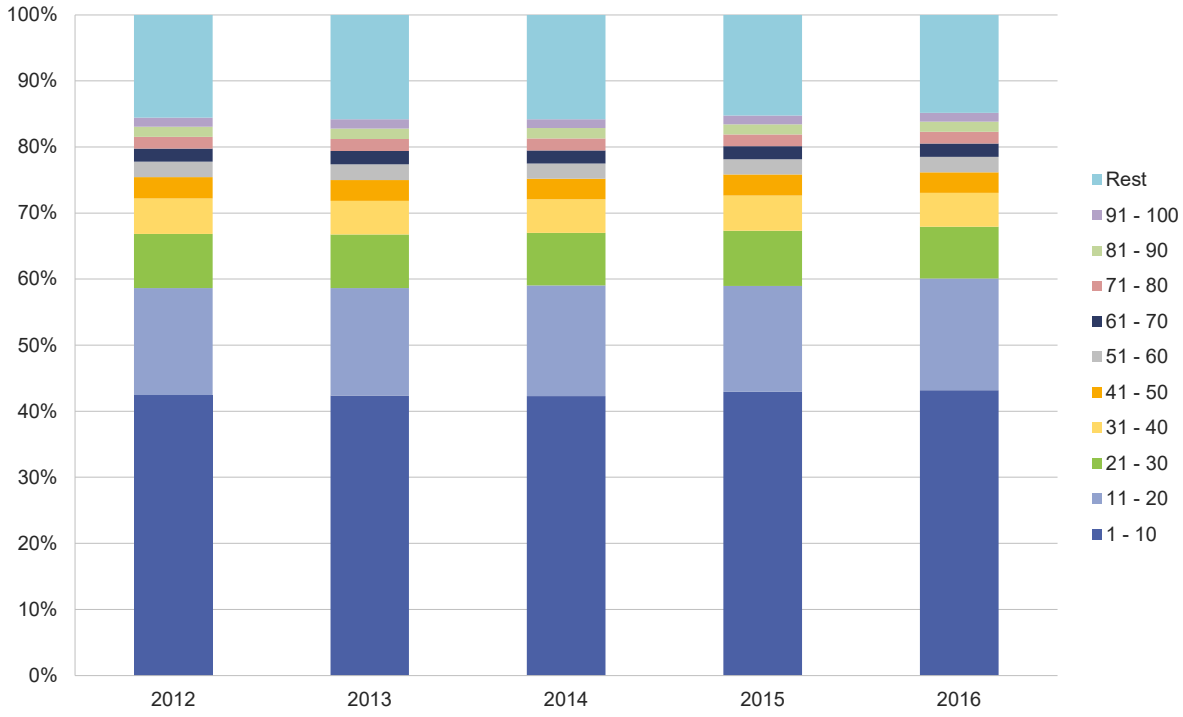



*Figure 4: Proportional holdings in the distribution network by company size*

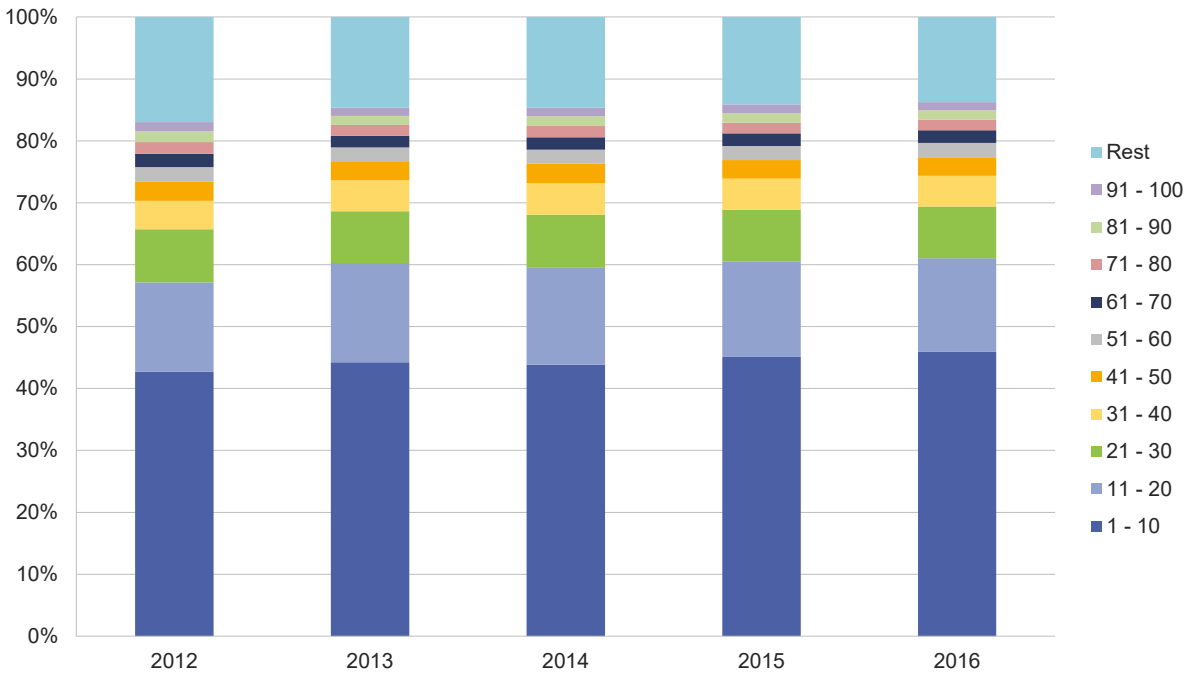



*Figure 5: Proportion of network utilisation revenue (distribution network) by company size*

Network costs are based on the operating and capital costs of a "safe, productive and efficient" network, plus tax expenditure and fees and payments to the state. For 2016, the distribution network operators declared network costs totalling 4.7 billion Swiss francs. A chronological breakdown by the individual components clearly shows that the fees and payments collected by the cantons and municipalities and the national legally required charges for renewable energy have significantly gained in importance in the past few years (Figure 6). Since 2012, their share has increased by 50 percent to more than 1 billion Swiss francs. Nonetheless, operating and capital costs remain the most significant component with a share of around 75 percent or 3.5 billion Swiss francs. A comparison of this figure with the amount of network use remuneration cited above shows that in 2016 there was a slight surplus of 34 million Swiss francs for the first time again. In the three previous years the deficits totalled 420 million Swiss francs, which induced additional interest costs.

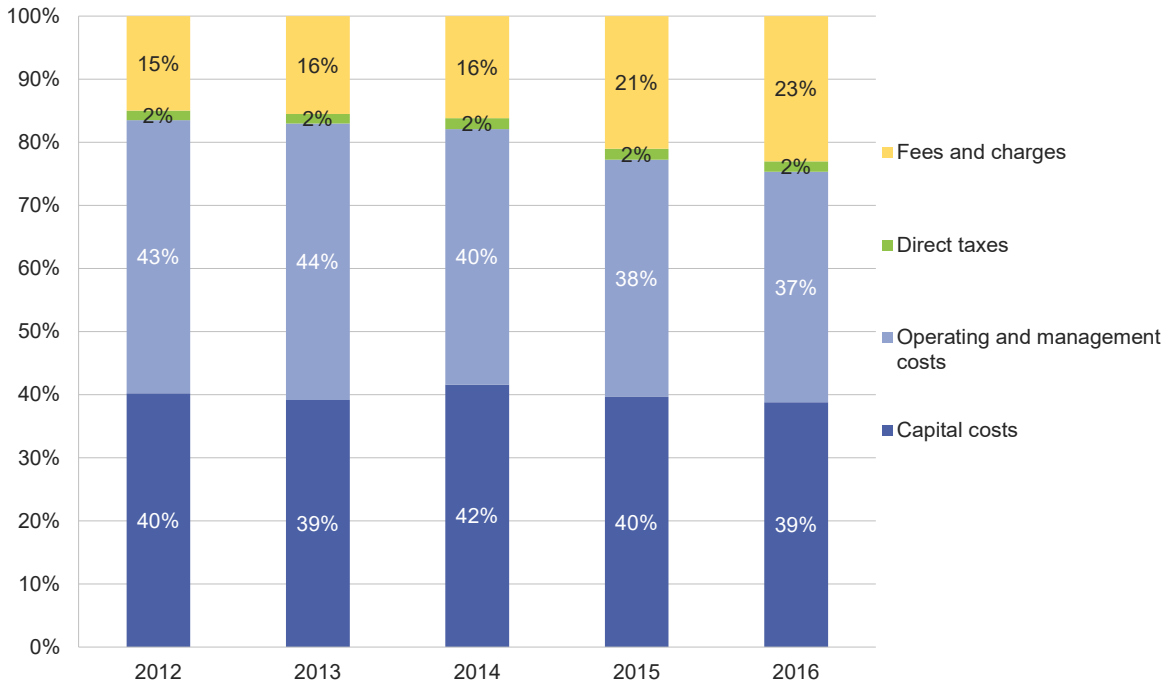



*Figure 6: Breakdown of distribution network costs*

In its 2016 annual report, Swissgrid disclosed network costs of 592 million Swiss francs and costs for system services amounting to 233 million Swiss francs. If these accumulated costs of 0.8 billion Swiss francs for the transmission network are added to the distribution network costs amounting to 4.7 billion Swiss francs, this results in total costs of around 5.5 billion Swiss francs for the Swiss electricity network. Figure 7 shows the distribution of this amount between the various network levels. The local distribution network (level 7) accounts for by far the highest proportion (almost 50 percent), and network level 5 accounts for a further 20 percent. By contrast, the shares of costs at the three transformation levels (2, 4 and 6), which form the links between the various transmission levels, were relatively low. The share of costs of the high-voltage network operated by Swissgrid (level 1, including system services) was 15 percent, of which roughly one-third was attributable to system services.

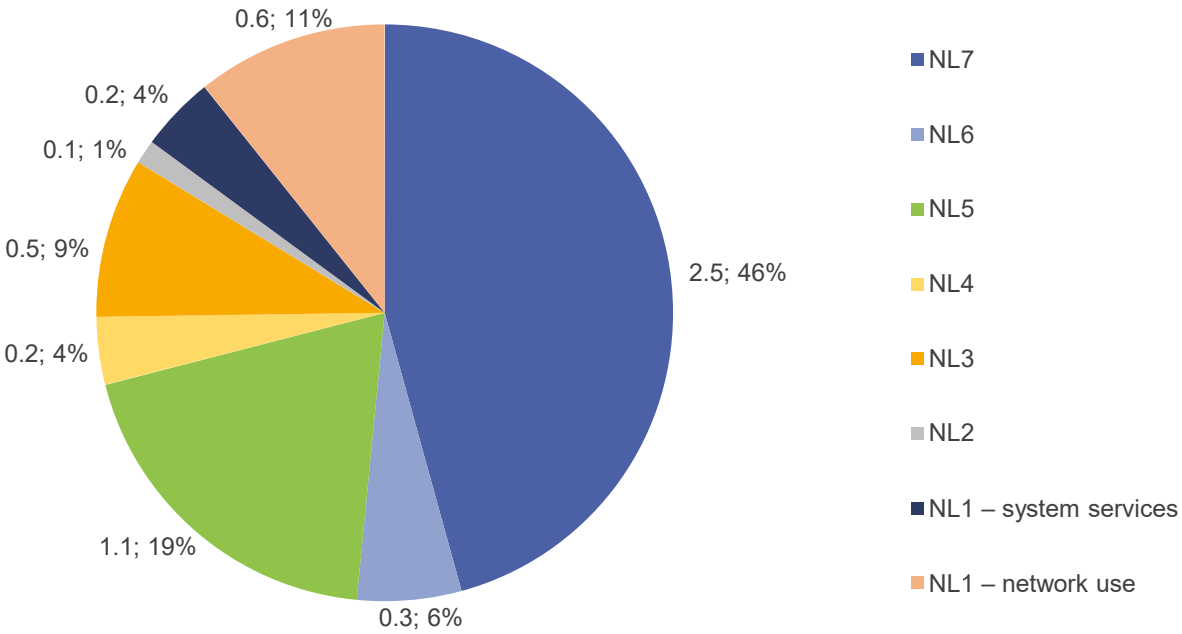



*Figure 7: Costs in billion Swiss francs and breakdown of the shares of costs of the Swiss electricity network by transmission (network level 1) and distribution network (levels 2 to 7) in 2016*

## 3.2 Grid expansion and planning

### 3.2.1 Long-term planning of the transmission network

A variety of decisions relating to sectoral plan and planning approval procedures will have to be taken at the federal level in the next few years, while taking due account of the criteria specified in the Federal Electricity Supply Act. ElCom, too, is involved in these procedures and needs to have objective and transparent planning fundamentals at its disposal in order to make the necessary assessments.

In accordance with the Electricity Networks Strategy that was adopted by Parliament in December 2017, Swissgrid will from now on base its long-term planning on the scenarios developed by the Swiss Federal Office of Energy (SFOE). ElCom approved the long-term plan (Federal Act on the Expansion and Upgrading of the Electricity Networks [amendment of the Federal Electricity Act and the Federal Electricity Supply Act] dated 15 December 2017, which was published in the 2017 Federal Gazette, pp. 7,909 ff). The date of entry into force of these provisions is not yet known. At the time this report went to press, the deadline for the associated referendum had not yet expired.

At the beginning of 2015, Swissgrid completed its "Strategic Grid 2025" report, which it presented to the public in April. With this report, the long-term planning of the transmission network has now been coordinated Swiss-wide, and this essentially meets the requirements specified in Article 8, paragraph 2, and Article 20, paragraph 2a, of the Federal Electricity Supply Act. From the point of view

of ElCom, the report represents a significant milestone in the Swiss-wide planning of the transmission network, but it can also contribute towards the improvement of cross-border coordination in the areas of financing and use of the grid. The magnitude of the investments for the expansion and maintenance of the grid appears to be plausible. The preservation of the value of the transmission network can be assured on the basis of the defined planning.

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

### 3.2.2 Long-term planning of the distribution networks

In accordance with Article 8, paragraph 2, of the Federal Electricity Supply Act, distribution network operators are obliged to carry out long-term planning in order to maintain safe, productive and efficient network operation. This obligation applies to networks with a voltage below 36 kV. With a strict application of the Federal Electricity Supply Act, this concerns 50 network operators. In the past, ElCom's policy has been to initially deal with the classification of long-term planning at the transmission network level and only then to more closely examine a potential "rollout" onto the distribution network with voltage levels of 36 kV and higher. ElCom discussed specific issues relevant from the point of view of the regulator with the operators of the distribution network relating to long-term planning, in particular the uncertainties with respect to the recoverability of costs for various expansion options (e.g. assumptions regarding the addition of renewable energy production that were of relevance in terms of investments and their recoverability).

