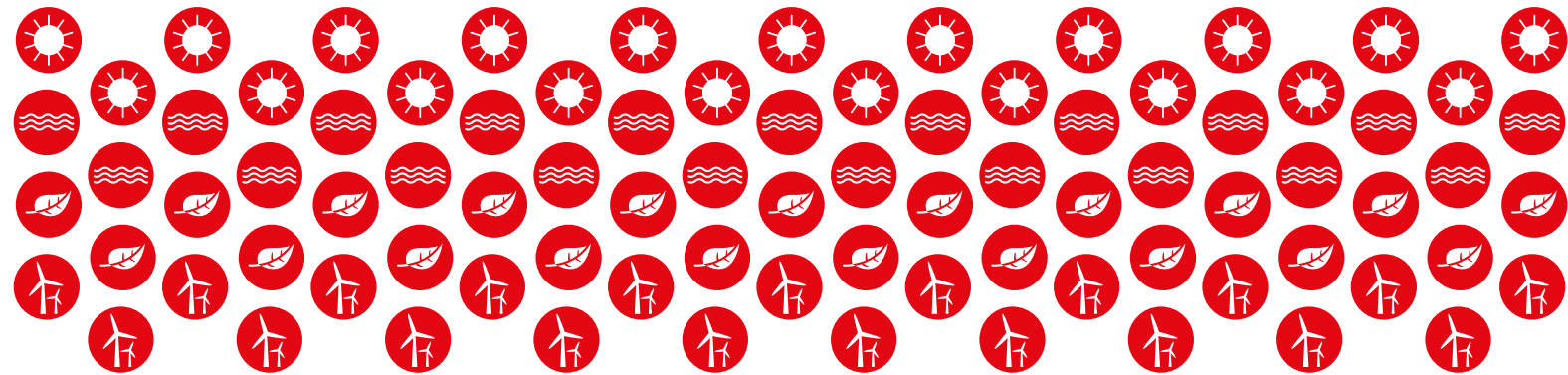


The Norwegian-Swedish Electricity Certificate Market

ANNUAL REPORT 2016





Preface

This is an English summary of the 2016 annual report from the Swedish Energy Agency and the Norwegian Water Resources and Energy Directorate (NVE) on the common Norwegian-Swedish electricity certificate market. This report contains key figures and tables from the Swedish/Norwegian annual report 2016.

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

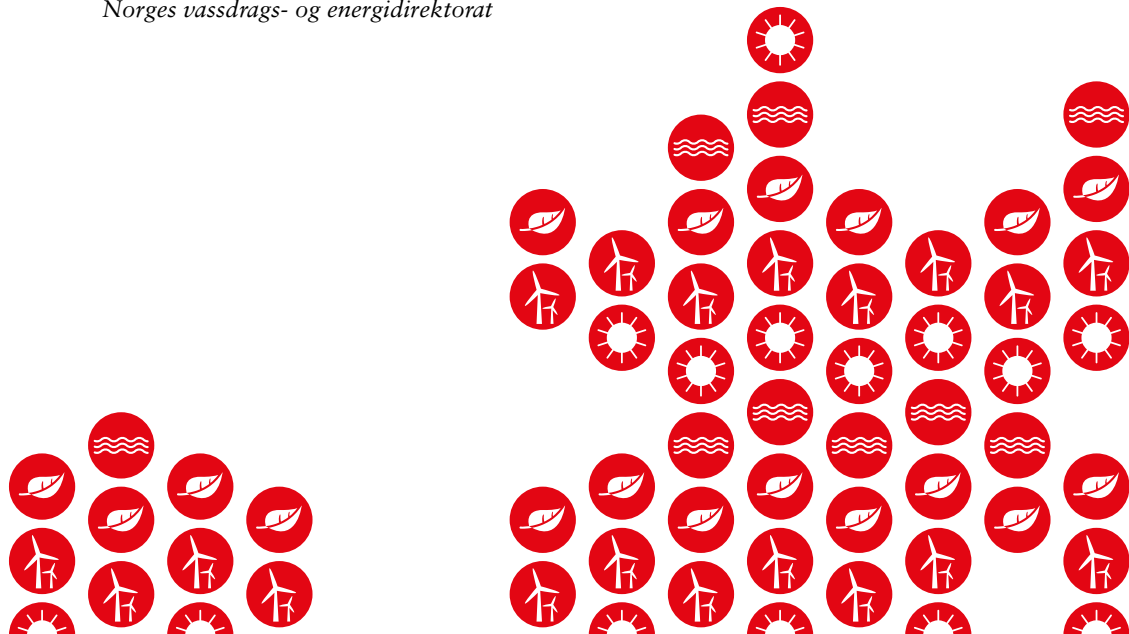
The goal of the two countries is to develop new energy production based on renewable energy sources amounting to 28.4 TWh by the end of 2020. Sweden will finance 15.2 TWh and Norway 13.2 TWh. The market will determine when and where the new production will take place.

