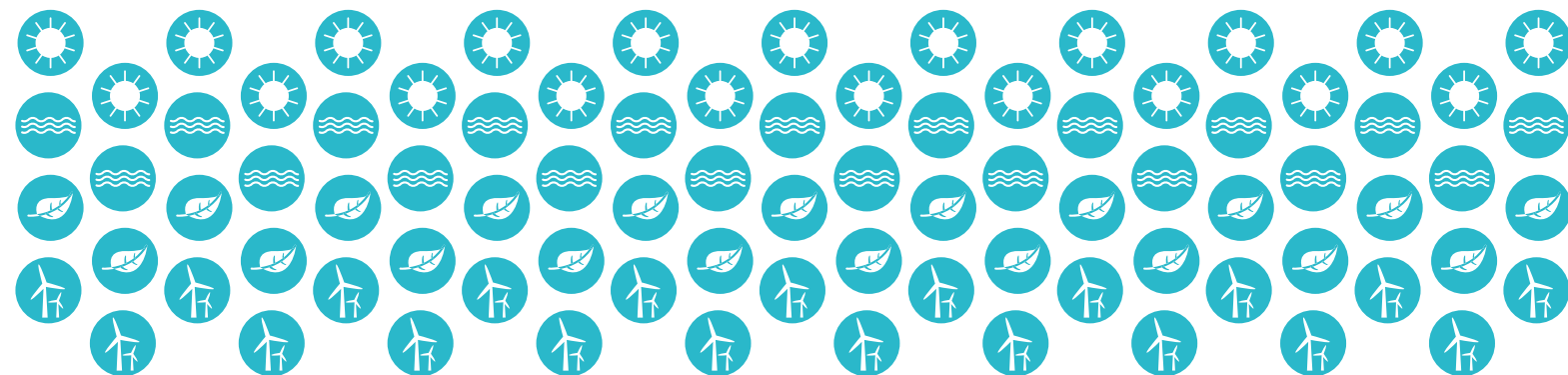
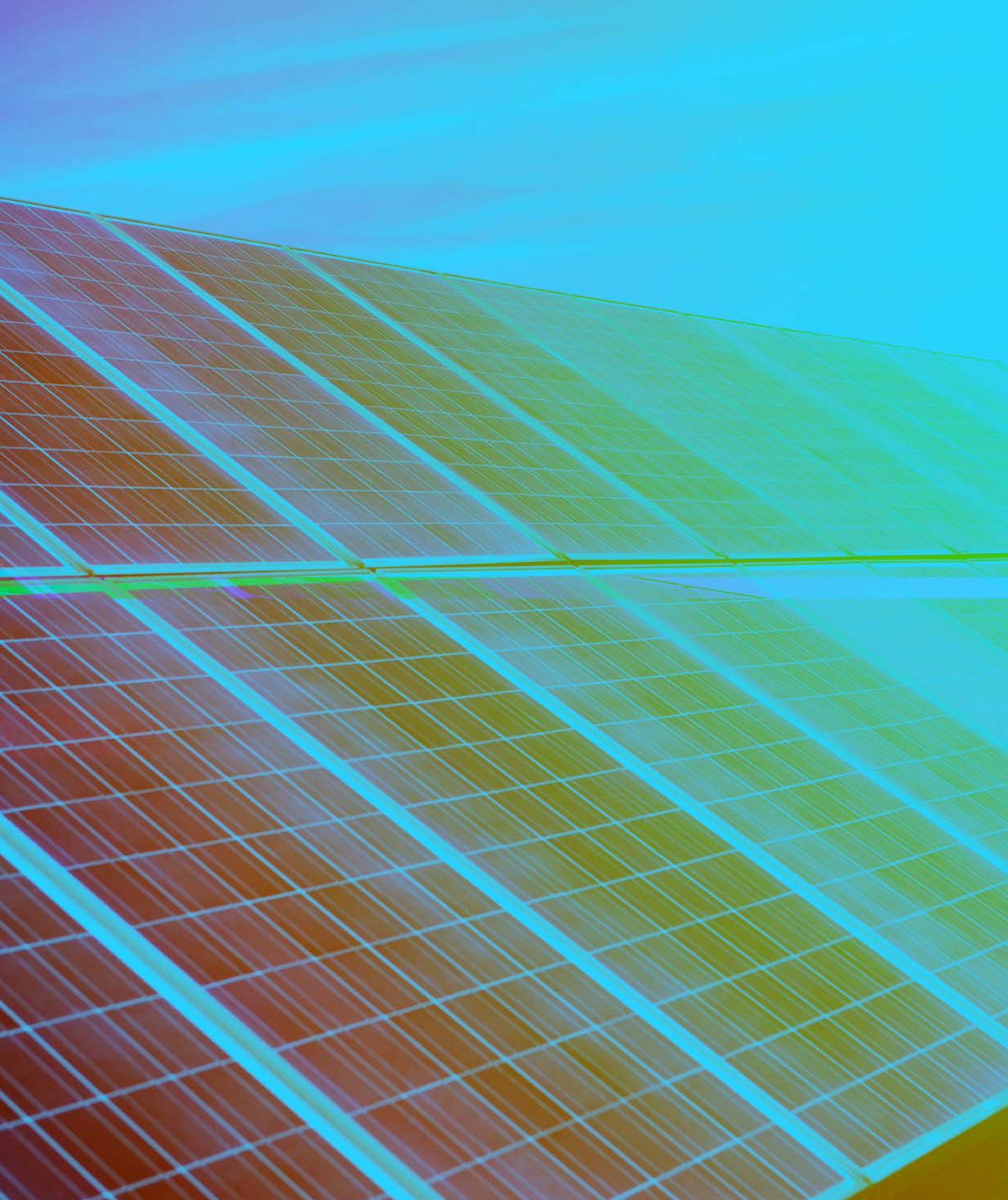


The Norwegian-Swedish Electricity Certificate Market

ANNUAL REPORT 2015





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Preface

This is the 2015 annual report from the Norwegian Water Resources and Energy Directorate (NVE) and the Swedish Energy Agency on the common Norwegian-Swedish electricity certificate market. This report aims to provide a picture of the most important events and key figures for the electricity certificate market in 2015.

Norway and Sweden have had a joint market for electricity certificates since 1 January 2012. It is based on the Swedish electricity certificate market, which has existed since 2003.

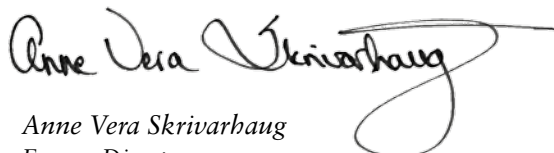
The goal of the two countries is to develop new energy production based on renewable energy sources amounting to 28.4 TWh by the end of 2020. Sweden will finance 15.2 TWh and Norway 13.2 TWh. The market will determine when and where this new production will take place.

As well as information on the progress being made towards this common goal, this report also includes a summary of approved production in the Norwegian and Swedish transition schemes.

Should you require further information about the electricity certificate system and the electricity certificate market, please see the respective agencies' websites.

NVE and the Swedish Energy Agency welcome suggestions on how we could improve next year's report.

The project managers for the annual report were Nikolai Yde Aksnes from NVE and Johanna Nilsson from the Swedish Energy Agency.



Anne Vera Skriverhaug
Energy Director
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Key figures for 2015

The tables below summarise the relevant figures for the electricity certificate market in 2015. Analysis and further details on the content of the tables are presented throughout this report. The tables in the report may contain small rounding-off discrepancies.

Key figures A	Norway	Sweden
Issued electricity certificates (million certificates) ¹	2.8	21.8
Certificates issued to plants that are included in the joint electricity certificate target (million certificates)	2.1	10.7
Certificates issued to plants that are not included in the joint electricity certificate target (million certificates)	0.8	11.1
Normal annual production for plants that are included in the joint electricity certificate target (TWh)	2.3	11.6
Cancelled electricity certificates (million certificates)	6.9	12.8
Quota obligation fulfilment (%)	100	100

Key figures B	Norway and Sweden
Surplus 2015 (million certificates) (change since 2014)	18.1 (+4.9)
Volume-weighted average price of transactions in the electricity certificate registers NECS and Cesar (NOK/electricity certificate) (change since 2014) ²	181 (+9)
Average spot price (NOK/electricity certificate) (change since 2014) ³	145 (-19)