In the view of ElCom, there is no need for action with regard to the fundamental method of preparing long-term planning. ElCom will address this topic again as soon as the legal framework relating to "intelligent electricity supply networks" has been more clearly defined. For the time being, ElCom recommends that network operators should use the document entitled "Long-term planning for network levels 2 and 3" published by the Swiss Association of Electricity Producers (VSE) as a reference tool and contact the Technical Secretariat of ElCom if they have any questions regarding the recoverability of the costs associated with the various expansion options.

### 3.2.3 Participation in the sectoral plan and planning approval procedures

ElCom's participation in the sectoral plan and planning approval procedures relating to network expansion projects is essentially regulated in the Ordinance on the planning approval procedure for electrical installations. In its assessments of expansion projects, ElCom pays particular attention to the aspect of the economic viability of applications submitted for approval.

In 2017, within the scope of its official duties, ElCom commented on two important transmission network projects, namely the connection of the Lagobianco power plant and the accompanying measures for the Airolo-Lavorgo project. At the distribution network level, ElCom commented on several projects concerning voltage increases. ElCom also attended several support group meetings and participated in an on-site inspection.

In future, the choice between overhead lines and the option of cabling will be simplified through the application of the additional cost factor. Here, a distribution network is to be cabled as long as the additional costs do not exceed a specified factor and other prerequisites are met. The additional cost factor is specified by the Federal Council and may not exceed 3. Similarly, installations in the transmission network will be of national interest in the future, and this means that, on grounds of overriding interest, such installations can also be incorporated within inventory objects of national interest. These provisions are included in the "Electricity Networks Strategy" that was approved in December (Federal Act on the Expansion and Upgrading of the Electricity Networks [amendment of the Federal Electricity Act and the Federal Electricity Supply Act] dated 15 December 2017, which was published in the 2017 Federal Gazette, pp. 7,909 ff). The date of their entry into force is not yet known. At the time this report went to press, the deadline for the associated referendum had not yet expired.

## 3.3 Investments in the grid infrastructure

As an integral part of its monitoring activities, ElCom assesses whether sufficient investments are carried out over the medium and long term in order to keep the electricity networks in good condition and thus to ensure that they contribute towards a secure electricity supply. Because the figures relating to both the transmission and the distribution network were not yet available at the time of going to press, the data for the previous year will be cited below.

### 3.3.1 Investments in the transmission network

Within the 2016 realisation period, the budgeted investments of 177 million Swiss francs were reduced by 28 million to 149 million Swiss francs. This was primarily attributable to delays in public calls for tenders and in licensing procedures, as well as to the commissioned planners and to efforts aimed at optimising the implementation of certain substation projects.

### 3.3.2 Investments in the distribution network

The trend in investment activity relating to the distribution network was stable. With an accumulated amount of around 1.4 billion Swiss francs per annum, the network operators are on average investing approximately 60 percent more in upgrading and expanding the installations than they are simultaneously writing off. Write-offs amounting to around 0.9 million Swiss francs result in an investment surplus of more than half a billion Swiss francs (Figure 8).

Since the reliability of Switzerland's electricity networks is very high, also by international comparison, and was greatly increased during the period under review (cf. section 2.3), ElCom still considers the investments in the distribution network to be sufficient.

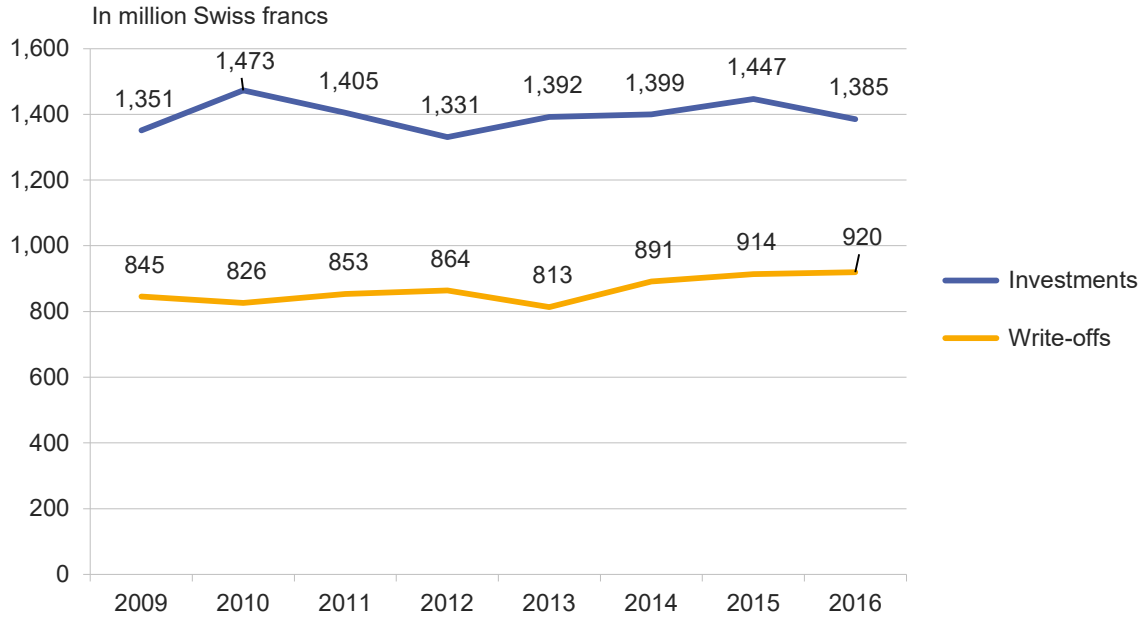



*Figure 8: Trend in investments and write-offs in the distribution network*

## 3.4 Increases in network capacity

Additional network capacity may become necessary in order to connect producers of electricity from renewable energy to the distribution network. Swissgrid refunds the associated costs by incorporating them into its calculation of the system services tariff. This form of remuneration therefore requires the approval of ElCom, which relies on a directive that serves as a guideline for network operators when submitting applications. This directive also specifies the criteria for the assessment of such applications. In the year under review, ElCom evaluated 148 applications for the remuneration of costs associated with increases in network capacity. In the past eight years, ElCom has issued a total of 678 associated rulings (cf. Figure 9).

As of the end of 2017, the total costs for network capacity increases reached 70.3 million Swiss francs, with a total power plant output of 253.3 MW. Table 5 presents an overview of the key data relating to network capacity increases in the period from 2009 to 2017.

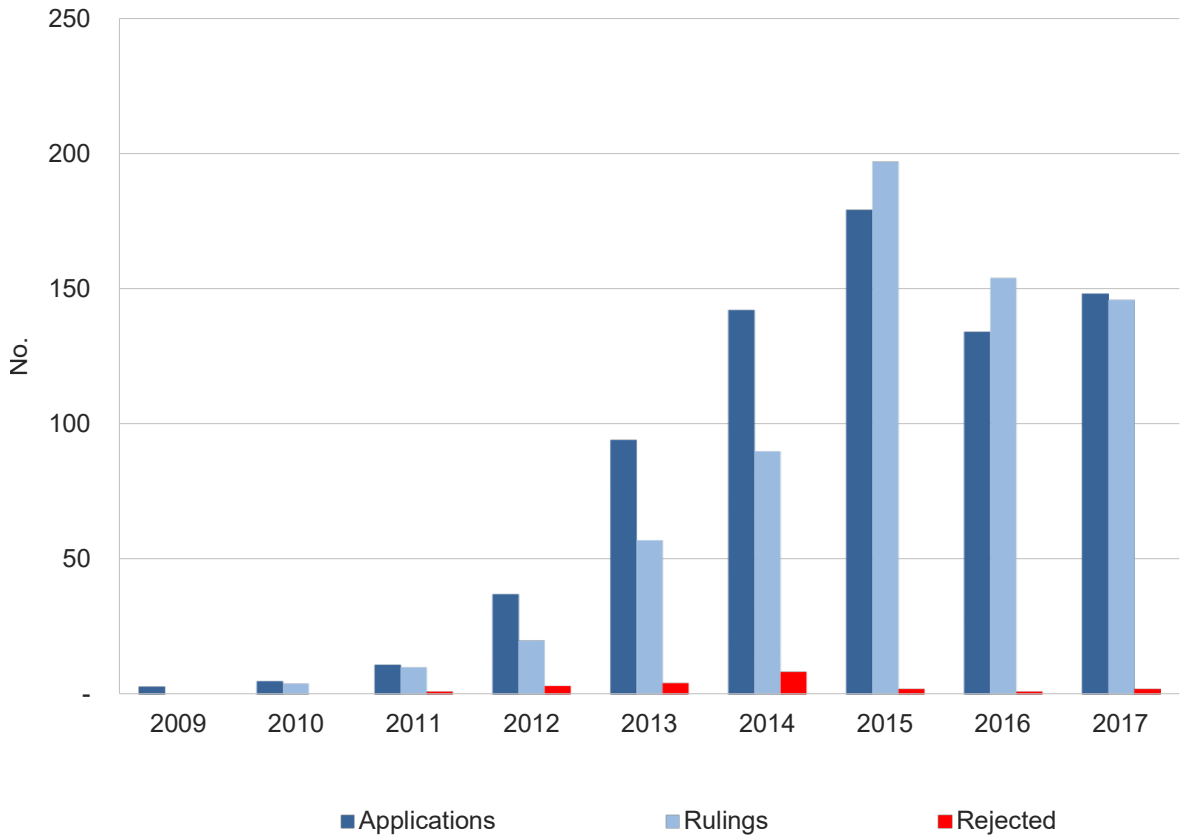



*Figure 9: Trend in the number of rulings on network capacity increases*

| | Total | Photo-voltaics | Wind | Other sources[1] |
|---|---|---|---|---|
| No. of rulings | 678 | 650 | 3 | 25 |
| Minimum generator output [kW][2] | 8 | 8 | 3,000 | 22 |
| Maximum generator output [kW][2] | 74,000 | 2,038 | 16,000 | 74,000 |
| Total generator output [kW] | 253,263 | 105,330 | 23,000 | 124,933 |
| Minimum costs [Swiss francs][2] | 3,500 | 3,500 | 1,805,003 | 19,311 |
| Maximum costs [Swiss francs][2] | 9,262,389 | 619,657 | 9,262,389 | 2,117,200 |
| Total costs [Swiss francs] | 70,318,953 | 50,242,973 | 13,523,872 | 6,552,108 |
| Average costs [Swiss francs][3] | 104,954 | 78,260 | 4,507,957 | 262,084 |

| | Total | PV | Wind | Other sources[1] |
|---|---|---|---|---|
| Minimum relative costs [Swiss francs][4] | 3 | 3 | 451 | 3 |
| Maximum relative costs [Swiss francs][4] | 8,725 | 8,725 | 819 | 3,498 |
| Average relative costs [Swiss francs][4] | 278 | 477 | 588 | 52 |

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

*Table 5: Figures relating to rulings on network capacity increases pronounced between 2009 and 2017*

## 3.5 National grid operator

The former owners of the transmission network were required by law to transfer the entire network to the national grid operator, Swissgrid. A further transfer of a transmission network facility to Swissgrid AG was effected in 2017, thus resulting in an amendment to the Articles of Association of the national grid operator.

## 3.6 Rulings and decisions relating to networks

With regard to a dispute concerning the increase of supply voltage for an existing network connection, on 16 January 2017 (2C_805/2016) the Federal Supreme Court rejected an appeal against the initial ruling and thus upheld the ruling by ElCom in this matter. ElCom had concluded that, in a medium-voltage network that in the past had been converted from 12 to 20 kV, the last consumer to be connected to the network at 12 kV did not have an entitlement to the continuation of the previous network connection (i.e. 12 kV instead of 20 kV). On the contrary, the non-discriminatory application of the guidelines of the network operator regarding network connection would mean that this entity, too, should be supplied with 20 kV. While the Federal Administrative Court found that the content of ElCom's ruling was lawful, it referred the matter back to the Commission for the purpose of specifying a new implementation deadline.

In another dispute, ElCom had to decide whether a distribution network operator may stipulate the use of a production meter in addition to a bidirectional total consumption meter in small photovoltaic facilities with own consumption of less than 30 kVA. Because the applicable federal legislation does not require production from small photovoltaic facilities to be metered and because an additional production meter is not necessary for guaranteeing secure network operation, ElCom came to the conclusion that distribution network operators may not stipulate the use of additional production meters and have to record the fed-in surplus energy without these devices.

# 4 The Swiss electricity market

*The number of photovoltaic installations has risen sharply in the past few years. In the year under review, ElCom again received numerous complaints relating to remuneration at cost for feed-in to the grid.*

## 4.1 Structure of network operators in Switzerland

Since the introduction of the Federal Electricity Supply Act in 2008, the number of network operators in Switzerland has fallen by around one-eighth to 650. This trend has been observed for a number of years and has continued until today. It is partly attributable to numerous network takeovers, but also to an increase in the number of municipal mergers. On 1 January 2008, there were 2,715 municipalities on the official list. Eight years later this number had fallen to 2,294 (status as of 1 January 2018: 2,222). In the same period, the country's population grew by around 10 percent, which means there are now more end consumers per network operator. As we can see from Figure 10, the typical network operator is relatively small and on average supplies around 1,500 end consumers. This tendency is rising slightly. Only 79 network operators supply more than 10,000 end consumers, with eleven supplying more than 100,000. Overall, Swiss network operators supply around 5.2 million consumers with electricity – approximately half a million more than five years ago.