If you would like more information about the electricity certificate system and the electricity certificate market, see the respective authorities' websites. For an explanation of how the electricity certificate market works, read the English version of the 2015 annual report on the websites.

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Key figures for 2016

The tables below summarise the relevant figures for the electricity certificate market in 2016. The tables in the report may contain small rounding-off discrepancies.

Key figures A	Norway	Sweden
Issued electricity certificates [million certificates] ¹	5,0	21,1
Certificates issued to plants that are included in the joint electricity certificate target [million certificates]	2,4	11,7
Certificates issued to plants that are not included in the joint electricity certificate target [million certificates]	2,6	9,4
Expected normal annual production for plants that are included in the joint electricity certificate target [TWh]	3,4	14,3
Cancelled electricity certificates [million certificates]	9,6	21,2
Quota obligation fulfilment [%]	100	99,9

Key figures B	
Surplus 2016 [million certificates] (change since 2015)	
Volume-weighted average price of transactions in the electricity certificate registers NECS and Cesar [SEK/electricity certificate] (change since 2015) ²	
Average spot price [SEK/electricity certificate] (change since 2015) ³	

Source: NVE and Energimyndigheten

1. 1 million electricity certificates = 1 TWh of certificate eligible production
2. Exchange rate at December 31th 2016: 1 EUR = 9,55 SEK = 9,09 NOK
3. Based on the average of the daily closing prices of spot price contracts at Svensk kraftmäklning in 2016

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).

Table 2.1. Electricity customers' calculated costs for electricity certificates in Sweden (per kWh) in 2003–2016

År	Volume-weighted average annual price of certificates (Cesar, NECS) [SEK per certificate]	Quota Sweden	Electricity customers' average costs for electricity certificates in Sweden [öre/kWh]*
2003	201	0,074	1,5
2004	231	0,081	1,9
2005	216	0,104	2,3
2006	167	0,126	2,1
2007	195	0,151	3,0
2008	247	0,163	4,0
2009	293	0,179	5,3
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
2016	158	0,231	3,6

* VAT and transaction costs may accrue.

Source: The Swedish Energy Agency

Table 2.1. Electricity customers' calculated costs for electricity certificates in Norway (per kWh) in 2012–2016

Year	Electricity customers' calculated costs for electricity certificates in Norway [öre/kWh]**
2012	0,6
2013	1,2
2014	2,1
2015	2,5
2016	3,1

** 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 Expected normal annual production for plants included in the 28.4 TWh target in 2016

Energy source	Norway [TWh]	Sweden [TWh]
Biofuel, peat	0	2,86
Solar	0,00	0,08
Hydro	3,00	0,79
Wind	0,43	10,63
Total	3,43	14,34

Source: The Swedish Energy Agency, NVE

Table 4.1 Expected 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	27	1 092	1 121
SE2	325	3	505	5 095	5 929
SE3	1 770	51	157	2 317	4 295
SE4	759	21	96	2121	2 998
Total	2 855	76	786	10 626	14 342

Table 4.2 Expected 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	-	1	454	0	455
NO2	-	0	798	183	981
NO3	-	-	641	46	687
NO4	-	-	590	189	779
NO5	-	-	516	17	532
Total	-	1	2 999	434	3 435