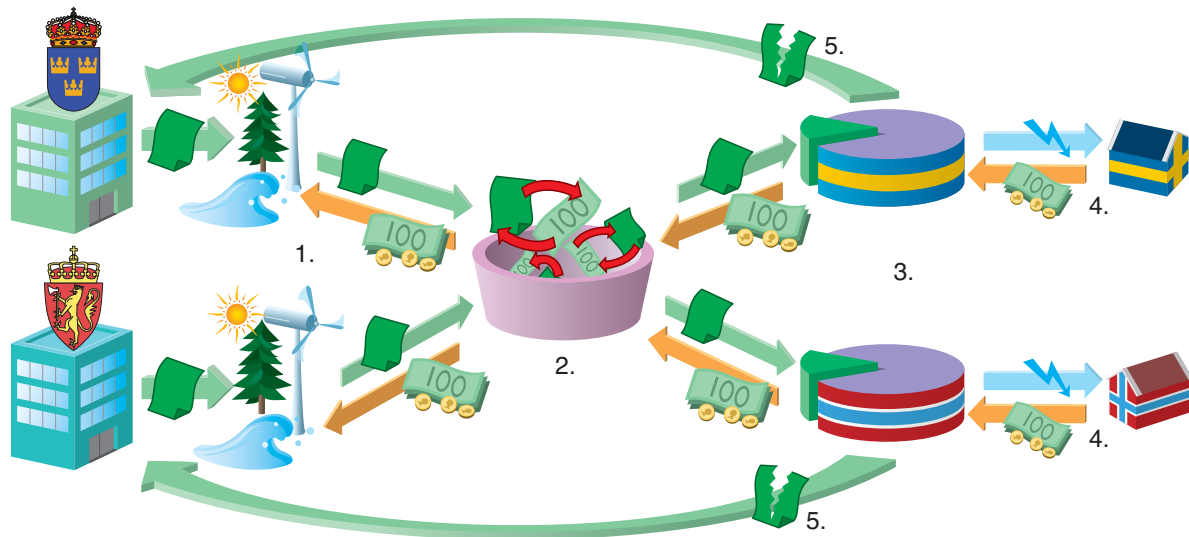
1. 1 million electricity certificates = 1 TWh of certificate eligible production

2. Exchange rate at 31 December 2015: 1 EUR = 9.19 SEK = 9.60 NOK

3. Based on the average of the daily closing prices of spot price contracts at the three largest brokers in the electricity certificate market in 2015.

How the electricity certificate market works

Electricity certificates represent a form of financial support for the production of electricity from renewable energy sources in Norway and Sweden. The electricity certificate system is market-based and is intended to increase energy production from renewable energy sources in a cost-effective manner.



How the electricity certificate market works:

(1) The energy producers receive one electricity certificate for each megawatt hour (MWh) of renewable energy produced, over a maximum 15 years.

(2) The electricity certificates are sold in a market where prices are determined by supply and demand. In this way, the producers receive extra income in addition to the energy price.

(3) Demand for electricity certificates arises in that energy suppliers and certain electricity customers are obligated by law to buy electricity certificates corresponding to a certain proportion (quota) of their calculation-relevant electricity consumption.

(4) The electricity end users pay for the development of renewable energy production because the cost of the electricity certificates is included in electricity bills.

(5) Every year, the market participants with quota obligations must cancel electricity certificates in order to fulfil their quota obligation.

A COMMON MARKET

Sweden and Norway have had a joint market for electricity certificates since 1 January 2012. This common market is based on the Swedish electricity certificate market, which has existed since 2003. The goal is to increase renewable energy production by a total of 28.4 TWh in both countries from 2012 to the end of 2020, and thus contribute to the countries' targets in relation to the EU Renewable Energy Directive. The common electricity certificate market is an example of a so-called collaboration mechanism under the EU Renewable Energy Directive.⁴

Norway and Sweden will finance 13.2 TWh and 15.2 TWh, respectively, of the increased renewable energy production in relation to the 2012 level (see fact box 2). Both countries will also finance renewable energy production in plants commissioned before 1 January 2012 and that are eligible for electricity certificates. These plants are not included in the joint target.

A common market for electricity certificates in Norway and Sweden will result in a greater volume and more market participants than would national markets. The target for increased renewable energy production can thereby be achieved in a more cost-effective manner, in that investment will be directed to where conditions are most favourable.

ENERGY PRODUCERS

An energy producer applies to the Norwegian Water Resources and Energy Directorate (NVE) or the Swedish Energy Agency to have its plant approved for the issue of electricity certificates. Applications for approval are sent to NVE for power plants in Norway, while applications are sent to the Swedish Energy Agency for power plants in Sweden. A power plant cannot be approved for the issue of electricity certificates until the application has been completed and the power plant commissioned. The Norwegian or Swedish state issues electricity certificates to energy producers for each megawatt hour (MWh) they produce. The electricity certificates can

Fact box 1: Collaboration mechanisms

The EU's Renewable Energy Directive sets binding national targets for the proportion of renewable energy. Binding national targets have been set so as to ensure that by 2020 the EU will have a proportion of renewable energy corresponding to 20 per cent of total energy consumption. In order to achieve the overall target at the lowest possible cost, the directive allows for cooperation on measures through so-called collaboration mechanisms. The following four mechanisms are defined in the directive: (1) renewable energy in excess of what is needed to achieve a country's own target can be sold (transferred statistically) from one member state to another; (2) joint energy projects can be developed in electricity, heating and cooling; (3) for electricity, collaboration on projects in third-party countries is also possible; and (4) two or more member states may coordinate support systems or establish joint support systems. The Norwegian-Swedish electricity certificate system is an example of a joint support system and is the first example within the EU of how collaboration mechanisms can be utilised in order to achieve the national targets in 2020.

4. The EU's Renewable Energy Directive was adopted by the EEA Joint Committee in December 2011.

thereafter be sold and the producer will receive extra income in addition to the electricity price.

Electricity certificates are issued on the 15th of each month, based on the energy production in the previous month as reported by grid owners and energy producers with a responsibility to report metered values.

Certificates are issued to the producer's electricity certificate account in the Norwegian or Swedish electricity certificate register: NECS or Cesar.⁶

New plants and production increases in existing plants are eligible for electricity certificates for 15 years, although not after the end of 2035,

Fact box 2: Obligation according to the agreement

Norway and Sweden signed an agreement on 29 June 2011 concerning a common market for electricity certificates. The agreement stipulated that the parties had a joint goal of stimulating 26.4 TWh of new electricity production based on renewable energy sources in Norway and Sweden in 2020. The financing of the agreement would be shared equally between the countries and each country would be responsible for 13.2 TWh of the new energy production in 2020.

The agreement was amended on 1 January 2016. The amendment involved the joint 2020 target for Norway and Sweden being increased by 2 TWh from 26.4 TWh to 28.4 TWh. Sweden would be solely responsible for financing the increase in the target. Each of the countries would still be responsible for 13.2 TWh in 2020 in line with their obligations pursuant to the Renewable Energy Directive. Beyond 26.4 TWh, 100 per cent of the new electricity production will be attributed to Sweden until the target of 28.4 TWh is achieved.

Fact box 3: Energy sources

Electricity produced from the following sources is eligible for electricity certificates:

- Biofuel (and peat in combined heat and power plants in Sweden)⁵
- Geothermal energy
- Solar energy
- Hydropower
- Wind power
- Wave power

Fact box 4: Issue periods for approved plants

- In Sweden, plants that were commissioned on or after 1 May 2003 are issued with electricity certificates for 15 years.
- In Norway, the issue period is 15 years from the date of approval, less any time the plant may have been in operation before 1 January 2012.
- Production increases at existing plants in Norway and Sweden are eligible for electricity certificates for the increased volume of renewable energy production for a maximum of 15 years.
- Comprehensive rebuilding of existing plants in Sweden is treated as a new plant with certificates issued for up to 15 years.

5. In Sweden pursuant to the Electricity Certificate Regulation (Regulation no. 2011:1480). In Norway pursuant to Reg. no. 1398 of 16 December 2011: the Electricity Certificate Regulation. Owners of biofuel plants must report how large a proportion of their produced electricity comes from certificate eligible fuel every month for the previous month.

6. Statnett is responsible for NECS, the Swedish Energy Agency is responsible for Cesar.

when the electricity certificate system expires. The total number of electricity certificates issued is determined by energy production in the approved plants. In combined heat and power plants, the issue of certificates is also affected by the proportion of renewable fuel. External factors such as temperature, rainfall, wind and energy prices also affect energy production and thereby the issue of electricity certificates.

QUOTAS AND MARKET PARTICIPANTS WITH A QUOTA OBLIGATION

The market participants with quota obligations are primarily energy suppliers, but also certain electricity customers (see fact box below). Each year, these must buy electricity certificates corresponding to a certain proportion of their electricity deliveries or consumption, the so-called quota obligation. The quota curve states how great a proportion of the calculation-relevant electricity consumption the market participants with quota obligations must buy electricity certificates for each year.

The quotas, which are defined in the legislation on electricity certificates, gradually increase until 2020 (see Table 1 in the table section and Figure 1), which causes increasing demand for electricity certificates. The quotas are specific to each country. Norway's quotas run from 2012 to 2035. Sweden's quota curve applies from 2003 to 2035. The quota curves are designed to stimulate the development of renewable energy production in accordance with the countries' established targets. The respective countries' quota curves are calculated and set based on assumptions of future calculation-relevant electricity consumption. If the actual calculation-relevant electricity consumption deviates from what is expected, this may mean that the quota curves need adjusting. The first technical adjustment was made in connection with the progress review in 2015.

For 2015, Norwegian market participants with quota obligations had to purchase electricity certificates corresponding to 8.8 per cent of

Fact box 5: Market participants with quota obligations

In Norway the following market participants have quota obligations:

- all those who supply electrical energy to end users;
- all those who consume electrical energy that they have produced themselves; and
- all those who buy electrical energy for their own use on Nordic Pool Spot or through bilateral agreements.