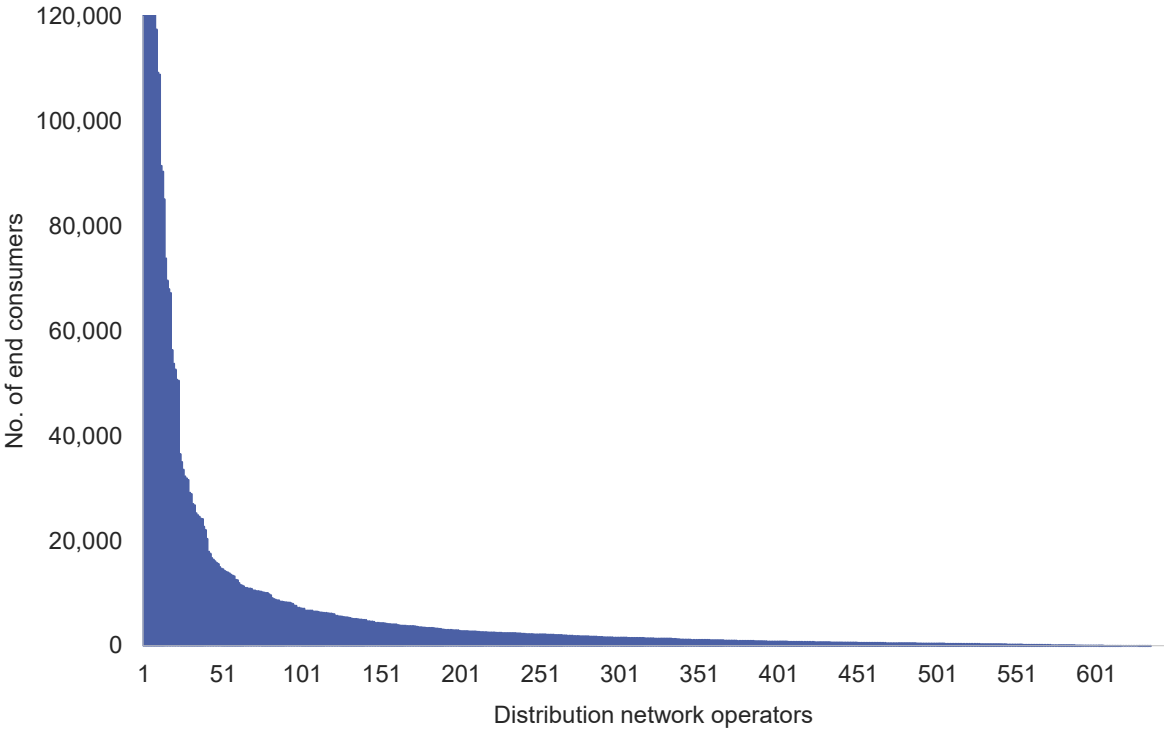



*Figure 10: Number of end consumers per distribution network operator. For the sake of legibility the vertical scale has been cut off at 120,000 end consumers, which concerns eight distribution network operators.*

## 4.2 Economic situation in the electricity industry

In the year under review, the issue of the economic situation in the electricity industry gave rise to heated discussions during the parliamentary debates on the federal legislation on expansion and upgrading of the electricity networks. The Council of States, in particular, identified a need for financial support and proposed that the "average price method", the legality of which was only fairly recently confirmed by the Federal Supreme Court, should be repealed with retroactive effect. According to this method, operators of distribution networks are obliged to proportionally pass on to connected end users any price gains they may obtain as a result of their free market access. By contrast, the National Council focused attention on the question of promoting renewable energy, calling for connected end consumers to be exclusively supplied with electricity from renewable energy produced by domestic power plants. In the end, Parliament voted in favour of retaining the average price method (cf. page 37 for further information).

In a memo for the attention of Parliament, ElCom pointed out that the economic situation of the majority of electricity supply companies is good. In most cases, the operating results of electricity suppliers are pleasing. Even the figures for those companies with a high proportion of own production, and which are therefore potentially exposed to the risk of low electricity prices, are mostly in the black. Here, the regulated revenue from distribution network operati-

on and the sale of electricity to connected users have a had a stabilising effect.

The economic situation for major electricity producers Alpiq and Axpo is less rosy. In the past few years, major valuation adjustments and provisions resulted in heavy annual losses. At present, these two companies can hardly (or only partially) benefit from the stabilising effect of regulated revenue. Furthermore, because the market is only partially liberalised, they are unable to gain access to the vast majority of end consumers who do not have the option of changing their supplier. This means they are particularly hard hit by lower market prices. Nonetheless, their liquidity was secured at all times. Their shareholders are firmly financed and in principle were (or would have been) able to offset the negative results at all times. The applicable Swiss legislation does not stipulate an obligation on the part of the owners to pay additional contributions, and the same applies with respect to the federal government/taxpayers.

For the next few years, following the acceptance of Energy Strategy 2050, hydropower is to receive subsidies in the amount of 120 million Swiss francs a year for a limited period of time as a "market premium". However, various exponents are of the opinion that this will not suffice: by comparing the theoretically derived acquisition costs and the hypothetically achieved sales prices they estimate the annual deficit at around 1.2 billion Swiss francs. Half the deficit is already borne by fixed end consumers and, after taking account of the market premium, a deficit of 0.5 billion Swiss francs remains. To overcome this "missing money" problem, an additional charge is being proposed as a "basic supply premium" to be paid solely by end consumers tied to the monopoly.

In the view of ElCom, these calculations and deliberations have a number of significant weak points. The assumed acquisition costs are at the high end of the estimates. At the same time, the calculations are based on unusually low sales prices. ElCom's estimate is considerably higher. Furthermore, some earnings are completely excluded from the calculation. If the above effects are combined, the amount of "missing money" drops to around 180 million Swiss francs. The calculations of the production costs also include an imputed return on equity of 350 million Swiss francs. The deficit could therefore be borne by the owners, since it merely reduces their profit.

On balance, there is no industry-wide missing money problem. Nonetheless, Axpo and Alpiq still face significant challenges. However, the associated risks could be borne by their shareholders.

## 4.3 Market access and change of supplier

In the period under review, the Swiss electricity market was still only partially liberalised and it will remain only partly so in the foreseeable future. In this initial stage of market liberalisation, only major consumers (with an annual consumption of at least 100 MWh) may exercise their right to free market access, i.e. can freely choose their electricity supplier. At the end of October each year, they can decide whether they wish to switch from basic supply to free market in the upcoming year. Once they have opted for the free market, however, they may no longer revert to regulated basic supply.

In order to ascertain the potential or actual number of end consumers in the free market, ElCom periodically conducts a survey of the largest distribution network operators. The 94 operators surveyed supply electricity to 80 percent (or 4.2 million) of Switzerland's end consumers. Of the 32,500 end consumers entitled to market access (0.8 percent of all end consumers), 21,900 (or 67 percent) have exercised this right. End consumers in the supply regions of these network operators account for a total of 44.1 TWh (or around 80 percent) of end consumption in Switzerland. Half the supplied energy (22.6 TWh of the total of 44.1 TWh) is consumed by end users with right of access to the market. Those consumers who have chosen to access the market consume 18.0 TWh (or 80 percent) of the available energy.

In the first few years after market liberalisation, relatively little use was made of the right to choose a supplier. As a result of falling market prices, the number of users switching to the free market rose sharply (cf. Figure 11). According to the latest figures, two-thirds of all consumers entitled to market access have exercised this right to date (orange curve). In terms of energy quantities, 80 percent of the overall volume is now supplied via the market (blue curve). This means that the number of consumers who have not yet made use of their right to market access is relatively low.

*2 Between 2007 and 2016, the average end consumption, excluding public transport and lighting, amounted to 53.7 TWh.*

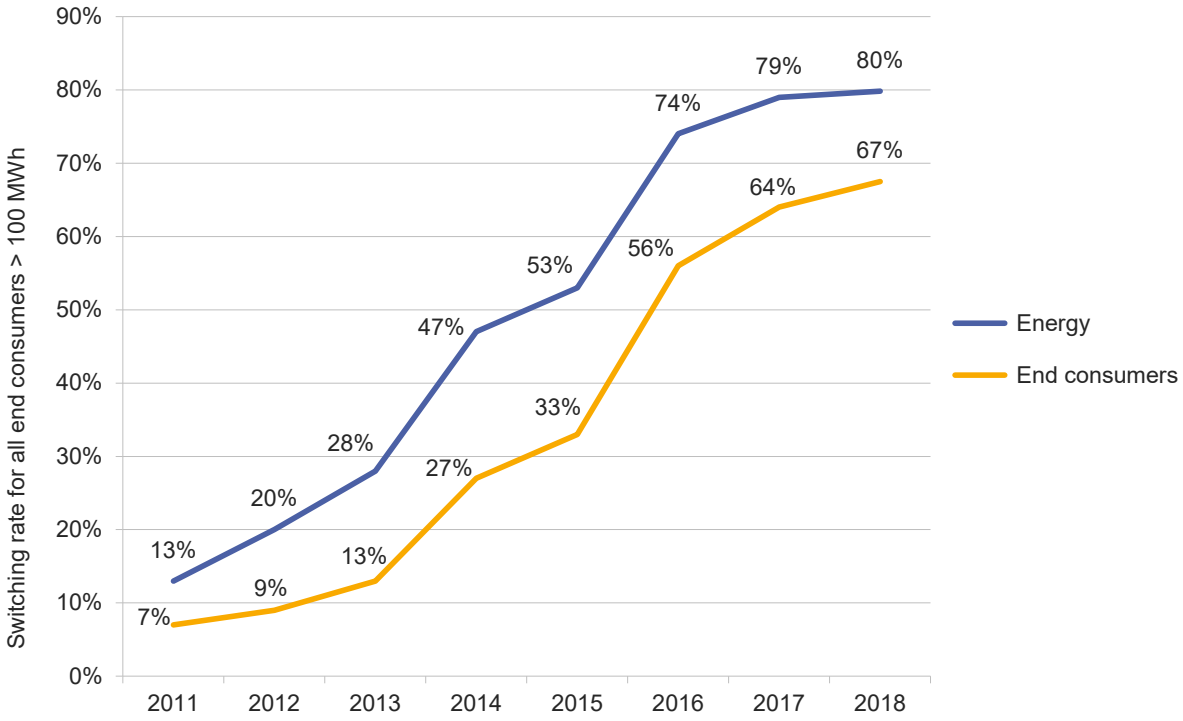



*Figure 11: Transfer to the free market*

Figure 12 (below) shows the distribution of sold quantities of energy in relation to the size of the network operator. The largest network operators (dark blue) supply considerably more than 40 percent of the electricity that is sold in the distribution network to end consumers. If we look at the figures for the biggest 100 network operators, the proportion increases to more than 80 percent. The remaining 544 network operators (or around five-sixths of the total) collectively supply around one-sixth of the electricity consumed by end users.

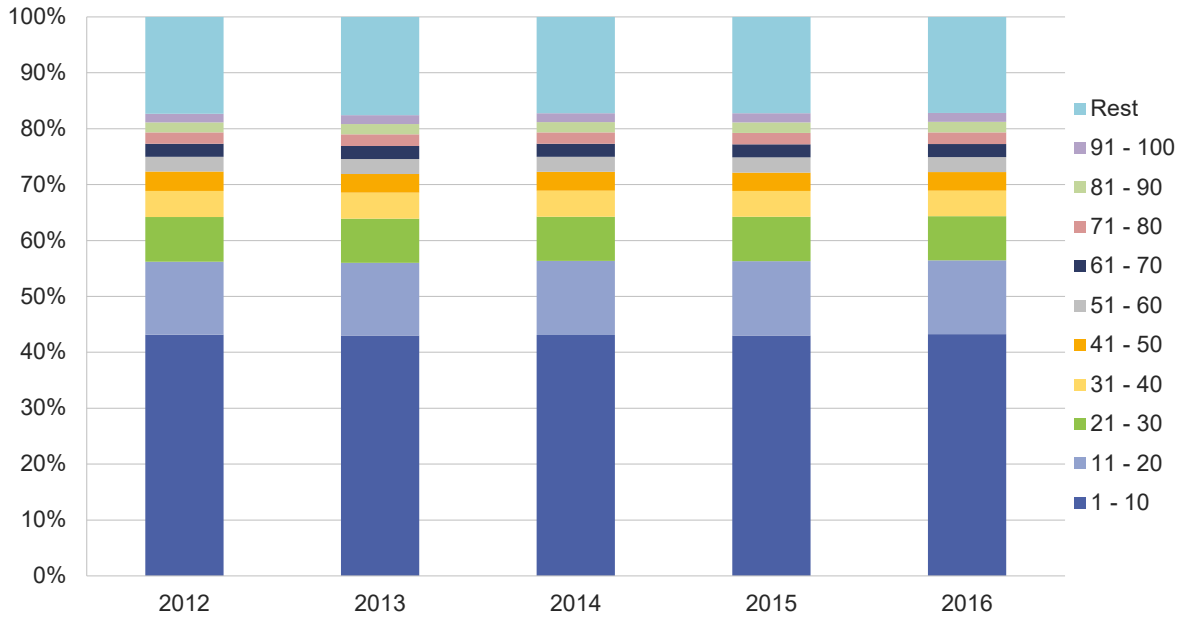



*Figure 12: Proportion of energy supplies via the distribution network, by company size*

## 4.4 Transmission network tariffs

As we can see from the overview in Table 6, the tariffs for the use of the transmission network remain subject to considerable fluctuations. The current tariff for general system services fell by 20 percent versus 2017. In addition to lower costs for reserve energy capacities, the reduction of existing surpluses also resulted in lower tariffs. The network use tariffs, which are regulated in Article 15, paragraph 3, of the Federal Electricity Supply Ordinance (30 percent working tariff, 60 percent demand tariff, 10 percent basic tariff), were reduced thanks to the cost-cutting offsetting of auction proceeds (cf. section 6.4).

| | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| **Network use** | | | | | |
| Working tariff [cents per kWh] | 0.19 | 0.22 | 0.25 | 0.25 | 0.23 |
| Power tariff [Swiss francs per MW] | 30,900 | 36,100 | 41,000 | 41,000 | 38,200 |
| Fixed basic tariff per exit point | 285,500 | 336,300 | 387,700 | 387,700 | 365,300 |
| **General system services tariff** [cents per kWh] | 0.64 | 0.54 | 0.45 | 0.40 | 0.32 |
| **Individual system services tariff** | | | | | |
| Active power losses [cents per kWh] | 0.08 | 0.11 | 0.11 | 0.08 | 0.08 |

*Table 6: Trend in transmission network tariffs for network use and general system services for distribution network operators and end consumers (source: Swissgrid AG)*

In order to compare the tariffs of the various network operators, ElCom converts the two components, demand and basic tariff, into cents per kWh. If the individual tariff components of the transmission network are summarised in cents per kilowatt hour, this results in a figure of 1.14 cents per kWh for 2018. On average, a typical household with an annual consumption of 4,500 kWh (category H4: 5-room apartment with electric cooker and tumble dryer, but without an electric boiler), pays 9.65 cents per kWh for network use (cf. Figure 13). The share represented by the transmission network in the tariffed network costs for these households is around 12 percent.