Source: The Swedish Energy Agency, NVE

Table 5 Issued electricity certificates in Sweden and Norway in 2016

Energy source	Sweden [TWh]	Norway [TWh]
Hydro	1,46	4,60
Wind	14,94	0,36
Biofuel	4,53	
Peat	0,09	
Solar	0,05	0,00
Total	21,06	4,96

Source: Cesar and NECS

Table 6.1 Number of plants end energy production per energy source in 2012–2016 included in the 28.4 TWh target

Number of plants	Sweden					Norway				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Biofuel, peat	13	23	28	38	44	0	0	0	0	
Solar	62	379	967	2 324	4 214	0	0	0	0	3
Hydro	9	61	102	137	159	29	74	127	171	240
Wind	218	921	770	982	1 227	2	3	4	5	7
Total	302	1 384	1 867	3 481	5 644	31	77	131	176	250

Actual energy production – renewable and peat [GWh]*	Sweden				
	2012	2013	2014	2015	2016
Biofuel, peat	174 (773)	742 (986)	881 (1435)	1367 (2088)	1 967 (2 855)
Solar	0,4 (1)	2 (7)	9 (18)	23 (42)	43 (76)
Hydro	2 (11)	76 (424)	454 (534)	694 (658)	618 (786)
Wind	566 (2 061)	3 248 (3 899)	4 699 (6 584)	8 577 (8 852)	9 080 (10 626)
Total	742 (2 846)	4 068 (5 316)	6 043 (8 571)	10 661 (11 640)	11 708 (14 343)

Actual energy production – renewable and peat [GWh]*	Norway				
	2012	2013	2014	2015	2016
Biofuel, peat	0 (0)	0 (0)	0 (0)	0 (0)	
Solar	0 (0)	0 (0)	0 (0)	0 (0)	0,3 (1)
Hydro	40 (342)	406 (727)	755 (1 357)	1 738 (1 877)	2 039 (2 999)
Wind	8 (16)	39 (185)	218 (374)	344 (390)	358 (434)
Total	43 (358)	445 (912)	973 (1 731)	2 082 (2 267)	2 398 (3 435)

* Actual production is based on issued electricity certificates and expected 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 2016 that are included in the transition scheme

Number of plants	Sweden	Norway
Biofuel, peat	106	
Solar	116	
Hydro	207	382
Wind	1 226	
Total	1 655	382

Energy production – renewable and peat [GWh]*	Sweden	Norway
Biofuel, peat	2 649 (3 453)	
Solar	2 (3)	
Hydro	839 (999)	2 561 (3 134)
Wind	5 860 (6 261)	
Total	9 350 (10 716)	2 561 (3 134)

* Actual production is based on issued electricity certificates and expected normal annual production is stated in brackets.
Source: The Swedish Energy Agency, NVE and Statnett

Table 7.1 Norway – phasing out of power plants (normal annual production) in 2020–2032**

[GWh]	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Biofuel														
Solar												1		
Hydro	8	29	51	38	170	527	544	975	787	1 372	468	1 161	4	6 134
Wind	–	–	–	–	–	–	–	16	169	189	17	43		434
Total	8	29	51	38	170	527	544	991	957	1 561	485	1 206	4	6 569

** In 2032 are power plants phased out that was approved in December 2016 but with start date in January 2017
Source: NVE

Table 7.2 Sweden – phasing out of power plants (normal annual production) in 2018–2031

[GWh]	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total [GWh]
Biofuel	7	43	125	685	705	170	1104	359	248	586	394	462	666	753	6 308
Solar	0	0	0	0	0	0	0	1	0	1	7	13	23	33	78
Hydro	53	105	56	149	290	36	156	49	99	87	379	53	137	134	1 784
Wind	60	136	134	111	658	642	938	1 567	1 945	2 102	1 866	2 701	2 253	1 774	16 886
Total	119	283	316	946	1 653	849	2 198	1 977	2 292	2 777	2 646	3 229	3 078	2 695	25 057

Source: The Swedish Energy Agency

Table 8 Surplus

	Issued electricity certificate [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
2016	26,0	30,8	-4,8	13,3

Source: NVE, the Swedish Energy Agency and Statnett