In Sweden the following market participants have quota obligations:

- energy suppliers;
- electricity consumers who use energy they have produced themselves, if the quantity of consumed electrical energy exceeds 60 MWh per year of calculation and has been produced in a plant with an installed output greater than 50 kW;
- electricity consumers who have used electricity they have bought on Nordic Pool Spot; and
- energy-intensive industries that have been registered by the Swedish Energy Agency.

Figure 1 Quotas for Norway and Sweden



Source: The Swedish Electricity Certificate Act (Act no. 2011:1200) and the Norwegian Electricity Certificate Act (Act no. 39 of 24 June 2011).

their calculation-relevant electricity consumption. In Sweden, the quota was 14.3 per cent. The main reason for the quotas being different is that they have also been determined to finance the plants in the transition scheme. The difference in quotas is also due to the calculation-relevant electricity consumption being higher in Sweden than in Norway.

TRADING

Trading in electricity certificates occurs on the electricity certificate market, where the price is determined by supply and demand. The common market makes it possible to trade in both Swedish and Norwegian electricity certificates. Trading occurs through bilateral agreements between energy producers and market participants with quota obligations, as well as via brokers. Both energy producers and market participants with quota obligations must have an electricity certificate account. Swedish participants have electricity certificate accounts in Cesar, while Norwegian participants have accounts in NECS. When traded, electricity certificates are transferred from the seller's to the buyer's account.

Electricity certificates are mainly traded via two types of contract: spot price contracts and forward contracts. For both types of contract, the price of electricity certificates is set on the date of the agreement. The main difference between the contract types is the date of transfer of, and payment for, the electricity certificates. With forward contracts, transfer and payment occur on a specified future date, while with spot price contracts the certificates are paid for and transferred within five and ten working days, respectively.

QUOTA OBLIGATION AND CANCELLATION

Each year, market participants with quota obligations must notify NVE or the Swedish Energy Agency of the number of certificates they require to fulfil their quota obligation and have that number in their electricity certificate accounts. Swedish market participants with quota obligations do this by sending a declaration of their quota obligation to the Swedish Energy Agency. Norwegian market participants with quota obligations approve the quota obligation that is presented in NECS.

In order to fulfil the quota obligation, the market participants with quota obligations must have certificates corresponding to the statutory proportion of their calculation-relevant electricity consumption in their electricity certificate accounts. The electricity certificates are cancelled on 1 April, which means that they are deleted and cannot be re-used. Cancellation means that market participants with quota obligations must buy new electricity certificates in order to fulfil next year's quota obligation. This creates a constant demand for electricity certificates.

Important dates for quota obligation and cancellation:

15 February

Norway: The grid companies must report to NECS the calculation-relevant electricity consumption for every market participant with quota obligations in their grid area.

16 February

Norway: The total calculation-relevant electricity consumption of the market participants with quota obligations for the previous year is available on the participant's account in NECS.

1 March

Norway: The last day for market participants with quota obligations to approve their quota obligation for the previous calendar year, as well as any corrections for the calendar year before that.

Sweden: The last day for Swedish market participants with quota obligations to send in declarations of their calculation-relevant

electricity consumption as a basis for the previous year's quota obligation.

31 March

Norway and Sweden: The last day for market participants with quota obligations to have a sufficient number of electricity certificates in their accounts to fulfil their obligations.

1 April

Norway and Sweden: Cancellation of the number of electricity certificates needed to fulfil the quota obligation. If there are insufficient certificates in the account, NVE or the Swedish Energy Agency will charge a quota obligation fee.

THE ELECTRICITY CERTIFICATE MARKET IS FINANCED BY ELECTRICITY CUSTOMERS

If the market participant with quota obligations is an energy supplier, the costs of electricity certificates are included in the electricity customers' bills. In this way energy customers in Sweden and Norway help to pay for the development of energy production from renewable energy sources. Energy-intensive industries have an electricity certificate cost linked to that proportion of their electricity consumption that is not used in production processes.

Different electricity certificate quotas in Norway and Sweden mean that the cost per kilowatt hour (kWh) differs for Norwegian and Swedish electricity customers even though the electricity certificate price is the same in both countries.

Household customers with an annual electricity consumption of 20,000 kWh in Norway and

7. Costs stated for Swedish household customers are exclusive of transaction costs that may be added. Costs for Norwegian household customers are inclusive of transaction costs and are based on data reported by energy suppliers in Norway

8. Exchange rate at 31 December 2015: 1 EUR = 9.19 SEK = 9.60 NOK

Fact box 6: The energy suppliers' costs

Energy suppliers buy electricity certificates on the electricity certificate market, where the price is set by supply and demand and thus varies over the course of time. The energy suppliers' costs for electricity certificates are included in electricity customers' bills. The costs vary according to the energy suppliers' expenses from buying electricity certificates and the quota curve. The price that electricity customers pay for electricity certificates also depends on the type of electricity contract. The following formula can be used to calculate how much a specific electricity certificate price corresponds to in cost per kWh:

$$\frac{\text{electricity certificate price} \left[\frac{\text{NOK}}{\text{MWh}} \right] \times \text{annual quota}}{10} = \text{cost of electricity certificate (øre/kWh)}$$

The volume-weighted average annual price for transactions in the electricity certificate registers NECS and Cesar for electricity certificates in 2015 was NOK 181 per electricity certificate.⁹ The quotas in 2015 were 8.8 per cent in Norway and 14.3 per cent in Sweden. This corresponds to an approximate average cost for electricity certificates of 1.6 øre/kWh (NOK) in Norway and 2.6 øre/kWh (NOK) in Sweden. In addition to this cost, the energy supplier may also incur transaction costs.

Sweden paid an average of NOK 390 and NOK 520, exclusive of VAT, respectively, for electricity certificates in 2015.^{7,8}

ONE ELECTRICITY CERTIFICATE MARKET, TWO NATIONAL REGULATORY REGIMES

The agreement of 29 June 2011 between Norway and Sweden on a common market for electricity certificates sets out the purpose of the certificate system and how the market will function. In spite of the fact that it is a common market, each country has national Acts and Regulations that govern the electricity certificate system in that country.

The agreement between Norway and Sweden on a joint market for electricity certificate is available in its entirety on the websites of the relevant authorities.

<http://www.regeringen.se>

<http://www.regjeringen.no>

The relevant Acts and Regulations that apply to the electricity certificate system in Norway are as follows:

- Act no. 39 of 24 June 2011: Electricity Certificate Act
- Reg. no. 1398 of 16 December 2011: Electricity Certificate Regulation

The relevant Acts and Regulations that apply to the electricity certificate system in Sweden are as follows:

- Electricity Certificate Act (Act no. 2011:1200)
- Electricity Certificate Regulation (Regulation no. 2011:1480)
- The Swedish Energy Agency's Regulation STEMFS (2011:4) regarding electricity certificates

9. Exchange rate at 31 December 2015: 1 EUR = 9.19 SEK = 9.60 NOK

Fact box 7: Differences between the two countries

Some legislative differences exist between the two countries, although the underlying principles are the same. Some important differences are presented below:

- In Sweden, peat is eligible for electricity certificates.
- In Norway, the proportion of biofuel in mixed waste is eligible for electricity certificates.
- In Sweden, plants commissioned in 2020 will be eligible for electricity certificates.
- In Sweden, a plant's entire production may be eligible for electricity certificates following extensive rebuilding. In Norway, only the increase in production is eligible for electricity certificates.
- Some minor differences exist in the exemption rules for energy-intensive industries.

WHO DOES WHAT?

In Norway, NVE is the regulatory authority and Statnett is responsible for the register, while in Sweden the Swedish Energy Agency is both the regulatory authority and responsible for the register.

NVE and the Swedish Energy Agency

- Administer the electricity certificate systems in their country.
- Process applications for electricity certificates.
- Register/deregister market participants with quota obligations.
- Supervise market participants in the electricity certificate market.
- Provide ongoing information about developments in the electricity certificate market.
- Administer penalties and quota obligation fees.

Access to information

NVE and the Swedish Energy Agency report market statistics, such as the number of

approved production plants and registered market participants with quota obligations, on their websites. These also carry information on which energy producers electricity certificates can be bought from, as well as other information about the electricity certificate market. Quarterly market reports are published in addition to this annual report. All of the reports are available from the agencies' websites.

Links:

www.nve.no/elsertifikater

www.energimyndigheten.se/elcertifikat

Statnett and the Swedish Energy Agency

- Responsible, respectively, for the Norwegian and Swedish electricity certificate registers (NECS/Cesar).
- Issue electricity certificates on the 15th of each month.
- Cancel electricity certificates based on decisions made by NVE or the Swedish Energy Agency.

- Publish ongoing information about the number of issued and cancelled electricity certificates and the average electricity certificate price.