## 4.5 Distribution network tariffs

For 2018, the average electricity price for a household with consumer profile H4 is 20.4 cents per kWh (Figure 13). Projected over the full year, this is equivalent to an electricity bill of 918 Swiss francs – an increase of 13 Swiss francs versus the previous year.[3] The total tariff comprises four elements: remuneration for network use, energy price, fees and payments to the state and federal charges for the promotion of domestic renewable energy. Network operators are required to publish the first three elements by not later than the end of August for the following year's tariffs. In comparison with the previous year, the network use and energy tariffs are around 2 percent lower, while fees and payments to cantons and municipalities are stable. By contrast, the charges for the promotion of renewable energy are higher. Here, the Federal Council has increased the network surcharge from 1.5 cents per kWh to the new legally specified maximum of 2.3 cents per kWh. Of this amount, 1.2 cents per kWh are reserved for the new feed-in remuneration system, which will replace the previous feed-in remuneration at cost programme once the new Federal Energy Act enters into force. A large portion of the revenue collected in the network surcharge fund is also to be used for supporting the additional measures aimed at promoting domestic renewable energy. These include a one-time payment of remuneration for photovoltaic installations, a market premium for existing large-scale hydropower plants and contributions towards investments in new large-scale hydropower plants.[4]

*3 With effect from tariff year 2018, network operators have to declare not only their lowest-priced, but also their standard electricity product. The latter is charged to end consumers if they do not actively select another electricity product. This affects the energy costs, which increase by 0.4 cents per kWh. The costs of a typical household with standard tariff amount to 936 Swiss francs, which is 18 Swiss francs higher than the cheapest tariff.*

*4 As of the beginning of 2018, the newly created Pronovo AG is responsible for collecting the network surcharge and the management of various federal programmes for the production of electricity from new renewable energy sources.*

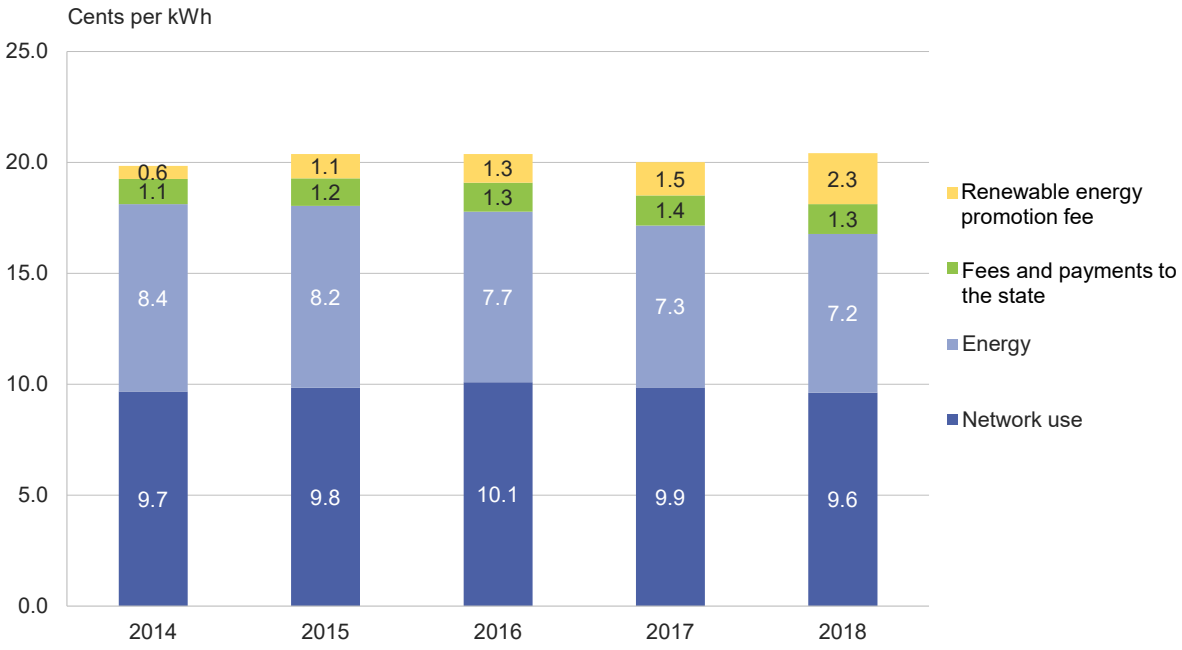



*Figure 13: Cost components of the overall electricity tariff for consumer profile H4 (excluding value-added tax*

The tariff figures cited above refer to national averages. Considerable differences in tariffs often exist at the cantonal and municipal levels. Detailed information about the tariffs of each municipality can be accessed on the ElCom website (www.elcom.admin.ch), together with an interactive map, by clicking on the link to the overview of electricity tariffs ("Strompreis.Übersicht"). Median cantonal tariffs (the level at which half the population pays a higher price and the other half pays a lower price) are compared in Figures 14 to 17. The further away the cantonal tariffs are from the Swiss median, the deeper red (higher tariff) or green (lower tariff) the colouring. The changes in colour therefore depict the development of the cantonal tariffs in relation to the comparable national level. For example, the network tariffs in the canton of Basel-Stadt were relatively low in 2014 (light green), but are somewhat higher now (orange).

The maps below depict the respective situations in 2014 and 2018. In the period concerned, the median Swiss network use tariffs for a category H4 household fell slightly (by 0.2 cents per kWh), while the energy tariffs fell by 1.3 cents per kWh. Compared with the levels ten years ago, the end consumer tariffs for network use and energy have fallen since the initiation of tariffing in accordance with the Federal Energy Supply Act by 1.8 cents per kWh, or almost 10 percent. It is only these tariffs that can be directly influenced by the network operators and controlled by ElCom.

## Network use

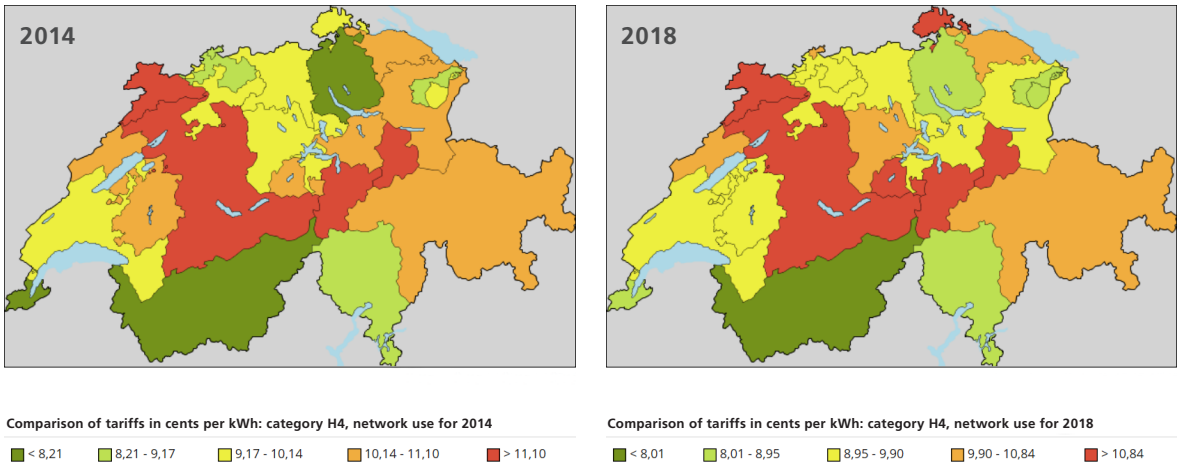



*Figure 14: Comparison of average cantonal tariffs (median) for network use for consumer profile H4 in 2014 and 2018*

## Energy

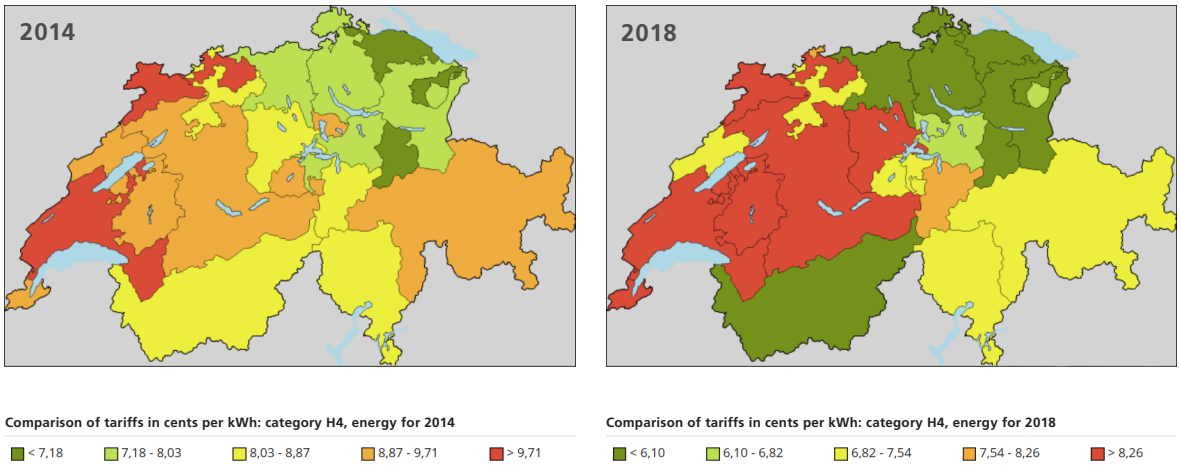



*Figure 15: Comparison of average cantonal tariffs (median) for energy for consumer profile H4 in 2014 and 2018*

The picture is different regarding the development of the tariff elements specified at the political level. While most of the cantons and municipalities initially did not alter the applicable fees and payments, they increased them notably in 2012 and 2017. Since then they have remained stable. The national median rose by 0.2 cents per kWh, or around 30 percent. The development of the uniform Swiss-wide federal fee for the promotion of domestic production from renewable energy was more pronounced: the network surcharge for "remuneration of feed-in at cost" was introduced with the 2009 tariffs. For five years it remained unchanged at 0.45 cents per kWh, after which it was successively increased to the already cited 2.3 cents per kWh (i.e. by a factor of five).[5]

*5 Since the network surcharge is uniform throughout Switzerland, it is not shown here. However, the total is depicted in Figure 17.*

## Fees and payments to the state

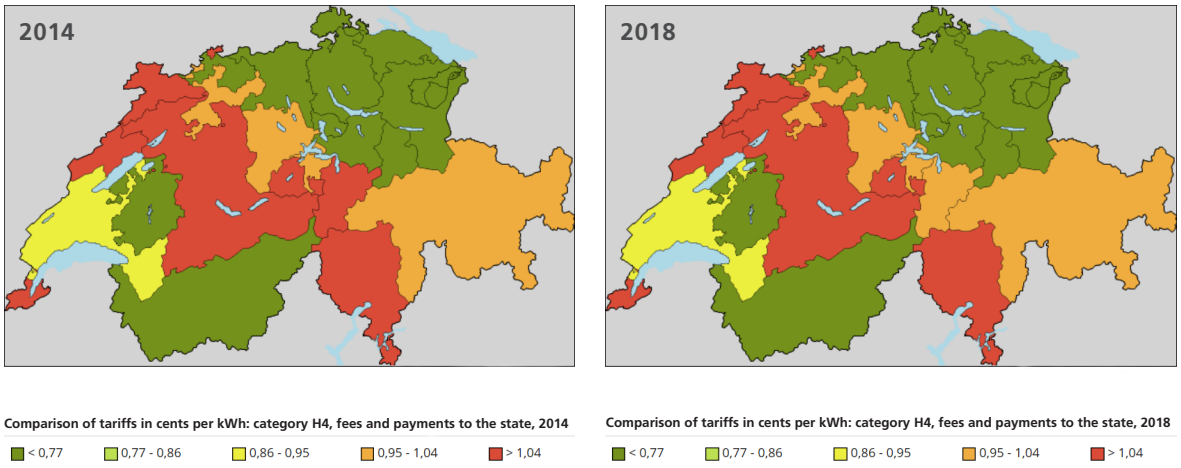



*Figure 16: Comparison of cantonal tariffs (median) for cantonal and municipal fees and payments to the state for consumer profile H4 in 2014 and 2018*

Added to the overall tariff, the developments outlined above largely offset one another. Expressed as a Swiss average, a household with consumer profile H4 has to pay around 15 Swiss francs (1.5 percent) more today for its annual electricity consumption than it did ten years ago. By contrast, with an unchanged network surcharge, the electricity bill would have been almost 70 Swiss francs lower. While in 2009 the network surcharge and fees and payments to the state only accounted for 7 percent of the overall electricity tariff, as of recently this proportion had increased to 18 percent.

## Overall electricity tariff

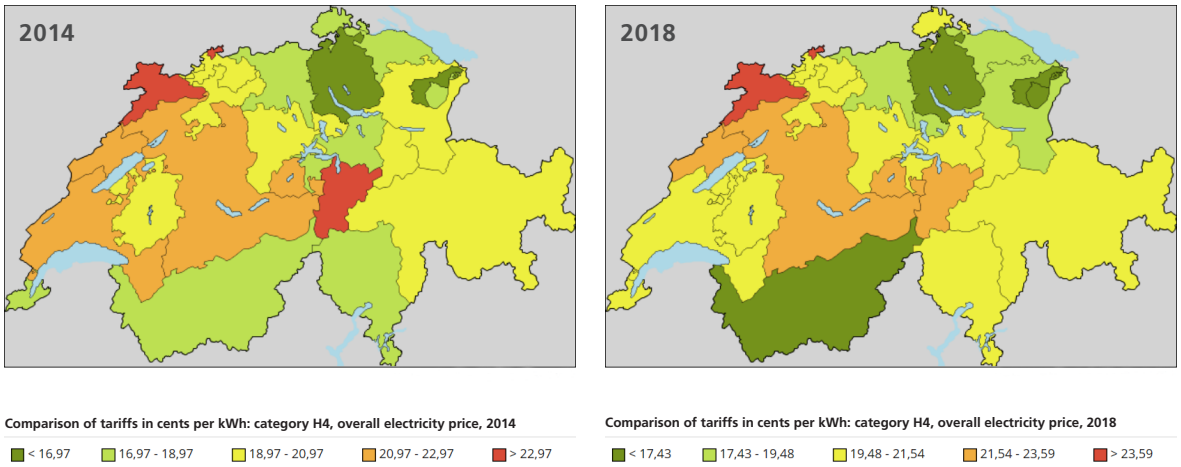



*Figure 17: Comparison of average cantonal tariffs (median) for energy for the total electricity price for consumer profile H4 in 2014 and 2018*

## 4.6 Examination of tariffs

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

- Each network operator is required to submit its cost accounting by the end of August, which forms the basis for the network and energy tariffs for the following year. ElCom uses around 150 tests in order to check the cost accounts for errors, inconsistencies and implausible figures, and returns its evaluations to the network operators for adjustment where necessary. The 630 network operators who submitted their cost accounts on time or after the first reminder received ElCom's evaluation in the year under review together with the request to check any required changes and either implement them or substantiate the original figures.