Links:

<http://necs.statnett.no>

<http://cesar.energimyndigheten.se>

The Swedish Energy Markets Inspectorate

In Sweden, the Swedish Energy Markets Inspectorate is the regulatory authority for the electricity, natural gas and district heating energy markets. The Swedish Energy Markets Inspectorate checks that energy companies are complying with the Regulations and works to ensure that energy markets function well. The Swedish Energy Markets Inspectorate has information about energy suppliers' electricity prices on its website, including the price of electricity certificates, so that electricity customers can compare prices in the market. The website also has analyses and information about monitoring of the energy market.

www.energimarknadsinspektionen.se

The Council

The electricity certificate market's council was set up in accordance with Article 11 of the Agreement on a Common Market for Electricity Certificates dated 29 June 2011 between Norway and Sweden. The Council consists of representatives from the Norwegian Ministry of Petroleum and Energy and the Swedish Ministry of the Environment and Energy. The Council's duties include facilitating the planning and

implementation of progress reviews. This includes, for example, initiating reviews, continuously monitoring market trends, analysing the potential need for regulatory changes, and developing a common communication strategy for measures of significance for those involved.

The Council has no decision-making authority as far as national questions are concerned; for example, in terms of amending national legislation.

The Committee

The electricity certificate system's committee was set up in accordance with Article 12 of the Agreement on a Common Market for Electricity Certificates dated 29 June 2011 between Norway and Sweden. The Committee consists of representatives from NVE and the Swedish Energy Agency.

Committee members must brief each other and discuss the design and implementation of the regulatory framework governing the issuing of electricity certificates. This applies, for example, to the issuing of electricity certificates for production increases due to plant upgrades or expansions, new issue periods, and when plants restart production. The Council determines the Committee's focus areas. The representatives on the Committee must provide the background information necessary for the Committee to perform its duties.

Goal fulfilment

The Norwegian-Swedish electricity certificate system has contributed 13.9 TWh of new renewable production capacity (normal annual production) since the beginning of 2012. During 2015, 0.5 TWh was built in Norway and 3.1 TWh was built in Sweden. Production from these plants is included in the joint target of 28.4 TWh of new renewable energy production by the end of 2020.

Swedish wind power continues to dominate the development included in the joint target. In 2015, wind power accounted for about 74 per cent (2.3 TWh) of new production in Sweden. Almost half of the wind power plants commissioned in Sweden before and including 2015 were built in the SE2 Elspot area (see Table 4.1 in the table section).

In Norway, 0.5 TWh of new normal annual production was commissioned in power plants included in the target in 2015. Hydropower accounted for 97 per cent of the new production, of which 0.3 TWh came the NO2 Elspot area.

In order to achieve the target of 28.4 TWh by the end of 2020, an average of 3.33 TWh of renewable energy production must be commissioned each year. There is no fixed target for each individual year. However, the relationship between actual development and the average figure provides an indication of how much new production must be put in place by 2020 (see Figure 2). To date, the normal annual production of the power plants that have been commissioned is above the average required to achieve the target. It is the market participants that make investment decisions, build plants, and determine how much renewable energy production is developed each year.

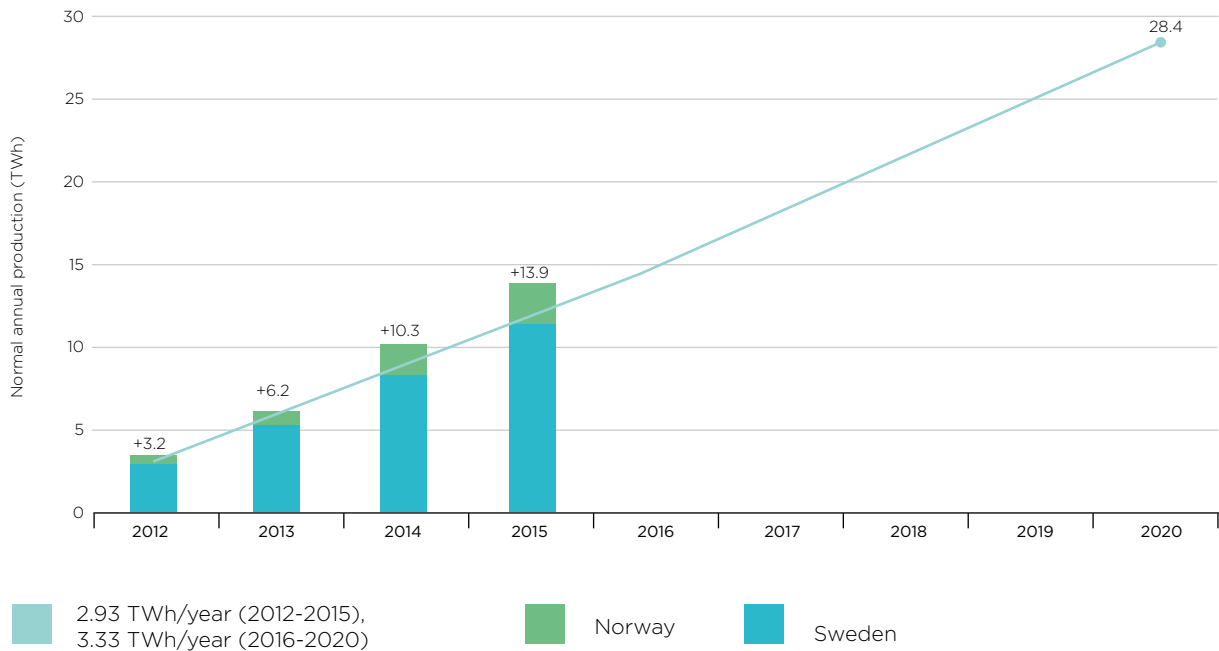
Fact box 8: Normal annual production versus actual production

Normal annual production is an estimate of a plant's annual production under normal operating conditions. This will differ from the actual production each year. In this section, normal annual production is used because it provides a picture of the plants' anticipated annual production. It is the actual production that determines how many electricity certificates a plant receives. The issue of electricity certificates is partly dependent on weather conditions and the time of year the plant's participation in the system was approved. The target of 28.4 TWh will be compared with the actual production in 2020. In 2015, the plants included in the joint target were issued with electricity certificates corresponding to approximately 2.1 TWh in Norway and approximately 10.7 TWh in Sweden.

Fact box 9: Plants not included in the joint target

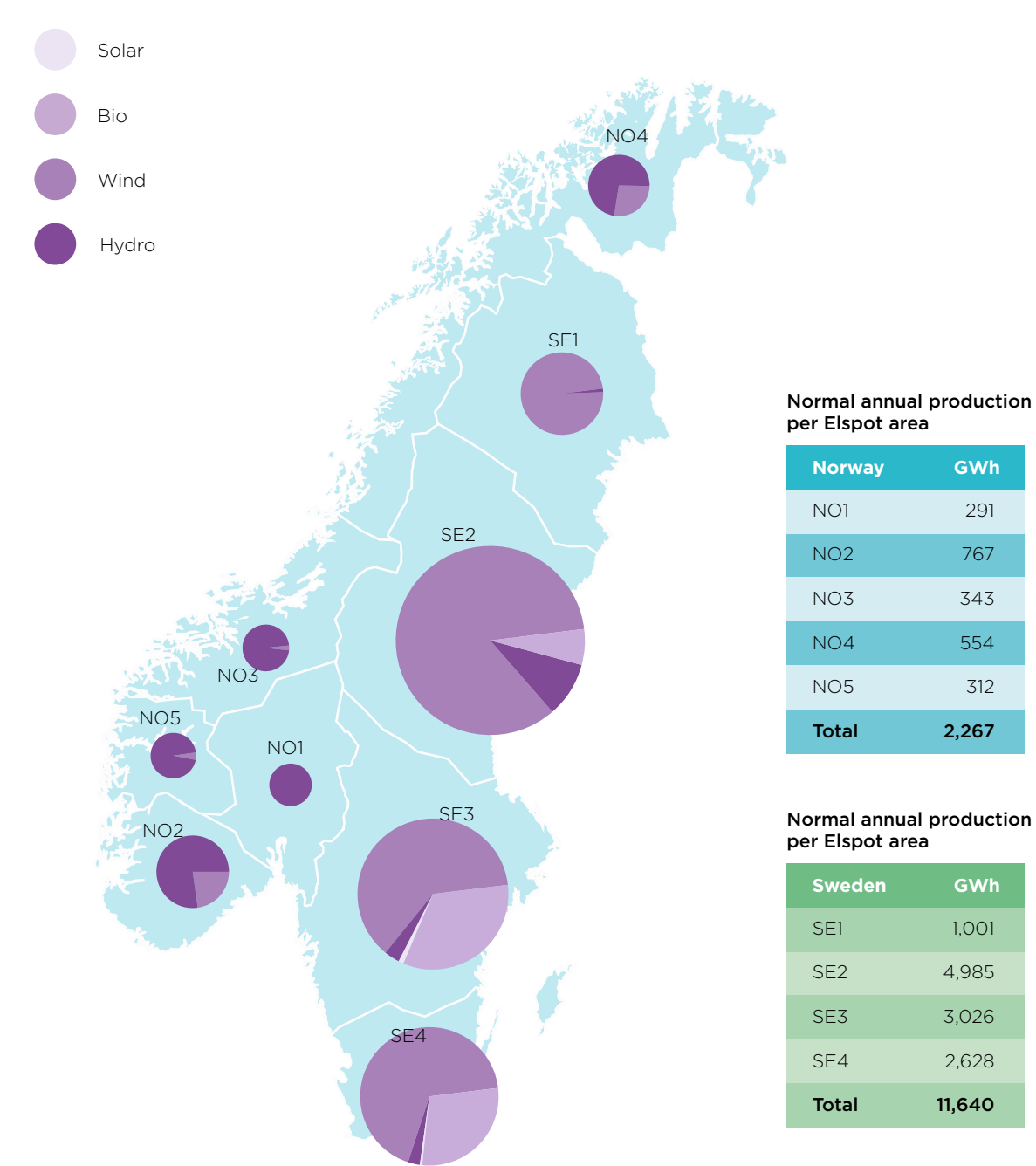
Plants eligible for electricity certificates but that were commissioned before 2012 are not included in the joint target of 28.4 TWh in 2020. Electricity certificates issued to these plants must be financed by the country in question. In 2015, these plants' certificate eligible production amounted to 0.75 TWh in Norway and 11.1 TWh in Sweden.

Figure 2: Normal annual production of plants included in the 28.4 TWh target



Source: NVE and the Swedish Energy Agency

Figure 3: Normal annual production of plants included in the 28.4 TWh target by Elspot area





Issuing of electricity certificates

In 2015, energy producers in Norway and Sweden were issued with a total of 24.6 million electricity certificates. In Norway, hydropower still dominates, while in Sweden wind power accounts for most of the certificates issued.

In total, energy producers in the two countries were issued with 24.6 million electricity certificates in 2015. The distribution between Norway and Sweden was 2.8 and 21.8 million certificates respectively. Figure 4 and the table on the next page show the certificates issued by country and energy source.

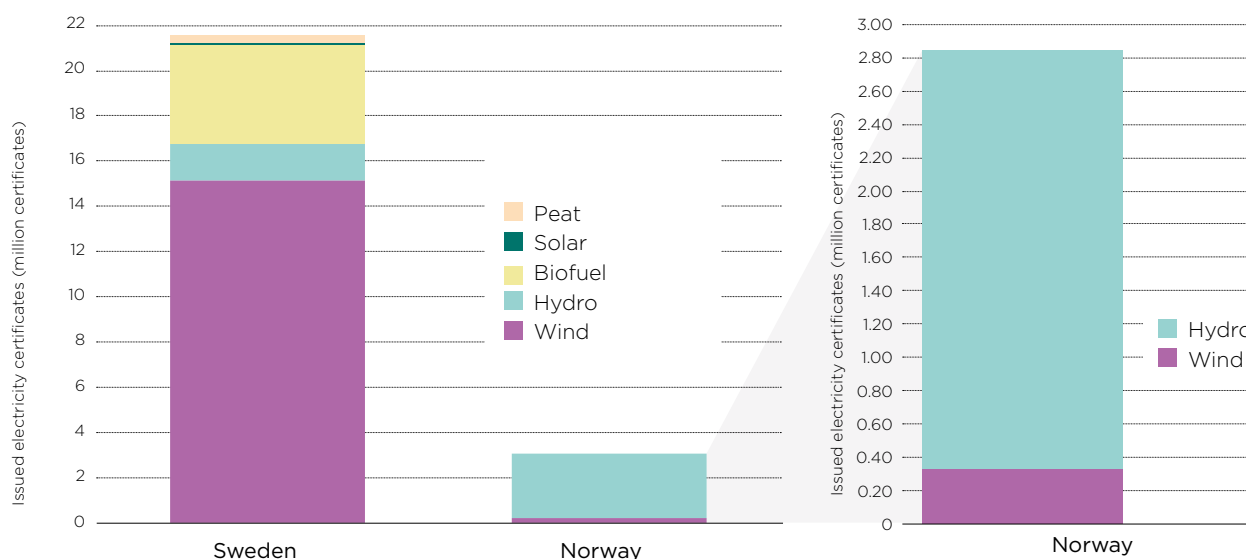
DISTRIBUTION OF ISSUED ELECTRICITY CERTIFICATES

The fact that the number of electricity certificates in Sweden is increasing is mainly due to the expansion of wind power. 15.6 million electricity certificates were issued to wind power producers in Sweden in 2015. Swedish wind

power and biofuel plants that were in operation for the whole of 2015 produced on average 113 per cent and 73 per cent, respectively, of their normal annual production.

The proportion of electricity certificates issued in Norway, compared with Sweden, was low due to there being few approved power plants. It also mainly has small plants with a low combined installed output. As far as the electricity certificates that were issued in Norway in 2015 are concerned, hydropower was dominant. Norwegian hydropower plants that were in operation throughout 2015 produced almost on a par with normal annual production.

Figure 4: Issued electricity certificates in Sweden and Norway in 2015



Key figures C

Electricity certificates issued in 2015	Norway (million certificates)	Sweden (million certificates)
Wind	0.34	15.61
Hydro	2.49	1.70
Biofuel	-	4.34
Solar	-	0.02
Peat	-	0.07
Total	2.83	21.75

PHASING OUT OF APPROVED POWER PLANTS

Swedish plants that were commissioned before 1 May 2003 are no longer part of the electricity certificate system. These plants were phased out between 2012 and the end of 2014.

Approved plants are eligible for 15 years. From and including 2018, plants will be phased out of the electricity certificate system. Tables 7.1 and 7.2 (see table section) show the number of

plants and normal annual production for all approved plants by when the certificate issue period expires. It is important to remember that the amount of production that will be phased out at various times may change because of varying operating conditions. Factors that can affect the calculation include changes in the proportion of certificate eligible fuel and external conditions, such as temperature and wind.

Fact box 10: Energy producers receive one electricity certificate for each MWh produced from renewable energy resources.

1 MWh = 1 electricity certificate

1 TWh = 1 million electricity certificates

Cancellation of electricity certificates

19.7 million electricity certificates were cancelled in 2015. 12.8 million of these were cancelled in Sweden and 6.9 million in Norway.

The quota curves are based on how much renewable energy production will be financed and estimates of the magnitude of calculation-relevant electricity consumption in each country. The relationship between these figures results in a proportion that represents the quota each year. Since the quota is fixed by law, while the calculation-relevant electricity consumption varies with temperature and economic cycles, the number of cancelled electricity certificates will not always correspond with the cancellation rate necessary to achieve the target. In years when electricity consumption is higher or lower than anticipated by the quota curves, too many or too few certificates, respectively, will be cancelled.

In 2015, the calculation-relevant electricity consumption in Norway was higher than predicted in the quota curve. Fewer certificates were therefore cancelled than had been calculated. Because the electricity certificate quota in Norway was low (8.8 per cent) in relation to Sweden (14.3 per cent), this represented a relatively small number of certificates (see figure 5).

The calculation-relevant electricity consumption in Sweden in 2015 was also lower than anticipated by the quota curve. Fewer certificates were therefore cancelled than had been calculated. The percentage deviation in Sweden was almost double that in Norway and because of the higher electricity certificate quota in Sweden

(14.3 per cent) this deviation represented a greater number of certificates.

In order to ensure that Sweden and Norway finance an equal amount of new energy production, the quota curves must be adjusted as part of the ongoing collaboration on the electricity certificate market. Such technical adjustments are made as part of the so-called progress reviews. One of the tasks of NVE and the Swedish Energy Agency in the 2017 progress review will be to analyse and suggest any adjustments to quotas with a view to fulfilling the obligations of the agreement on electricity certificates (see chapter on progress reviews).

FULFILMENT OF QUOTA OBLIGATION

The cancellations for 2015 show that most market participants with quota obligations cancelled a sufficient number of certificates. In 2015, the joint cancellation percentage was almost 100 per cent. Market participants with quota obligations who do not cancel electricity certificates are charged a quota obligation fee. For 2015, 30 market participants (3 in Norway and 27 in Sweden) must pay a quota obligation fee of NOK 248 per certificate by which they failed to fulfil the quota obligation. A total of 2,079 electricity certificates were not cancelled. The fee amounts to 150 per cent of the volume-weighted average price in the year of calculation for transactions in the account systems (Cesar and NECS).