- If a network operator still had unlawful or implausible figures in its cost accounting even after it had been adjusted, ElCom carried out an audit in the corresponding segments. In the year under review, ElCom particularly reprimanded the inadmissible calculation of coverage differentials from the previous years and excessively high profits from the implementation of the "95 Swiss francs rule". With respect to coverage differentials, as in the previous year this involves the calculation of coverage differentials in one year and the amount carried forward to the following year. By contrast, the "95 Swiss francs rule" concerns the costs and profits relating to the distribution of energy among end consumers with basic supply. The tariffs of 86 network operators were subjected to close examination and corrected where necessary.

- ElCom also examines whether the network operators fulfil various requirements relating to tariffs, costs and compliance with the "95 Swiss francs rule". In a total of 79 cases the balance was found to be in order. In its capacity as regulator, ElCom informed these network operators that it would not be opening proceedings against their tariffs next year.

- Finally, in some cases ElCom comprehensively examines the entire spectrum of network and energy costs (the latter only for end consumers with basic supply). ElCom was able to conclude proceedings in five cases.

ElCom also planned to enforce the average price method, based on Article 6, paragraph 5, of the Federal Electricity Supply Act and the ruling by the Federal Supreme Court dated 20 July 2016 on the energy tariffs of CKW (2C_681/2015 and 2C_682/2015). This concerns the question of how the costs of electricity from various sources (own power plants, purchases on the market, etc.) are to be distributed between end consumers with basic supply and those with free market access. However, in view of the parliamentary debates on the calculation of energy costs within the framework of the Electricity Networks Strategy (Federal Act on the Expansion and Upgrading of the Electricity Networks [amendment of the Federal Electricity Act and the Federal Electricity Supply Act] of 15 December 2017, published in the 2017 Federal Gazette, pp. 7,909 ff), ElCom decided not to open any further proceedings. In its final vote on 15 December 2017, Parliament decided in favour of retaining the average price method. At the same

time, it created the legal bases for including the acquisition costs for electricity from renewable energy sourced from domestic and non-promoted production capacities into the tariffs for basic supply until the expiry of the market premium in accordance with Article 30 of the revised Federal Energy Act of 30 September 2016. The date of entry into effect of this special regulation has not yet been specified. At the time this report went to press, the deadline for the associated referendum had not yet expired.

In the year under review, ElCom's tariff audits focused on the following aspects in particular:

**Network evaluation**
Here the focus was on the same problems as in previous years.

In the year under review, ElCom again identified installations for which the synthetic values were not derived correctly, were inadequately documented or were calculated on the basis of a very low number of historically valued installations. Synthetic values have to be derived in a transparent and comprehensible manner based on the acquisition and production costs of a sufficient number of similar installations. Otherwise, there is a risk that they could exceed the value of a similar installation and thus infringe Article 13, paragraph 4, of the Federal Electricity Supply Ordinance.

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

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

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

With respect to the distribution of costs by segment, it was often the case that remuneration for network use was charged on the basis of excessive common costs. Furthermore, in some cases network operators apply factors that are not consistent with the "user pays" principle or are not derived correctly and in a comprehensible manner, which contravenes Article 7, paragraph 5, of the Federal Electricity Supply Ordinance.

The specification of the tariff for grid losses was also a disputed issue. This concerns the question of whether, in its capacity as energy

supplier, a network operator is permitted to make a profit from the sale of grid losses to its own network that exceeds the interest on the utilised capital. While network operators claim a profit derived in different ways, ElCom accepts as a maximum the interest on the utilised capital in accordance with Article 15 of the Federal Electricity Supply Act in conjunction with Article 13 of the Federal Electricity Supply Ordinance. The amount of recoverable costs and admissible profit has to be independent of the division of the company into organisational units and the resulting internal allocation.

**Energy costs:**
ElCom had earlier suspended all energy-related proceedings due to a ruling by the Federal Administrative Court, but these proceedings were reinstated following the ruling by the Federal Supreme Court on electricity supply company CKW in the summer of last year. However, due to the uncertain legal situation no proceedings relating to the average price method were initiated, and within the scope of its cost accounting audits ElCom focused on the enforcement of the "95 Swiss francs rule".

**Rights and obligations arising from licensing agreements:**
Two cases are currently pending that concern the rights and obligations associated with licensing agreements relating to the payment of network use remuneration. In an interim ruling, ElCom stated that it examines questions on a preliminary basis if this is necessary in the framework of an application and if no especially complicated circumstances exist and no special expertise appears to be required.

## 4.7 Judicial practice

In the year under review, the relevant courts did not pronounce any rulings on tariff audits or the issue of network access.

## 4.8 Sunshine Regulation

The aim behind the "Sunshine Regulation" is to make the quality, costs and efficiency of network operators more visible with the aid of a transparent and standardised comparison process. In 2016 ElCom decided to definitively introduce this form of regulation as a supplement to the existing tariff auditing procedures. Here, selected indicators relating to quality of supply and services, as well as to costs and tariffs, measure the quality, costs and efficiency of the provision of services by the individual suppliers. In addition, compliance indicators demonstrate adherence with the legally stipulated deadlines and regulatory requirements. This direct comparison of network operators is intended to create incentives to eliminate any identified weaknesses without the need for intervention on the part of the regulator. For comparison purposes, network operators with similar structures are grouped together.

ElCom was involved in activities relating to the Sunshine Regulation throughout the entire year under review. The creation of a legal basis within the framework of the revision of the Federal Electricity Supply Act for the publication of the results was a focus of attention here. For the calculation of the indicators, ElCom essentially uses data that are submitted each year by the network operators within the scope of cost accounts and supply quality surveys. ElCom also uses data from the Federal Statistical Office (FSO) that are publicly accessible. This means that there are practically no additional administrative costs for network operators associated with the Sunshine Regulation.

In the first few months of the year under review, the focus was on the formation of groups for comparison purposes and on the calculation of the various indicators. ElCom divided the approximately 650 network operators into a total of eight groups based on topographic criteria, population density and the quantity of energy supplied to end consumers (energy density). It also calculated the necessary indicators for the third round. The individual results of the comparisons were successively submitted to the operators in the spring, grouped by national language. As in the previous years, the results of the comparisons were only sent to the network operators to whom they applied. An indicator concerning the "95 Swiss francs rule" was newly introduced in the year under review. This rule was developed by ElCom in order to facilitate an assessment of the reasonable costs and profits of network operators relating to the distribution of energy to end consumers with basic supply.

As in the previous years, explanatory documentation on the Sunshine Regulation was published on the Internet. The documents concerned are primarily intended for the attention of the involved network operators. In order to inform the general public, ElCom published a comprehensive report in autumn 2017 which describes the objectives and methodology of the Sunshine Regulation.

## 4.9 Issues relating to measurement services

In 2017, ElCom dealt with two aspects of measurement services: on the one hand, it addressed the question of whether a producer may freely choose its measurement service provider and thus whether competition exists in the area of measurement services, and, on the other hand, it conducted a survey regarding the level of measurement costs.

In its ruling dated 14 July 2017 (2C_1142/2016), the Federal Supreme Court found that the choice of measurement service provider for producers with a connected capacity of more than 30 kVA lies within the scope of protection of economic freedom because the production, sale and purchase of electricity are fundamentally private-sector activities or are subject to economic freedom. A de facto monopoly exists for the electricity network. With its stipulated obligation of connection of producers and end consumers with free market access, and the requirement to grant network access, the Federal Electricity Supply Act creates the network-based prerequisites for the smooth functioning of the electricity market. A legal exclusive right of the network operator exists for the operation of the network in its region; otherwise, the principle of economic freedom is applicable. Therefore, the decisive question is whether or not the measurement services belong to the network. The fact that some end consumers and producers (and not the network operators) have to be equipped with a load output measurement device indi-

cates that these measurements are within the sphere of responsibility of the end consumers and producers – who in any case bear the costs. The measurement point belongs to the photovoltaic facility, not the network. It is therefore production facilities with load output measurement, and not the network operator, who have to report production data for the issue of the certificates of origin to Swissgrid.

According to the Federal Supreme Court, measurements in production facilities with a connected capacity above 30 kVA are therefore not a part of the network operation, but rather are the responsibility of the producer. The correct input and forwarding of data are of central importance for the proper functioning of the network and the electricity market and therefore have to meet certain requirements. A producer may thus be denied access to the network if the measurement services provider contracted by the producer would threaten the safe operation of the network through incorrect measurements. The appeal was upheld and referred back to ElCom for clarification of the question of whether the safe operation of the Repower network would be put at risk through the contracting of a third party. ElCom reinstated the examination of this issue.

The ruling explicitly concerns only measurement services for producers who produce more than 30 kVA. ElCom has been requested to examine the question of whether end consumers and producers of less than 30 kVA may also choose their measurement services provider.

Based on proceedings already initiated and the still high number of complaints about high measurement tariffs, ElCom decided to examine measurement costs in Switzerland in greater depth. The aim of the survey it conducted between the beginning of May and the end of October 2017 was to obtain an overview of the installed measurement equipment and the total measurement costs. In a first phase, data was collected on the quantity of installations and the overall measurement costs. In a second phase, the tariffs and costs for load output measurements with remote metering in accordance with Article 8, paragraph 5, of the Federal Electricity Supply Ordinance were surveyed. Approximately 92 percent of the contacted network operators submitted a completed form. The initial results show that the sum of 600 Swiss francs cited earlier by ElCom for a load output measurement at low voltage is sufficient for the majority of the network operators, although some operators still claim significantly higher costs. In addition, measurement tariffs often deviate considerably from the declared costs. The submitted data will be evaluated in depth by spring 2018 and published in a report.

On 21 May 2017, the Swiss electorate accepted the revision of the Federal Energy Act which was amended in order to incorporate Energy Strategy 2050. Provisions of the Federal Electricity Supply Act were amended in the appendix, including, in particular, those relating to measurement services. These amendments entered into force on 1 January 2018, together with the revised ordinances that were adopted in November 2017. Beforehand, however, the legislator had already adapted some of the provisions governing measurement services again within the scope of the Electricity Networks Strategy (Federal Act on the Expansion and Upgrading of the Electricity Networks [amendment of the Federal Electricity Act and the Federal Electricity Supply Act] dated 15 December 2017, which was published in the 2017 Federal Gazette, pp. 7,909 ff). The date of entry into effect of these adaptations has not yet been specified. At the time this report went to press, the deadline for the associated referendum had not yet expired.

## 4.10 Feed-in remuneration at cost, non-recurring remuneration and return delivery tariff

In the year under review, ElCom pronounced a total of 18 rulings relating to feed-in remuneration at cost, non-recurring remuneration and the return delivery tariff.

**Feed-in remuneration at cost, non-recurring remuneration**

In three cases concerning feed-in remuneration at cost, the dispute involved the question of whether Swissgrid was within its rights to declare significantly expanded or upgraded installations subject to the market price and demand repayment of the paid feed-in remuneration at cost. The systems concerned had failed to reach the required minimum production level. ElCom ruled that the period for determining whether the required minimum production level had been reached is the full calendar year. In one of these cases, an appeal was lodged with the Federal Administrative Court.

In one case, the addressee for the payment of non-recurring remuneration was contested because the person who had registered the photovoltaic facility with Swissgrid was not the same person who was operating the facility at the time of payment of the remuneration. According to ElCom, it is the person who actually invests in the installation of the facility and who pays the corresponding bills who is entitled to receive investment support in the form of non-recurring remuneration. This was the person who registered the facility. Ownership of the facility under civil law is not relevant. An appeal against this ruling was lodged with the Federal Administrative Court. Five cases were submitted to ElCom involving a total of eleven projects subject to feed-in remuneration at cost. Here, the issue was whether a positive decision on feed-in remuneration at cost could be transferred to a project at another location. In this matter, ElCom pronounced a pilot ruling in which it found that there is no legal provision that substantiates a right to transfer feed-in remuneration at cost. An appeal against this pilot ruling was lodged with the Federal Administrative Court. In two other cases, ElCom confirmed the revocation of a decision on feed-in remuneration at cost and denied a new extension of the deadline for the project progress report. If a project is not sufficiently advanced at the time of registration, responsibility for the delay has to be borne by the applicant. In one of these cases, an appeal against ElCom's ruling was lodged with the Federal Administrative Court. ElCom also declared four appeals that were submitted after the specified deadline as inadmissible. These concerned the rejection of an application for an extension of the deadline for the project progress report.

At the end of 2017, ElCom received around 200 appeals against rulings by Swissgrid in which the latter reduced the feed-in remuneration at cost from the higher level for integrated photovoltaic systems to the lower level for attached systems.

The Federal Administrative Court classified one photovoltaic facility as an attached system because, while it qualified as an integrated facility in accordance with the earlier guidelines of the Swiss Federal Office of Energy (SFOE), it did not comply with the provisions of the Federal Energy Ordinance (A-195/2016). Since

the operator of the facility relied on the correctness of the SFOE guidelines and the facility was installed in accordance with those guidelines, the fund for feed-in remuneration at cost had to compensate the operator for the additional costs (plumbing work). ElCom was consequently able to reinstate thirteen suspended proceedings in order to specify the level of remuneration for additional work. In accordance with another ruling of the Federal Administrative Court, this remuneration may not be specified as a lump sum of 150 Swiss francs per installed kWp, but must be calculated on the basis of the work that has been carried out.

In another case, the Federal Administrative Court confirmed that a photovoltaic facility that ElCom had classified as quasi-integrated was in fact an integrated system. The appeal against this ruling lodged by the SFOE with the Federal Supreme Court was still pending at the end of the year under review.

On 21 June 2017, the Federal Supreme Court ruled that the decisions by Swissgrid relating to feed-in remuneration at cost are first instance rulings (1C_532/2016). This means that ElCom is now the appeal body in this regard, and no longer the first instance.