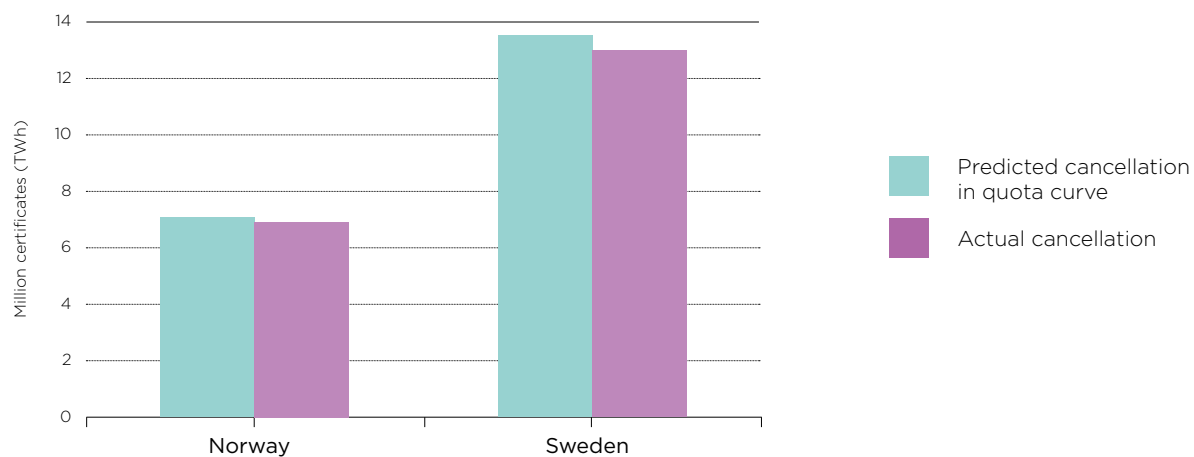
Key figures D

Cancellation for 2015	Norway	Sweden
Cancellation (million certificates)	6.9	12.8
Quota obligation fulfilment (%)	100	100
Quota obligation fee	NOK 248 each	SEK 243 each

Key figures E¹⁰

Cancellation for 2015	Norway		Sweden	
	Predicted	Actual	Predicted	Actual
Calculation-relevant electricity consumption (TWh)	80.1	78.6	93.2	89.6
Quota obligation (%)	8.8		14.3	
Cancelled (TWh)	7.0	6.9	13.3	12.8

Figure 5: Number of cancelled electricity certificates in relation to number anticipated by quota curve.



Source: NECS, Cesar, NVE and the Swedish Energy Agency

10. The figures presented in Key figures E under 'Predicted' are based on the quota curves prepared in 2015.

Surplus

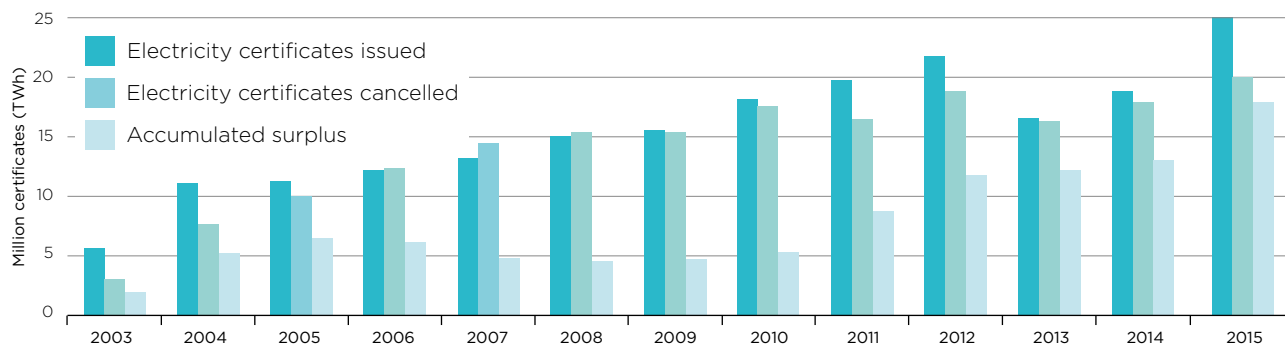
The surplus of electricity certificates at 31 December 2015, less the certificates cancelled for 2015, amounted to 18.1 million. This is an increase of 4.9 million certificates, or 37 per cent, on the year before. Lower calculation-relevant electricity consumption in Sweden than anticipated was one of the factors that affected the surplus.

Electricity certificates that have been issued but not cancelled represent the electricity certificate surplus. There must be a sufficient number of electricity certificates to balance the market. The surplus increases in years when certificate eligible production is higher than demand. Demand is fixed by law via the quota curves in Norway and Sweden. Explanations for why supply and demand for electricity certificates differ in some years include new production being phased in earlier than assumed or fewer certificates than expected being cancelled. The latter occurs if the calculation-relevant electricity consumption is lower than anticipated by the quota curve or if market participants with quota obligations fail to cancel sufficient certificates.

When the common market for electricity certificate started in 2012, the surplus was 8.8 million electricity certificates. This surplus was built up in the Swedish electricity certificate market from 2003 and is now included in the common market.

In 2015, the surplus increased by 4.9 million electricity certificates. This results in an accumulated surplus of 18.1 million electricity certificates (see Figure 6). Most of the increase was corrected for in the quota curve that was approved in the 2015 progress review. The quota obligation was adjusted upwards from and including 2016 to take account of known estimation errors from previous consumption

Figure 6: Issued certificates, cancelled certificates, and accumulated surplus 2003-2015.



Source: Cesar and NECS

forecasts for both Norway and Sweden. The rest of the deviation will be adjusted for in the 2017 progress review (Key figures E).

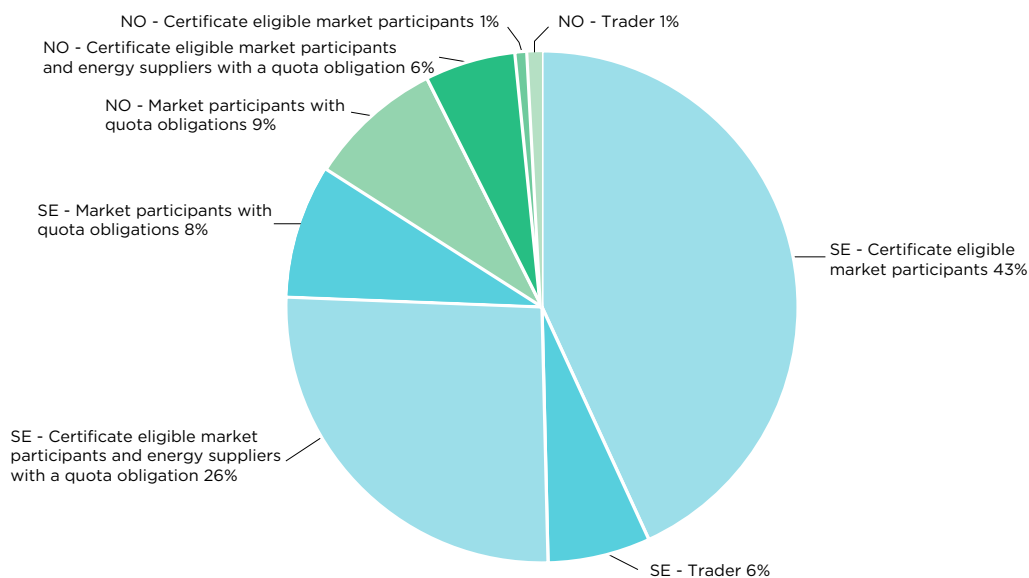
The size of the surplus in relation to the number of electricity certificates that must be cancelled can provide an indication of the pressure in the electricity certificate market. A small surplus in relation to the number of electricity certificates to be cancelled can contribute to increased pressure in the electricity certificate market, since competition to buy increases. Conversely, a large surplus in relation to the number of certificates to be cancelled contributes to negative price pressure.

DISTRIBUTION OF THE SURPLUS

Following the cancellation of electricity certificates on 1 April 2016, there were 22.4 million certificates left in the various accounts in NECS and Cesar. These included certificates that were issued for production in January and February 2016.

Following the cancellation process on 1 April 2016, the remaining electricity certificates in accounts in Norway and Sweden had a combined market value of NOK 3.2 billion.¹¹ Figure 7 shows the distribution of these electricity certificates by the various market participants' accounts in Norway and Sweden

Figure 7: Electricity certificates by market participant in Norway and Sweden at 1 April 2016. 22.4 million electricity certificates were being held on accounts at 1 April 2016.



Source: Cesar and NECS

11. Calculation based on an electricity certificate price of NOK 143 per MWh (spot price Svensk Kraftmäklings AB 1 April 2016). Exchange rate 100 NOK = 97.92 SEK.



Price and trading

The average market price traded in the spot market for electricity certificates was NOK 145 per MWh in 2015. This represents a drop in price of 12 per cent from 2014. The electricity certificates were generally traded for between NOK 130 per MWh to NOK 165 per MWh.

The electricity certificate price fell by 17 per cent from December 2014 to February 2015 and then remained relatively stable between NOK 130 per MWh to NOK 140 per MWh until the autumn. Rising prices throughout September and October resulted in the price level in December 2015 being on a par with that in December 2014. The highest level was reached in October when the average spot price for the month was NOK 165 per MWh at the three largest brokers of electricity certificates.

Trading in electricity certificates mainly occurs between market participants with quota obligations and market participants with certificate eligibility. There are also speculators with accounts in the electricity certificate registers, NECS and Cesar. The aim of these speculators is to buy electricity certificates and sell them later at a profit. They can thereby help

to even out prices in the electricity certificate market over the course of time.

According to NECS and Cesar, approximately 58.7 million electricity certificates (equivalent to 58.7 TWh) were sold during the period 1 April 2015 to 31 March 2016, an increase of 62 per cent from the period before. This includes spot trading during the year, forward contracts with physical transfer of certificates during the period and transactions within the same group of companies.