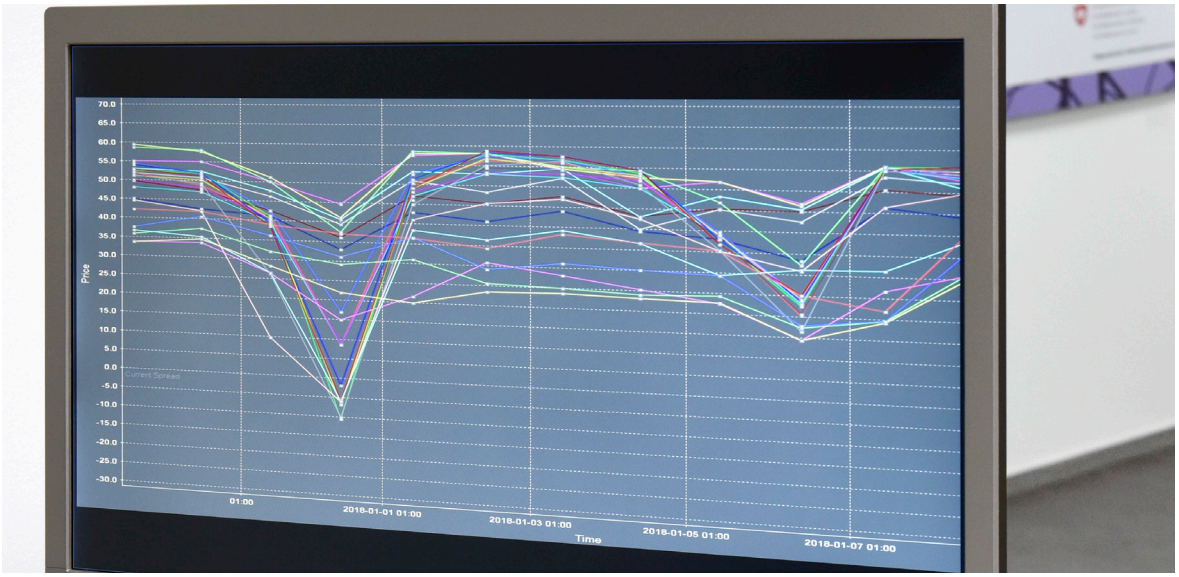
**Return delivery tariff**

In another case, the return delivery tariff for electricity from renewable energy was disputed. The applicant claimed that the method applied by ElCom for the first time in the previous year for determining return delivery remuneration failed to take certain important aspects into account. Insufficient attention was paid to aspects such as the equivalence of energy, the network operator's own production, upstream costs and foreseeable amendments to legislation. In its ruling, ElCom confirmed its practice in the previous year according to which return delivery remuneration is based on the acquisition costs of grey electricity from third parties.

**Outlook: New Federal Energy Act**

In accordance with the new Federal Energy Act, appeals concerning disputes over feed-in remuneration at cost and non-recurring remuneration, as well as other support measures, can be lodged with Pronovo AG and subsequently with the Federal Administrative Court. With respect to disputes over competitive tenders, the SFOE is the ruling authority and appeals can be subsequently lodged with the Federal Administrative Court. ElCom is no longer responsible for dealing with these disputes, but it is still responsible for ruling on return delivery remuneration, as well as on disputes between network operators and independent producers. Disputes between land owners and between the land owners and their tenants or leaseholders have to be settled in the relevant civil courts.

# 5 Market supervision




*In 2017, ElCom's Market Monitoring section received more than 2.3 million reports on fundamental data.*

## 5.1 Market transparency in wholesale electricity trading

In the year under review, the focus of attention of the Market Monitoring section was on the initiation of its operational and consolidation activities. In this context, all the associated processes were evaluated and documented. This included all internal processes as well as those involving external stakeholders such as market participants and data suppliers (referred to as "registered reporting mechanisms", or "RRMs").

At the same time, ElCom improved the functionalities of the market monitoring system. Here, the main focus was on the clear presentation of transaction data in combination with fundamental data. In the analysis of transaction data, numerous fundamental data available at the time or within the time frame in question have to be presented in a comprehensible manner so that as much information as possible can be viewed at a glance.

In addition, a number of necessary adjustments were made to ElCom's internal registration tool that has been in use since 2015. The primary aim was to improve the degree of user-friendliness of some of the functionalities.

With respect to the market monitoring processes, unusual market behaviour was analysed in greater detail. Based on the existing and available data, the reasons for the various occurrences were examined against a background of suspected market manipulation. In addition, occurrences of trading based on insider information were also investigated. The cases of unusual market behaviour ascertained by ElCom during the first year of active market monitoring were discussed with the involved market participants in order to prevent market-distorting behaviour in the future.

A workshop held in May 2017 for market participants and data suppliers focused on the issue of data quality. The purpose of the workshop was to jointly define measures with the participating stakeholders for increasing the quality of supplied data. The focus was on the frequent recurrence of dual reporting and how this can be avoided. It is only by standardising data reporting that the quality of the supplied data can be improved and a comprehensive, meaningful market monitoring process can be carried out.

Coordination with the regulatory authorities responsible for market supervision in the neighbouring countries is functioning very smoothly and was intensified in the year under review. Bilateral meetings are held when necessary, during which the participants have an opportunity to share experiences regarding the various methods they apply. In this context, coordination meetings were also held with the Swiss Federal Financial Market Supervisory Authority (FINMA).

In the first year in which the market monitoring system was fully operational, the Market Monitoring section was able to build up extensive know-how relating to market behaviour, market processes and price developments. This expertise is essential for ElCom when it has to make decisions regarding market structure and the future development of Switzerland as a market place.

## 5.2 Market Monitoring section: facts and figures for 2017

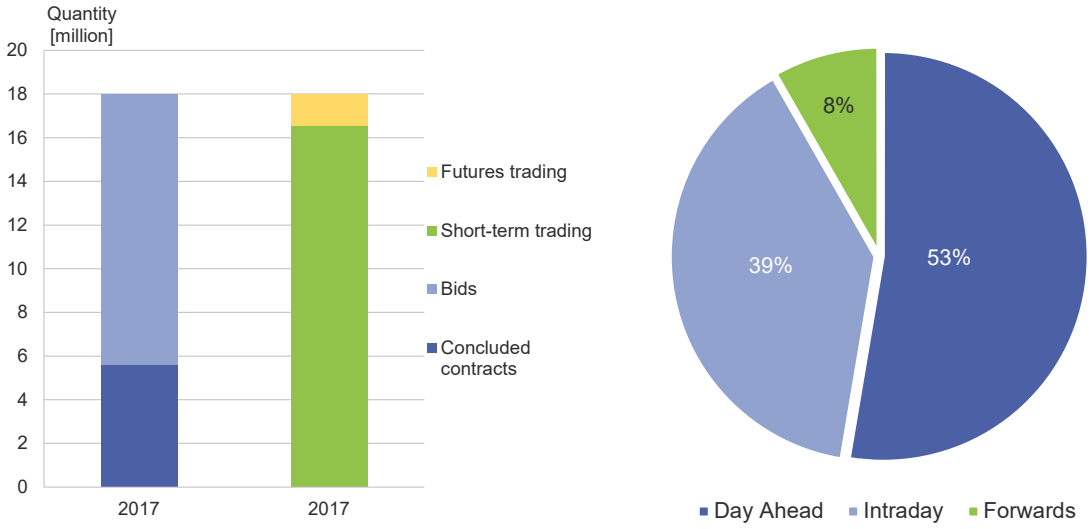


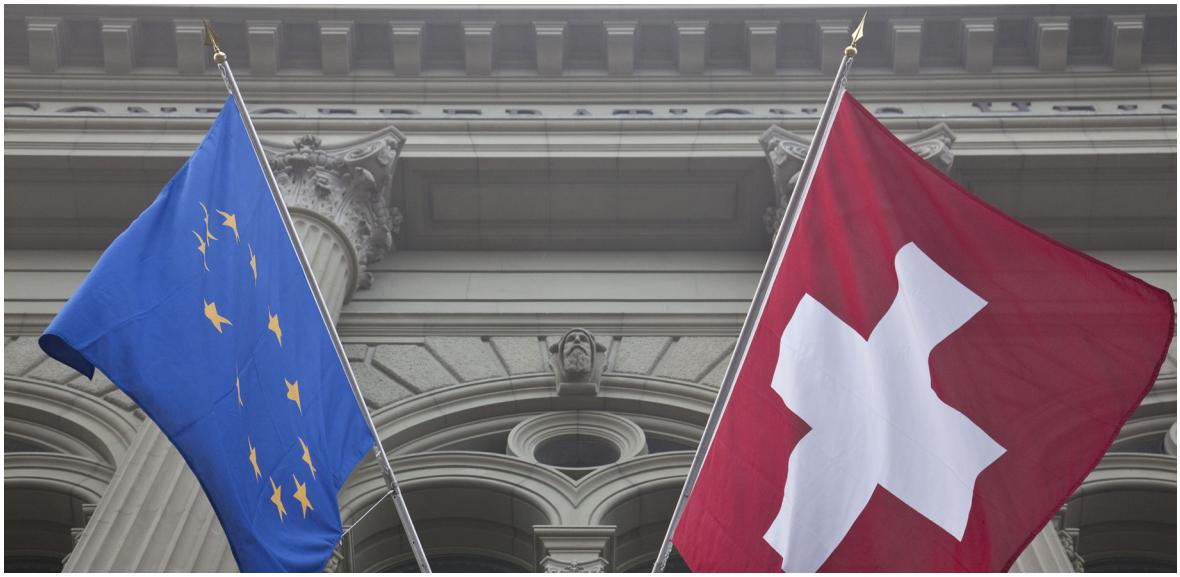

*Figure 18: Standard contracts reported for 2017. Left: Distribution of bids/transactions and short-term/futures trading in 2017; right: Distribution in 2017 of next-day short-term/same-day short-term/futures trading*

The quantity of reported standard contracts rose sharply in 2017: almost 18 million transactions (bids and concluded transactions) were registered. This corresponds to 30 percent more energy trading transactions versus 2016. The ratio of bids to concluded transactions was around 2:1. More than 90 percent of the transactions were processed on the spot market. Futures and forwards therefore accounted for less than 10 percent of the total number. Compared with standard contracts, the number of reported non-standardised contracts was very low: only 3,500 were reported in 2017.

In addition to data relating to energy trading transactions, in the year under review fundamental data were also recorded in the market monitoring system. This included the feed-in of electricity from power plants of all types (nuclear, coal-fired, gas-fired, hydropower, wind energy, solar energy, biomass), as well as import and export capacities at the country's borders, the water levels in the reservoirs and scheduled and unscheduled shut-downs of power plants. A total of more than 2.3 million reports relating to fundamental data were received in 2017.

The growing volume of reported energy trading transactions and the increased integration of fundamental data into the market monitoring system are improving the bases for market supervision and facilitating in-depth analyses of market activities. This is essential for the effective and efficient monitoring of the electricity market, which is a core task of the Market Monitoring section.

# 6 International activities



*For Switzerland, an electricity agreement with the EU would be desirable from the point of view of supply security.*

## 6.1 Congestion management

The Swiss transmission network is joined to the networks of its neighbouring countries via numerous interconnection points. The capacity of these cross-border transmission lines is a major variable in ensuring network stability: the cross-border capacities have to be limited, and in order for electricity traders to effect cross-border supplies they have to explicitly acquire capacity at auctions. The management of cross-border transmission lines is referred to as "congestion management", and the legal basis in Switzerland for auctioning these capacities is Article 17, paragraph 1, of the Federal Electricity Supply Act. However, Switzerland's electricity supply legislation also provides for exemptions from the market-based allocation (i.e. auctioning) of capacities. In accordance with Article 17, paragraph 2, of the Federal Electricity Supply Act, supplies based on international purchase and supply agreements that were concluded prior to 31 October 2002 are exempt from auctions and thus entitled to take precedence, as are supplies to end consumers with basic supply and from renewable energy sources (Article 17, paragraph 2, in conjunction with Article 13, paragraph 3, Federal Electricity Supply Act, as at 1 January 2017).

In 2014, an energy supplier requested priority for suppliers to end consumers with basic supply. ElCom denied this request. In a ruling dated 6 November 2017, the Federal Supreme Court rejected the appeal lodged by the network operator. The court found that in the transmission network, priority for suppliers to end consumers with basic supply can only be granted under certain conditions (2C_632/2016). The network operator has to demonstrate that it is unable to fulfil its supply obligation without imports and that it has not simultaneously reported supplies to third parties abroad. The network operator concerned was unable to meet these conditions.

With the entry into force of the amendment to the applicable legislation on 1 October 2017, priorities for supplies to end consumers with basic supply and from renewable energy were abolished. Priority for supplies based on international purchase and supply agreements that were concluded prior to 31 October 2002 still applies. Priority is also granted to border hydropower plants and cross-border transmission for securing the respective sovereignty quotas.

## 6.2 Border power plants

There are 30 hydropower plants along Switzerland's borders that produce electricity from bodies of water adjacent to neighbouring countries. The distribution of electricity is often regulated by long-standing treaties between Switzerland and the respective neighbouring country. In some cases, the contractually agreed quantity of electricity is distributed via the cross-border transmission network. When the cross-border transmission network is congested, the capacities are allocated on the basis of standard market procedures, such as auctions. For some power plants, exemptions from auction procedures have been granted in the event of congestion in the cross-border transmission network. These power plants are allocated the necessary cross-border capacity outside the auction procedure, and, therefore, free of charge (priorities).

In 2015, ElCom examined the legality of these priorities in the cross-border transmission network against the background of technical and legal framework conditions and pronounced five associated rulings. One ruling on cross-border energy supplies from border power plants has meanwhile become legally binding, while in the other four cases the operating companies each lodged an appeal with the Federal Administrative Court. In 2016, the Federal Administrative Court referred two rulings back to ElCom. These decisions were contested and appeals were then lodged with the Federal Supreme Court. In its ruling on 6 November 2017, the Federal Supreme Court rejected the appeals against the rulings of the Federal Administrative Court (2C_390/2016 and 2C_391/2016). Thus, in these two cases, based on the decisions of the courts, ElCom pronounced a new ruling on the granting of priorities.

The Federal Supreme Court found that the prerequisite for granting a priority is merely that congestion exists and that there is a constellation for granting priorities. This means that a priority has to be granted regardless of the technical or operational necessity. Since the two involved border power plants transfer cross-border supplies of electricity from renewable energy, which corresponds to a priority constellation in accordance with the applicable federal electricity supply legislation, they qualify for priority.

Until the end of 2014, a cooperation agreement existed between Swissgrid and the owners of the German transmission networks, which included the priorities in the cross-border transmission network provided for in the applicable Swiss legislation. This agreement was terminated by the German transmission network operators at the end of 2014. The new cooperation agreement that entered into force on 1 January 2015 does not include any clauses governing priorities. In the view of the German transmission network operators, the granting of priorities runs contrary to European as well as German law. Against this backdrop, the Federal Supreme Court had to decide how the priorities to be gran-

ted under Swiss law could be implemented, and it concluded that granting priorities is practically impossible without the cooperation of the German transmission network operators. In view of this, the obligation to grant priorities had become impossible in practice. However, Swissgrid would only be liable to pay compensation if it could be held jointly responsible for the refusal by the German transmission network operators to conclude an agreement that respects the right to grant priorities. Within the framework of the new ruling, ElCom now has to assess the degree of joint responsibility of Swissgrid and any resulting liability to pay compensation.

A further application by a border power plant concerning the granting of a priority for cross-border energy supplies is currently pending with ElCom.

## 6.3 Merchant lines

Merchant lines are cross-border transmission lines that are exempt from the obligation to grant network access to third parties. While the transmission capacity is managed by the network operators, its utilisation is reserved for the investors, who can choose whether to use it themselves or receive remuneration from the national grid operator for capacity they do not use themselves. This exemption is 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 two merchant lines at the Italian border. For both lines, ElCom had to rule on the extent of the capacity that is exempt from non-discriminatory access by third parties. One of these cases has already been concluded, while in the other a decision by the Federal Administrative Court is still pending. In the year under review, in an interim ruling the Federal Administrative Court initially examined the question of party status of a network operator and found that the latter does not qualify as a party.

## 6.4 Auction proceeds

Swissgrid allocates limited cross-border transmission network capacities via auctions. The proceeds of these auctions are shared equally for each border between Swissgrid and the respective foreign transmission network operator. Auction proceeds may be used to cover the costs of cross-border electricity supplies, to cover the recoverable costs of the transmission network or for the maintenance and expansion of the transmission network (Article 17, paragraph 5, Federal Electricity Supply Act). Swissgrid applies to ElCom for permission to use the proceeds in the desired manner, and ElCom ultimately decides on how they are to be used (Article 22, paragraph 5c, Federal Electricity Supply Act). In the period from 2009 to 2012, around 40 million Swiss francs were used for reducing the recoverable costs of the transmission network. The majority of the 2013 auction proceeds were to be used for the maintenance and expansion of the transmission network. Since, in the previous years, investments in the transmission network were not carried out to the extent originally planned, and given the costs associated with court rulings, Swissgrid applied to ElCom for the proceeds from 2014, 2015 and 2016, and in addition from 2013, to be used exclusively for reducing the network tariffs.

In the year under review, Swissgrid and ElCom modified the timing of the process for the ap-

plication for permission to use the auction proceeds with reference to tariffing. As a consequence, in the year under review Swissgrid submitted an application concerning the use of the 2017 auction proceeds together with an application concerning the use of the 2018 auction proceeds. In the applications concerning the use of the 2017 and 2018 auction proceeds, Swissgrid asked for these to be used for reducing recoverable costs. ElCom decided in favour of the requested use of the auction proceeds. It also pointed out to Swissgrid that, in the future, with respect to the application for the use of the auction proceeds, it requires all the uses provided for in Article 17, paragraph 5, of the Federal Electricity Supply Act to be taken into account.

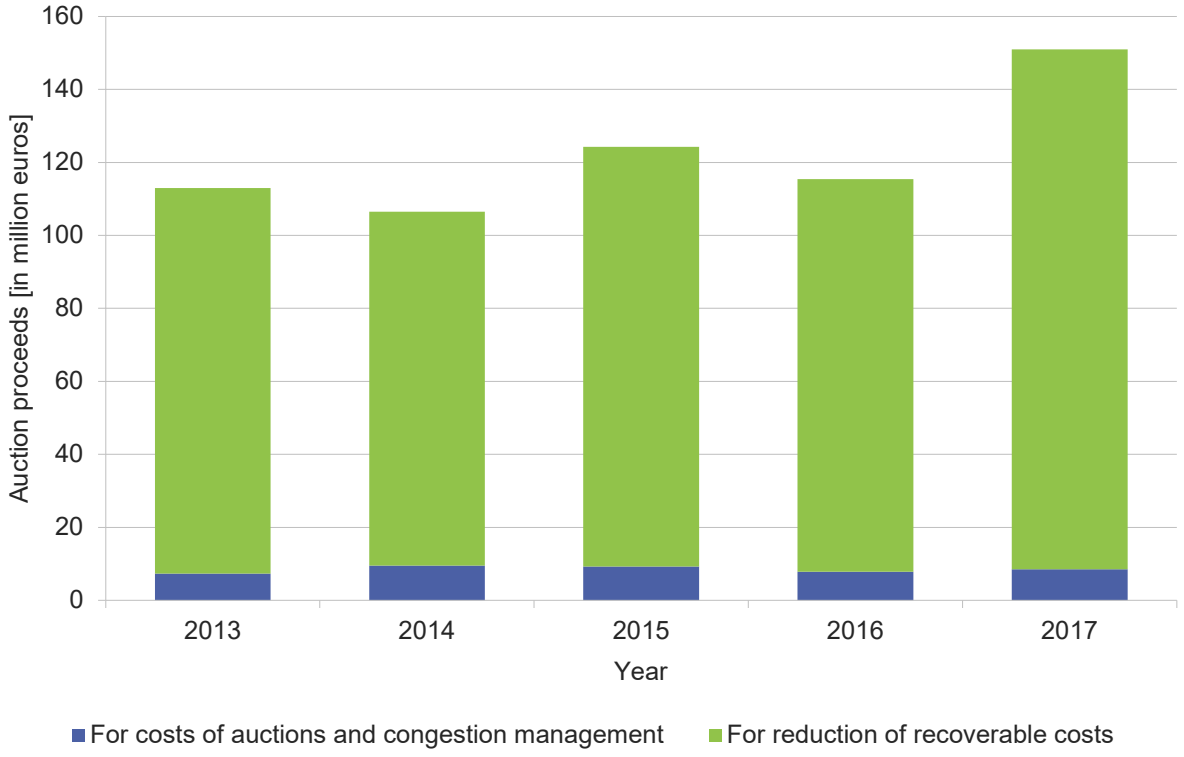



*Figure 19: Use of the auction proceeds, 2013 to 2017*

Figure 19 shows how the auction proceeds generated at Switzerland's borders were allocated between 2012 and 2017. The figures for 2017 are still provisional because the definitive calculations were not available at the time of going to press.

## 6.5 International platforms for reserve energy

A balance always has to be maintained between electricity supply and demand. However, short-term fluctuations occur every day, for example due to inaccuracies in forecasting demand, the failure of production facilities or the generation of unexpectedly high quantities of electricity from wind power plants. These have to be balanced, and this is where reserve energy comes in. In Switzerland, Swissgrid maintains the necessary balance in a three-step process (primary, secondary and tertiary reserve energy).

This initially occurs on the domestic market, with priority given to renewable energy. Swissgrid also procures energy on the international markets: here the main objective is to maintain Switzerland's supply security, which can be supported through cross-border cooperation because more suppliers from a variety of regions are able to contribute towards the stability of Switzerland's electricity network. Furthermore, positive price effects can be obtained in this way. ElCom monitors these international projects in its capacity as regulator.

In Switzerland's neighbouring countries, the procurement and use of reserve energy are more effectively coordinated through EU legislation. For the procurement of secondary and tertiary reserve energy, priority is given to standardised energy products. This means that there are significant synergy effects between the involved countries. This renders the balancing of the electricity network more flexible and reliable, which is one of the prerequisites for the greater market penetration of renewable energy. In effect, this results in the creation of an entirely new and comprehensive market and trading segment. This will also influence the Swiss network and Switzerland's supply security, because the networks cannot be readily separated from one another.

In the event of safety risks, the EU envisages Switzerland's participation in the reserve energy platforms. This matter is currently under discussion. Until the question is clarified, ElCom will continue to participate in the involved projects for secondary and tertiary reserve energy (MARI, PICASSO and TERRE). If Switzerland should be excluded from participation in the platforms, this could result in unscheduled and (due to their sudden occurrence) dangerous electricity flows through the Swiss transmission network, which could represent a threat to the supply security not only of Switzerland, but also of the entire region. If Switzerland should be unable to participate and also be excluded from the projects, ElCom will define measures for supporting Switzerland's network stability. Switzerland's participation in the exchange of primary reserve energy (FCR project) is not affected.

| Reserve energy | International relations | Project name | Swissgrid participation |
|---|---|---|---|
| **Primary reserve** | **FCR**<br>Frequency Containment Reserve | **FCR** | Full |
| **Secondary reserve energy** | **IN**<br>Imbalance Netting | **IN / IGCC** | Expiring (participation only until substituted by FRR projects) |
| **Automatically activated secondary reserve energy** | **aFRR**<br>Automatically Activated Frequency Restoration Reserve | **PICASSO** | At risk |
| **Manually activated secondary reserve energy** | **mFRR**<br>Manually Activated Frequency Restoration Reserve | **MARI** | At risk |
| **Tertiary reserve energy** | **RR**<br>Replacement Reserve | **TERRE** | At risk |

*Table 7: Switzerland's participation in major international reserve energy projects*

## 6.6 International bodies

At the end of November 2016, the EU Commission presented a comprehensive energy policy package under the name, "Clean energy for all Europeans". The revisions of the relevant legislation, which focus on energy efficiency and the structure of the electricity market, triggered a variety of heated debates, which are expected to be concluded in the course of 2018. Based on the Paris Climate Agreement, these revisions will speed up the integration of the European energy market and promote the use of renewable energy.

The Agency for the Cooperation of Energy Regulators (ACER), which is one of the driving forces behind the European internal market for electricity (and gas), could strengthen its influence as a result. ElCom possesses observer status in the ACER Electricity Working Group and its auxiliary bodies, where it states its own positions and represents Switzerland's interests.

Switzerland is especially concerned about unscheduled electricity flows from neighbouring countries.

Other countries are involved too, as indicated in the supervisory report published by ACER in October 2017 (Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2016). In this report, ACER emphasises the sustained economic losses that central European countries, including Switzerland, are incurring due to the lack of market integration, and recommends that better use should be made of the interconnected electricity system throughout Europe.

In the context of Brexit, Garrett Blaney, Commissioner of Ireland's national regulatory authority, took over at the beginning of November from Lord Mogg as President of both ACER and the Council of European Energy Regulators (CEER). Although a proposal had been made to split these two functions, it was ultimately decided to keep the presidency of both bodies in the hands of one person. The director of ACER will be stepping down in September 2018. The selection procedure for his successor was initiated during the summer.

ElCom monitors the activities of CEER, in which it holds observer status, as well as those of the OECD Network of Energy Regulators (NER). ElCom also attended the European Forum for Electricity Regulation (Florence Forum), which convened once in 2017. In addition, at the request of the SFOE, it participated in the audit of Switzerland's energy policy by the International Energy Agency (IEA). As of 31 December 2017, ElCom withdrew from the International Confederation of Energy Regulators (ICER).

# 7 Outlook

In 2018, ElCom will continue to focus on adequacy as a fundamental component of supply security. In the year under review, with its analysis of the 2020 adequacy calculations that Swissgrid carried out at ElCom's request, ElCom contributed towards the assessment of Switzerland's short- and medium-term supply security. ElCom will broaden this analysis during 2018 and extend the calculations to 2025. This time frame is particularly appropriate in that, by 2025, a considerable proportion of production from nuclear power plants will have been discontinued, both in Switzerland and in its neighbouring countries, and it is possible that the necessary expansion of networks may not yet have been effected, particularly in Germany. The aim of the calculations is to identify medium- and long-term supply security trends.

For ElCom, the continuation of the debates on market structure and supply during the winter is of central importance. In this context, ElCom is emphasising the fact that it is worthwhile examining options such as a strategic (energy) reserve or capacity mechanisms. ElCom will ensure that the advantages and disadvantages of their implementation are carefully analysed and weighed up. Furthermore, the optimisation of import capacity will remain a high priority in the future. For this purpose, rapid progress will have to be made with the expansion of the networks in Switzerland. With respect to the Electricity Networks Strategy, ElCom will be making the necessary preparations within the scope of its official duties. For the implementation of manual load shedding, ElCom will call for the necessary organisational preparations.

The implementation of Energy Strategy 2050 and the entry into force of the associated initial package of measures on 1 January 2018 mean that numerous amendments to the applicable legislation will be required. At the beginning of 2018, the fully revised Federal Energy Act, as well as other revised federal acts, new federal ordinances and amendments to other ordinances (including the Federal Electricity Supply Ordinance) will enter into force. For ElCom, the most relevant amendments concern the network surcharge, the promotion of renewable energy, and regulations governing own consumption, tariffs, return delivery remuneration and measurement services. ElCom initiated its examination of the new legal provisions at an early stage and will be adjusting its regulatory activities accordingly.

At the beginning of 2017, ElCom contacted several network operators regarding compliance with the average price method. As a consequence of the parliamentary debates that took place on this issue in 2017, ElCom suspended any further activities in this area, but will be reinstating them in 2018 and considering the next steps to be taken.

As in the past, ElCom will be closely monitoring the relations between Switzerland and the EU in the electricity sector. An electricity agreement with the EU would be highly desirable for Switzerland's electricity industry, as well as from the point of view of supply security. Without such an agreement, Switzerland could possibly be forced to implement precautionary measures in the future, for example concerning the problem of unscheduled load flows.

On 8 January 2018, ElCom and its Technical Secretariat will be moving to new premises at Christoffelgasse 5, 3003 Bern.

# 8 About ElCom

*ElCom, from left to right: Carlo Schmid-Sutter (President), Anne d'Arcy, Antonio Taormina (Vice President), Brigitta Kratz (Vice President), Christian Brunner, Laurianne Altwegg, Matthias Finger*

ElCom is responsible for monitoring the Swiss electricity market and securing compliance with the Federal Electricity Supply Act. As an independent state supervisory authority, ElCom is playing an active role in the transition from a monopolistic electricity supply system to a competition-based electricity market. It is also responsible for monitoring electricity tariffs for end consumers with basic supply, as well as for ensuring that the network infrastructure is properly maintained and is expanded as required so that the future supply can be guaranteed.