The increased trading has also affected the trading between brokers in the electricity certificate market. Data from the three largest brokers in the electricity certificate market shows that approximately 30 TWh was sold through brokers during the period from 1 April 2015 to 31 March 2016. This is almost 40 per

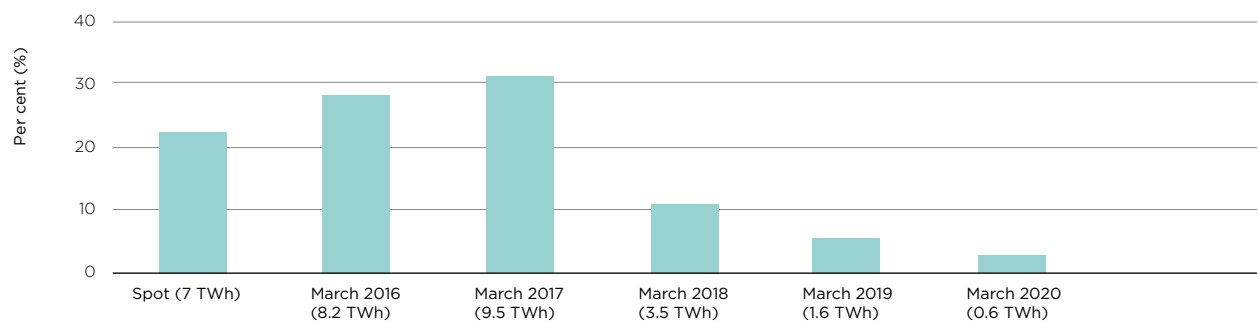
Figure 8: Electricity certificate prices 2003–2015



Source: CleanWorld, ICAP and Svensk Kraftmäklings AB

12. NVE has received updated figures from brokers for the period 1 April 2014 until 31 March 2015.

Figure 9: Trading in electricity certificates via brokers by type of contract during the period 1 April 2015 to 31 March 2016



Source: CleanWorld, ICAP and Svensk Kraftmäklings AB

cent higher than the period before.¹² Figure 9 shows the distribution of traded volumes by the various contracts traded between brokers.

REGISTER PRICES

The volume-weighted average price of transactions in NECS and Cesar from 1 April 2015 to 31 March 2016 was NOK 165 per MWh. This represents a decrease of NOK 7 per MWh from the previous period.

The average price that is presented in the certificate registers NECS and Cesar is the volume-weighted average price of transactions

in the register during the course of the period in question. Thus the price reflects all transfers between two juridical entities during the period.

The register price states a value of electricity certificates sold over a historical period, weighted according to traded volume in the same period. The register price also includes transfers that were agreed in earlier years. The market price provides an indication of the value of an electricity certificate at a given time. The register price cannot therefore be regarded as a market price for electricity certificates.

Fact box 11: Standard contract – delivery and payment

Electricity certificates are traded both bilaterally and via brokers. There are two types of broker contracts on the electricity certificate market: spot price contracts and March contracts. These contracts are available for the next five years.

Spot contract	Price.....	Set on date of agreement
	Delivery.....	Within five working days after agreement
	Payment.....	Within ten working days after agreement
March contract	Price.....	Set on date of agreement
	Delivery.....	18th March each year
	Payment.....	Within five working days after delivery

Progress review

NVE and the Swedish Energy Agency have been given the task of preparing a basis for the second progress review of the Norwegian-Swedish electricity certificate market. The progress review has been planned such that any legislative amendments can enter into force on 1 January 2018.

In accordance with the agreement for a common market for Norwegian-Swedish electricity certificates, so-called progress reviews must be performed at regular intervals. Joint investigations are carried out in a progress review in order to evaluate any need for amendments to the Regulations and adjustments to the quota curves in order to achieve the target.

The Norwegian Ministry of Petroleum and Energy and the Swedish Ministry of the Environment and Energy have tasked their respective energy agencies, NVE and the Swedish Energy Agency, with preparing a basis for the progress review. The tasks assigned by the Ministry of Petroleum and Energy are listed below. The deadline for tasks 1, 2, 3 and 5 is June 2016 and the deadline for task 4 is 18 October 2016.

1. Technical adjustment of the quota curve. Based on the adjustment principles applied in the first progress review, the energy agencies must analyse and propose any adjustments of the quota curve that are required in order for the countries to fulfil their obligations within the framework of the common market for electricity certificates.

2. Timing of plant approvals. Study the need to introduce in Sweden as well a date by when plants must be commissioned in order to be

approved as eligible for electricity certificates within the framework of the common market for electricity certificates. Particular consideration must be given to whether the ability to approve plants commissioned after 2020 may influence the investment climate in general and target fulfilment in 2020 in particular. The analysis must specifically assess technological development, including the effects on production costs. The analysis must also include an assessment of how production increases in connection with upgrades or expansions of plants approved as eligible for electricity certificates can be handled.

3. Market improvement measures. NVE currently provides market participants with information on a number of factors under the electricity certificate system. This includes information about power plants approved under the system, power plants under construction, and calculation-relevant consumption and its relationship to the quota curve. This information is important to ensure the market functions.

NVE must present the information measures they have taken or will take in the period 2015-2017 with a view to strengthening the functioning of the market. NVE must also analyse whether there is a need for further

measures to improve the functioning of the market and propose measures when necessary.

4. Development after 2020. Analyse how a situation can be handled in which only one party adopts new targets after 2020. Both energy agencies should propose which potential changes, with advantages and disadvantages, could be made in such a situation with respect to the parties' obligations within the framework of the common market for electricity certificates. Account must also be taken of the potential introduction in Sweden of a date by when plants must be commissioned in order to be approved as eligible for electricity certificates.

5. Regulation of quotas by law. NVE must consider whether the quota curve in the electricity certificate system should be regulated by law in a such a manner that the adjustment of annual electricity certificate quotas pursuant to amendment agreements and the agreement of 29 June 2011 does not require legislative amendments. It must consider various methods for technical adjustments and clearly set out their advantages and disadvantages, including for affected market participants and on the way the market functions.

The agencies must present a comprehensive assessment of how the quota curve should be regulated by law. The assessment must also take account of the effects of other measures the agencies introduce in the form of improved information for the market.

Tables¹³

Table 1: Quotas for Norway and Sweden

Year	Quota Sweden	Quota Norway
2003	0.074	
2004	0.081	
2005	0.104	
2006	0.126	
2007	0.151	
2008	0.163	
2009	0.170	
2010	0.179	
2011	0.179	
2012	0.179	0.030
2013	0.135	0.049
2014	0.142	0.069
2015	0.143	0.088
2016	0.231	0.119
2017	0.247	0.137
2018	0.270	0.154
2019	0.291	0.172
2020	0.288	0.197
2021	0.272	0.196
2022	0.257	0.196
2023	0.244	0.195
2024	0.227	0.193
2025	0.206	0.186
2026	0.183	0.174
2027	0.162	0.156
2028	0.146	0.131
2029	0.130	0.109
2030	0.114	0.090
2031	0.094	0.072
2032	0.076	0.054
2033	0.052	0.036
2034	0.028	0.018
2035	0.013	0.009

Source: The Swedish Electricity Certificate Act (Act no. 2011:1200) and the Norwegian Electricity Certificate Act (Act no. 39 of 24 June 2011).

13. The table section may contain small rounding-off discrepancies.

Table 2.1: Electricity customers' calculated costs for electricity certificates in Sweden (per kWh) in 2003-2015

Year	Volume-weighted average annual price of electricity certificates (Cesar, NECS) (SEK per certificate)	Quota Sweden	Electricity customers' average costs for electricity certificates in Sweden (øre/kWh) ¹⁴
2003	201	0.074	1.5
2004	231	0.081	1.9
2005	216	0.104	2.2
2006	167	0.126	2.1
2007	195	0.151	2.9
2008	247	0.163	4.0
2009	293	0.170	5.0
2010	295	0.179	5.3
2011	247	0.179	4.4
2012	201	0.179	3.6
2013	201	0.135	2.7
2014	197	0.142	2.8
2015	172	0.143	2.5

14. VAT and transaction costs may accrue. Source: Swedish Energy Agency

Table 2.2: Electricity customers' calculated costs for electricity certificates in Norway (per kWh) in 2012-2015

Year	Electricity customers' calculated costs for electricity certificates in Norway (øre/kWh) ¹⁵
2012	0.6
2013	1.2
2014	2.1
2015	2.5

15. The costs for Norwegian households are based on data from about 2/3 of sales via energy suppliers in Norway (incl VAT). Source: NVE

Table 3: Normal annual production for plants included in the 28.4 TWh target in 2015

Energy source	Norway (TWh)	Sweden (TWh)
Biofuel, peat	-	2.09
Solar	-	0.04
Hydro	1.88	0.66
Wind	0.39	8.85
Total	2.27	11.64

Source: NVE and the Swedish Energy Agency

Table 4.1: Normal annual production for Swedish plants included in the 28.4 TWh target, by technology and Elspot area