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

**No, of network operators:** approximately 650
**No, of network levels:** 7
**Lengths of the electricity networks:** level 1, approx. 6,600 km; level 3, approx. 9,000 km; level 5, approx. 44,000 km; level 7, approx. 142,000 km (overhead lines and cable, including building connections)
**Transformers:** level 2, 146; level 4, 1,143; level 6, approx. 59,000 (including mast transformers)

**Total network use revenue:** 3.6 billion Swiss francs

**Annual investments:** approx. 1.4 billion Swiss francs

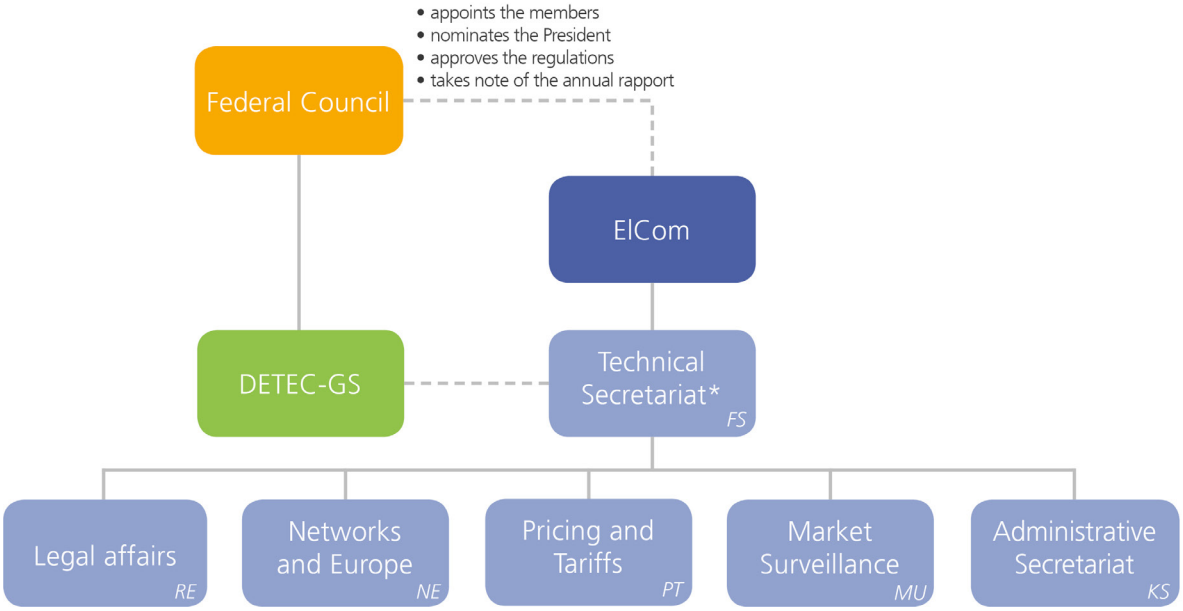
**Annual electricity consumption:** 58 TWh
**Production:** 62 TWh
**Electricity imports:** 38 TWh
**Electricity exports:** 34 TWh

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

- Examining all network use remuneration: in the liberalised energy market, the use of the networks for electricity transmission is compensated via network use remuneration. ElCom examines the lawfulness of this form of remuneration.
- Supervising electricity tariffs for fixed end consumers (basic supply, i.e. households and other end users with an annual consumption below 100 MWh) and all those end consumers who do not opt for network access.
- Ruling on disputes associated with free access to the electricity network: since 1 January 2009, large-scale consumers (i.e. those with an annual consumption of at least 100 MWh) have been able to freely choose their electricity supplier.
- Ruling on disputes relating to remuneration at cost for feed-in to the grid, which was introduced on 1 January 2009 for producers of electricity from renewable energy sources.
- 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) now that the ownership of the transmission network has been transferred to Swissgrid AG.
- Supervising wholesale electricity trading.

## 8.1 Organisation and personnel

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




*Administratively linked to the general secretariat of DETEC

*Figure 20: Structure of ElCom*

### 8.1.1 Commission

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

In the year under review, the composition of the Commission was as follows:

**President:**

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

**Vice Presidents:**

- Brigitta Kratz (since 2007): attorney-at-law, tutor in private law at the University of St Gallen
- Antonio Taormina (since 2014): mathematics degree, Federal Institute of Technology, Zurich, former member of the management board and head of Energy Western Europe at Alpiq

**Members:**
- Laurianne Altwegg (since 2015): degree in political science, responsible for energy, environment and landscape at the Western Switzerland Consumers Association (FRC)
- Anne d'Arcy (since 2007): Professor of Corporate Governance and Management Control, Vienna University of Economics and Business
- Matthias Finger (since 2007): PhD (political science), Professor of Management of Network Industries at the Swiss Federal Institute of Technology, Lausanne
- Christian Brunner (since 2014): degree in electrical engineering, Federal Institute of Technology, Zurich, former director of Alpiq Networks Business Unit

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

**Pricing and Tariffs**
- Anne d'Arcy (chair)
- Laurianne Altwegg
- Christian Brunner
- Carlo Schmid-Sutter

**Legal Affairs**
- Brigitta Kratz (chair)
- Laurianne Altwegg
- Carlo Schmid-Sutter

**Networks and Supply Security**
- Christian Brunner (chair)
- Matthias Finger
- Brigitta Kratz
- Carlo Schmid-Sutter

**International Relations**
- Antonio Taormina (chair)
- Matthias Finger
- Brigitta Kratz
- Christian Brunner

**Market Monitoring**
- Matthias Finger (chair)
- Christian Brunner
- Carlo Schmid-Sutter
- Antonio Taormina

**Resignations and new appointments**
In the year under review, two members of ElCom announced their resignation with effect from the end of 2017 and the end of March 2018 respectively: Anne d'Arcy and Antonio Taormina. Anne d'Arcy is stepping down after having served the maximum statutory term of office. Antonio Taormina is leaving at his own request in order to devote more time to his family. The Federal Council appointed Professor Dr. Sita Mazumder and Dario Marty as their successors.

**Representation of gender and language regions**
ElCom comprises three women and four men, i.e. the ratio of women to men is 43 percent. The official target of the federal government is 30 percent – on average, 39 percent of the members of Switzerland's extra-parliamentary commissions are women.

In terms of representation of language regions, the composition of ElCom is currently as follows: German-speaking region, four people; French-speaking region, two people; Italian-speaking region, one person. The proportions are therefore 57, 29 and 14 percent respectively. The official target of the federal government is to achieve an overall representation of French, Italian and Romansh speaking personnel of 40 percent.

### 8.1.2 Technical Secretariat

The Technical Secretariat provides the Commission with technical and specialised support, prepares ElCom's decisions and implements them. It conducts administrative proceedings and carries out the necessary clarifications. It is independent of any other authorities and is solely subject to the directives of the Commission. At the administrative level, the Technical Secretariat is affiliated with the General Secretariat of the Federal Department of the Environment, Transport, Energy and Communications (DETEC). The Commission 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 2017, the Technical Secretariat employed 43 personnel on a full- or part-time basis, including 3 trainees. Its total workforce corresponds to 37.9 full-time equivalents and comprises 17 women and 26 men. The average age of all employees is 41. Breakdown by national language:

- Italian: 2 employees
- French: 6 employees
- German: 35 employees

**Head of the technical Secretariat (43 employees)**

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

**Networks and Europe (8 employees)**

Michael Bhend
engineer (Federal Institute of Technology)

**Pricing and Tariffs (11 employees)**

Stefan Burri
PhD in political science

**Market Monitoring (6 employees)**

Cornelia Kawann
degree in engineering, MBA

**Legal Affairs (9 employees)**

Nicole Zeller
attorney-at-law

**Commission Secretariat (8 employees)**

Barbara Wyss
PhD in economics

## 8.2 Finance

In the year under review, ElCom had a budget of 10.5 million Swiss francs at its disposal. Its effective expenditure amounted to almost 10 million Swiss francs, which covered its entire personnel and operating costs, including the additional expenditure associated with the final activities for the development of its market monitoring activities.

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

## 8.3 New management model within the federal administration

On 1 January 2017, the new management model was introduced in the federal administration. The main aims behind this model are to strengthen management within the administration at all levels and increase the transparency and performance of the various services. In the year under review, ElCom defined an integrated strategy, planning and goal-setting process for the new model.

For the purpose of performance measurement, reporting is to be based on the balance between cases received and concluded in the course of the year. The defined target is 100 percent, and this was already applicable in the past. It shows the extent to which the Technical Secretariat is able to reduce the number of cases brought forward from previous years, i.e. to avoid a build-up of pending proceedings. In the year under review, it was only able to accomplish this to a limited extent; it concluded 678 out of a total of 859 cases received (cf. section 9.1). This corresponds to a success rate of 70 percent. This relatively low figure is mainly attributable to the reassessment by Swissgrid of almost 400 cases relating to feed-in remuneration at cost as the consequence of a court ruling at the end of the year under review. In November and December, almost 200 cases were submitted to ElCom as appeals.

## 8.4 Events

**2017 ElCom Forum**

The eighth ElCom Forum was held on 17 November at the Centre de Congrès Beaulieu in Lausanne. Around 300 participants attended the event, where a variety of lectures were held and discussions took place focusing on supply security and the implementation of "Energy Strategy 2050". On the podium, a debate took place concerning the question of whether the turnaround in energy policy could spell the end of supply security. The participants shared the view that the challenges would be considerable, despite the optimistic results of calculations relating to supply security.

The 2018 ElCom Forum will take place on Thursday 29 November, at the Kursaal in Bern.

**Information events for network operators**

In spring 2017, ElCom again held a series of information events at a variety of venues in Switzerland. The main topics were network expansions, the average price method, coverage differentials and digitisation. ElCom and the SFOE also provided information about the most recent developments relating to electricity networks. A total of around 700 participants attended the ten events, which were offered on a non-profit basis. They provided a welcome opportunity for the participants, as well as the involved ElCom and SFOE personnel, for sharing professional views and experiences.

**Market monitoring workshop**

As in the previous years, a workshop focusing on market monitoring at ElCom was held in Bern in 2017. Here, the main topics were REMIT (Regulation [EU] No. 1227/2011 on Wholesale Energy Market Integrity and Transparency), ElCom's market monitoring role and the function of RRMs (registered reporting mechanisms).

# 9 Appendix

## 9.1 Facts and figures

A total of 589 new cases were received in 2017, almost half of which concerned appeals and applications relating to feed-in remuneration at cost. In the year under review, 269 of these cases were successfully concluded, which is equivalent to a proportion of 46 percent of cases in the year in which they were received. In 2016, a total of 415 cases were brought to a conclusion. For the first time since 2014, it was not possible in 2017 to achieve a completion rate of more than 100 percent (cf. 8.3). The number of general enquiries has also been systematically recorded since 2016. These involve enquiries submitted via the contact form on the ElCom website or by e-mail and which deal with routine matters. Handling these enquiries normally takes from a few hours to one or two days. Occasionally, an enquiry may lead to proceedings. A total of 270 general enquiries were received in 2017 and all but seven of them were dealt with in full (97 percent). A total of 172 rulings were pronounced in 2017, a large proportion of which concerned applications for increasing network capacity.

| Complaints, etc. | Brought forward from previous years | Received in 2017 | Dealt with in 2017 | Carried forward to 2018 |
|---|---|---|---|---|
| Specific matters relating to tariffs | 38 | 111 | 75 | 74 |
| Feed-in remuneration at cost | 30 | 232 | 58 | 204 |
| Increases in network capacity | 82 | 162 | 206 | 38 |
| Other cases | 52 | 84 | 76 | 60 |
| **Total** | **202** | **589** | **415** | **376** |
| General enquiries | 2 | 270 | 263 | 9 |
| **Total including general enquiries** | **204** | **859** | **678** | **385** |

*Table 8: ElCom activities: statistics for 2017*

## 9.2 Meetings

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

## 9.3 Publications (in national languages only)

**Directives**

| | |
|---|---|
| 16.11.2017 | Erfassung Versorgungsqualität |

**Notifications**

| | |
|---|---|
| 08.06.2017 | Manuelle Lastabwürfe – Umsetzung in der Regelzone Schweiz |

**Reports and studies**

| | |
|---|---|
| 01.06.2017 | Report on the activities of ElCom 2016 |
| 28.06.2017 | Bericht zur Stromversorgungsqualität 2016 |
| 29.08.2017 | Bericht der ElCom zuhanden der UREK-N über den Um- und Ausbau der Stromnetze |
| 21.12.2017 | Technischer Bericht zu ungeplanten Stromflüssen |
| 21.12.2017 | Schlussbericht System Adequacy 2020 |

## 9.4 Abbreviations and glossary

| | |
|---|---|
| ACER | EU Agency for the Cooperation of Energy Regulators |
| Balance management | Measures for constantly maintaining the electricity and capacity balance in the electricity system. It includes time-table management, data measurement and balance compensation management. |
| CEER | Council of European Energy Regulators |
| 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. redispatch, reductions). |
| Control zone | Zone in which the national grid operator is responsible for network control. This zone is physically defined through measurement stations. |
| 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. |
| ElCom | Swiss Federal Electricity Commission |
| End consumers | Clients who buy electricity for their own consumption. This does not include power plants that buy electricity for their own consumption and for powering pumps in pump storage power plants. |
| ENTSO-E | European Network of Transmission System Operators for Electricity |
| ESTI | Swiss Federal Inspectorate for Heavy Current Installationsy |
| EU | European Union |
| FEN | Federal Institute of Technology, Zurich, Research Centre for Energy Networks |
| kWh | Kilowatt hour |
| kWp | Kilowatt peak |
| Median | Value in the middle of a data series arranged by size, i.e. half of all the observations are smaller and half are larger than the median figure. (Unlike the average figure, the median is resistant to statistical outliers.) |
| MWh | Megawatt hour |
| Net transfer capacity (NTC) | Maximum exchange programme between two network zones that is reconcilable with the safety standards of both zones and which takes technical uncertainties regarding future network situations into account. |
| Network access | Right to use a network in order to obtain electricity from any supplier or to feed electricity into a network. |
| Network use | Physical use of a network system based on feed-in or withdrawal of electricity. |

| | |
|---|---|
| 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 energy | 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 |
| Transmission network | Network used for the transmission of electricity over large distances within the country and for connection to networks outside the country, usually operated within the range of 220 to 380 kV. The following items are integral parts of the transmission network: a) transmission lines and support structures; b) coupling transformers, switching systems and measurement, control and communication equipment; c) systems that are used jointly with other network levels, mainly in association with the transmission network or without which it is not possible to operate the transmission network safely and efficiently; d) switching fields before the transformer at the transfer point to another network level or a power plant. |
| TSO | Transmission system operator |
| TWh | Terawatt hour |
| UREK | Parliamentary Commissions for Environment, Spatial Planning and Energy |

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