Normal annual production (GWh)	Bio	Solar	Hydro	Wind	Total
SE1	1	0	15	985	1001
SE2	314	2	466	4,203	4,985
SE3	1,017	29	98	1,882	3,026
SE4	756	11	79	1,782	2,628
Total	2,088	42	658	8,852	11,640

Table 4.2: Normal annual production for Norwegian plants included in the 28.4 TWh target, by technology and Elspot area

Normal annual production (GWh)	Bio	Solar	Hydro	Wind	Total
NO1	-	-	291	0	291
NO2	-	-	593	174	767
NO3	-	-	332	11	343
NO4	-	-	365	189	554
NO5	-	-	296	16	312
Total	-	-	1,877	390	2,267

Table 5: Issued electricity certificates in Sweden and Norway in 2015

Energy source	Sweden (TWh)	Norway (TWh)
Hydro	1.70	2.49
Wind	15.61	0.34
Biofuel	4.34	-
Peat	0.07	-
Solar	0.02	-
Total	21.75	2.83

Source: Statnett's accounting system and the Swedish Energy Agency (NECS and Cesar)

Table 6.1: Number of plants and energy production per energy sources in 2012-2015 included in the 28.4 TWh target

	Sweden				Norway			
Number of plants	2012	2013	2014	2015	2012	2013	2014	2015
Biofuel, peat	13	23	28	38	0	0	0	0
Solar	62	379	967	2,324	0	0	0	0
Hydro	9	61	102	137	29	73	126	171
Wind	218	4,921	770	982	2	3	4	5
Total	302	5,384	1,867	3,481	31	76	130	176

	Sweden			
Actual energy production - renewable and peat (GWh) ¹⁶	2012	2013	2014	2015
Biofuel, peat	174 (773)	742 (986)	881 (1,435)	1,367 (2,088)
Solar	0.4 (1)	2 (7)	9 (18)	23 (42)
Hydro	2 (11)	76 (424)	454 (534)	694 (658)
Wind	566 (2,061)	3,248 (3,899)	4,699 (6,584)	8,577 (8,852)
Total	742 (2,846)	4,068 (5,316)	6,043 (8,571)	10,661 (11,640)

	Norway			
Biofuel, peat	0 (0)	0 (0)	0 (0)	0 (0)
Solar	0 (0)	0 (0)	0 (0)	0 (0)
Hydro	40 (342)	406 (727)	755 (1,357)	1,738 (1,877)
Wind	3 (16)	39 (185)	218 (374)	344 (390)
Total	43 (358)	445 (912)	973 (1,731)	2,082 (2,267)

16. Actual production is based on issued electricity certificates and normal annual production is stated in brackets.

Source: Statnett, NVE and the Swedish Energy Agency

Table 6.2: Number of plants and energy production by energy source in 2015 that are included in the transition scheme

Number of plants	Sweden	Norway
Biofuel, peat	110	0
Solar	110	0
Hydro	207	208
Wind	1,196	0
Total	1,623	208

Source: Statnett, NVE and the Swedish Energy Agency

Energy production - renewable and peat (GWh) ¹⁷	Sweden	Norway
Biofuel, peat	3,049 (3,640)	0 (0)
Solar	13 (2)	0 (0)
Hydro	1,009 (990)	750 (704)
Wind	7,022 (6,250)	0 (0)
Total	11,093 (10,882)	750 (704)

17. Actual production is based on issued electricity certificates and normal annual production is stated in brackets.

Source: Statnett, NVE and the Swedish Energy Agency

Table 7.1: Norway - phasing out of power plants (normal annual production) in 2019–2030

GWh	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Biofuel	-	-	-	-	-	-	-	-	-	-	-	-	0
Solar	-	-	-	-	-	-	-	-	-	-	-	-	0
Hydro	3	8	29	51	27	43	55	205	541	456	742	425	2,585
Wind	-	-	-	-	-	-	-	-	16	169	189	16	390
Total	3	8	29	51	27	43	55	205	557	625	931	441	2,975

Source: NVE

Table 7.2: Sweden - phasing out of power plants (normal annual production) in 2016–2030

GWh	2016	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Biofuel	180	7	43	125	505	891	170	1,104	359	248	586	79	776	654	5,727
Solar	0	0	0	0	0	0	0	0	1	0	1	7	13	23	45
Hydro	0	53	105	56	151	276	36	156	49	99	87	379	67	133	1,647
Wind	0	60	136	134	112	658	642	974	1,521	1,949	2,102	1,866	2,696	2,253	15,103
Total	180	120	284	315	768	1,825	848	2,234	1,930	2,296	2,776	2,331	3,552	3,063	22,522

Source: Swedish Energy Agency

Table 8: Surplus

Year	Issued electricity certificates (million certificates)	Cancelled electricity certificates (million certificates)	Surplus/year (million certificates)	Accumulated electricity certificates (million certificates)
2003	5.6	3.5	2.1	2.1
2004	11.0	7.8	3.2	5.4
2005	11.3	10.1	1.2	6.5
2006	12.2	12.4	-0.2	6.3
2007	13.3	14.5	-1.2	5.1
2008	15.0	15.3	-0.3	4.8
2009	15.6	15.4	0.2	5.0
2010	18.1	17.5	0.5	5.5
2011	19.8	16.5	3.3	8.8
2012	21.7	18.7	3.0	11.8
2013	16.7	16.2	0.5	12.3
2014	18.7	17.9	0.9	13.2
2015	24.6	19.7	4.9	18.1

Source: Statnett, NVE and the Swedish Energy Agency

Glossary

Term	Explanation
Cancellation	The deletion of electricity certificates in order to fulfil the annual electricity certificate obligation.
Quota obligation fee	A fee that those with a quota obligation must pay for each certificate in their annual quota that has not been cancelled. The fee is intended to give suppliers and others an incentive to fulfil the quota obligation.
Calculation-relevant electricity consumption	Electricity consumption for which a quota obligation exists. There are national differences in the Regulations that determine electricity consumption for which electricity certificates must be obtained.
Cesar	The Swedish electricity certificate register. The electricity certificate register is an electronic register containing summaries of the issue, cancellation and sale of electricity certificates. It is operated by the Swedish Energy Agency.
Declaration of quota obligation	Market participants with quota obligations in Norway and Sweden must declare their quota obligations. on 1 March each year. In Norway this is based on values reported by grid companies. In Sweden, the market participants with quota obligations make a declaration to the Swedish Energy Agency.
Electricity certificate	Certificate issued by the state that one megawatt hour (MWh) of renewable electricity has been produced in accordance with the applicable national Electricity Certificate Act and Electricity Certificate Regulation.
Electricity certificate surplus	Electricity certificates that have been issued but not cancelled represent the electricity certificate surplus.

Term	Explanation
Certificate eligible	Energy producers eligible for electricity certificates pursuant to the applicable national Electricity Certificate Act and Electricity Certificate Regulation.
Quota	Ratio that designates how great a proportion of calculation-relevant electricity consumption must be cancelled each year.
Electricity certificate system	Market-based support scheme for electricity produced from renewable sources pursuant to the applicable national Electricity Certificate Act and Electricity Certificate Regulation.
Quota obligation	Energy suppliers and others with a quota obligation must procure electricity certificates and have an obligation to cancel a stated number each year.
Renewable Energy Directive	Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. In Norway, the Renewable Energy Directive was incorporated into the EEA Agreement in 2011.
Renewable energy production	Electricity produced from renewable energy sources, such as water, wind and the sun, as well as geothermal or bioenergy.
Progress review	Process involving a joint review of, and discussions between the parties concerning, among other things, the need to amend or adjust the Regulations on electricity certificates.
Quota curve	A curve that shows annual electricity certificate quotas over the effective lifetime of the electricity certificates system from 2012 to 2035.

Term	Explanation
NECS	The Norwegian electricity certificate register. The electricity certificate register is an electronic register containing summaries of the issue, cancellation and sale of electricity certificates. It is operated by Statnett.
Transition scheme	The transition scheme applies to plants commissioned before 1 January 2012. The rules governing eligibility for the scheme differ in Norway and Sweden.
Spot contract in the electricity certificate market	A spot contract is an agreement between two parties to buy or sell a number of electricity certificates at a price set on the date of agreement. The agreed number of electricity certificates is transferred from seller to buyer within a way of the agreement date.
Technical adjustment	Necessary adjustments in electricity certificate quotas so as to fulfil the obligations in the agreement on electricity certificates between Norway and Sweden. Thus this does not involve any target increase.
Forward contract in the electricity certificate market	A forward contract is an agreement between two parties to buy or sell a number of electricity certificates on a predetermined date in the future. A distinction is therefore made between the trading date and the delivery date. The price is set at the time of agreement.





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A common market for electricity certificates – more renewable energy production

Norway and Sweden have had a common market for electricity certificates since 1 January 2012. The annual report on the electricity certificate market is published by the Norwegian Water Resources and Energy Directorate (NVE) and the Swedish Energy Agency. With this report, NVE and the Swedish Energy Agency wish to present statistics for the electrical certificate system and to increase the understanding of how the system works.

This report is also published in Norwegian and Swedish.
Download or order the report from www.nve.no or www.energimyndigheten.se.