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Total Energy Supply

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DEFINITIONS, UNITS AND SYMBOLS

Installed capacity (net capacity):

The sum of the rated capacities of the individual power plant units (expressed in MW), excluding the power plant's own consumption of electricity.

Transmission capacity:

The power (in MW) that a high-voltage line can transmit under normal conditions, taking into account any limitations that may be imposed on the rated capacity.

Electricity generation (net generation):

The output of a power plant, excluding the plant's own consumption; usually expressed in GWh.

Generation of condensing power:

Generation at a conventional steam power plant where the energy of the steam is used solely for electricity generation and where the steam is condensed to water after the turbine.

Combined heat and power (CHP) generation:

Generation at a steam power plant where some of the energy of the steam is used for electricity generation and some for another purpose, e.g. for district heating or as process steam for industry. Previously known as back-pressure generation.

Imports/exports:

Since 1 January 1996, the monthly sums (in GWh) of the physically registered MWh values for each connection between the individual countries, per hour of exchange. Until 31 December 1995, imports and exports referred to the quantities of energy recorded as purchases and sales between the respective countries when accounts were settled. Net imports is the difference between imports and exports. The Norwegian share of Linnvasselv is recorded as imports to Norway and the German share of Enstedværket is recorded as exports to Germany.

Total consumption:

The sum of electricity generation and net imports, expressed in GWh.

Occasional power to electric boilers:

Expressed in GWh, this refers to the supply of electricity to electric boilers on special conditions for the generation of steam or hot water, which may alternatively be generated using oil or some other fuel. As of the reorganisation of its electricity market on 1 January 1996, Sweden can no longer determine monthly values for occasional power to electric boilers. The yearly statistics, too, only give the supply of power to electric boilers at district heating plants. Thus the values for gross and net consumption of electricity in Sweden also include the supply of power to electric boilers in industry.

Gross consumption:

The sum of domestic generation and imports minus exports and occasional power to electric boilers; usually expressed in GWh. For Sweden, the value for gross consumption of electricity also includes supply of power to certain electric boilers (see the definition under Occasional power to electric boilers).

Losses:

The difference between gross consumption and net consumption plus pumped storage power; usually expressed in GWh.

Pumped storage power:

The electricity used for pumping water up to a reservoir, for the generation of electricity on a later occasion; expressed in GWh.

Net consumption:

The sum of the energy used by consumers of electricity; usually expressed in GWh.

UNITS AND SYMBOLS

kW	kilowatt
MW	megawatt = 1,000 kW
GW	gigawatt = 1,000 MW
J	joule
kJ	kilojoule
PJ	petajoule = 10^{15} J
kWh	kilowatt-hour = 3,600 kJ
MWh	megawatt-hour = 1,000 kWh
GWh	gigawatt-hour = 1,000 MWh
TWh	terawatt-hour = 1,000 GWh
~	alternating current (AC)
=	direct current (DC)
.	Data are nonexistent
..	Data are too uncertain
0	Less than 0.5 of the unit given
-	No value

CALCULATION OF ELECTRICITY CONSUMPTION

Electricity generation
+ Imports
- Exports

= Total consumption
- Occasional power to electric boilers

= Gross consumption
- Losses, pumped storage power, etc.

= Net consumption

Responsible for statistical data on the individual countries:

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Arne Hjelle - Nord Pool ASA, Norway
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Responsible for processing of the statistics:

Laura Karjalainen - Fortum Power and Heat Oy, Finland

The present statistics were prepared before the 1998 official statistics for the individual countries had become available. Certain figures in the Annual Report may thus differ from the official statistics.

The statistical data and selected sections of the rest of the Annual Report can also be read on Nordel's Internet pages at www.nordel.org.

INSTALLED CAPACITY

S1 INSTALLED CAPACITY ON 31 DEC. 1998, MW

	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Installed capacity, total ¹⁾	12 423	16 458	1 213	27 690	31 994	89 778
Hydropower	11	2 937	952	27 388	16 204 ²⁾	47 492
Nuclear power	.	2 640	.	.	10 052	12 692
Other thermal power	10 962	10 864	121	293	5 564	27 804
- condensing power ³⁾	3 273 ⁴⁾	3 903	.	73	846	8 095
- CHP, district heating	7 061	3 606	.	.	2 246	12 913
- CHP, industry	322	2 477	.	185	841	3 825
- gas turbines, etc.	306	878	121	35	1 631	2 971
Other renewable power	1 450	17	140	9	174	1 790
- wind power	1 450	17	.	9	174	1 650
- geothermal power	.	.	140	.	.	140
Commissioned in 1998	903	640	84	112	101	1 840
Decommissioned in 1998	252	23	0	82	2 151	2 508

¹⁾ Refers to the sum of the rated net capacities of the individual power plant units in the power system, and should not be considered to represent the total capacity available at any single time.

²⁾ Includes the Norwegian share of Linnvasselv (25 MW).

³⁾ Includes capacity conserved for an extended period (ca. 1380 MW).

⁴⁾ Includes the German share of Enstedværket (316 MW).

S2 AVERAGE-YEAR GENERATION OF HYDROPOWER IN 1998, GWH

	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Average-year generation 1998	-	12 716	5 500	112 900	64 000	195 116
Average-year generation 1997	-	12 690	5 500	112 800	63 700	194 690
Change	-	26	0	100	300	426

S3 CHANGES IN INSTALLED CAPACITY IN 1998

Power category	Power plant	Commissioned	Decommissioned	Change in average-year generation (hydropower)	Type of fuel
		MW	MW	GWh	
Denmark					
CHP, district heating	Midtkraft		152		Coal/Oil
	Nordjyllandsværket	411			Coal/Oil
	Skærbækværket		100		Coal/Oil
	Others	112			Natural gas
CHP, industry		6			Waste
		54			Natural gas
Wind power	Several small plants	320			
Finland					
Hydropower	Taivalkoski I-III	16		26	
Nuclear power	Loviisa	70			
	Olkiluoto	200			
CHP, district heating	Vaasa	39			Light fuel oil
CHP, industry	Joutseno	85	23		Waste, natural gas
Condensing power	Vaskiluoto	230			Coal
Iceland					
Hydropower	Burfell	24			
Geothermal power	Nesjavellir	60			
Norway					
Hydropower	Austre Åskåra			24	
	Innset	102	80		
	Osbu/Aura			19	
	Sundsfossen	2		11	
	Sviland	2	2		
Sørfjord				18	
Wind power	Fjeldskår	4			
	Hundhammerfjellet	2			
Sweden					
Hydropower	Rottnen (Rottnan)	17		40	
	Skarped, Rottna		9	-30	
	Various changes in capacity	26	76	40	
Nuclear power	Ringhalsverket	2	6		
CHP, district heating	Visby		36		Oil
	Various changes in capacity	3	10		Biofuel, Coal
Condensing power	Aros G3		243		Oil
	Karlshamn		668		Oil
	Marviken		200		Oil
	Stenungsund		820		Oil
Gas turbines	Nyhamn		42		
	Västervik		40		
Wind power	Several small plants	53	1		

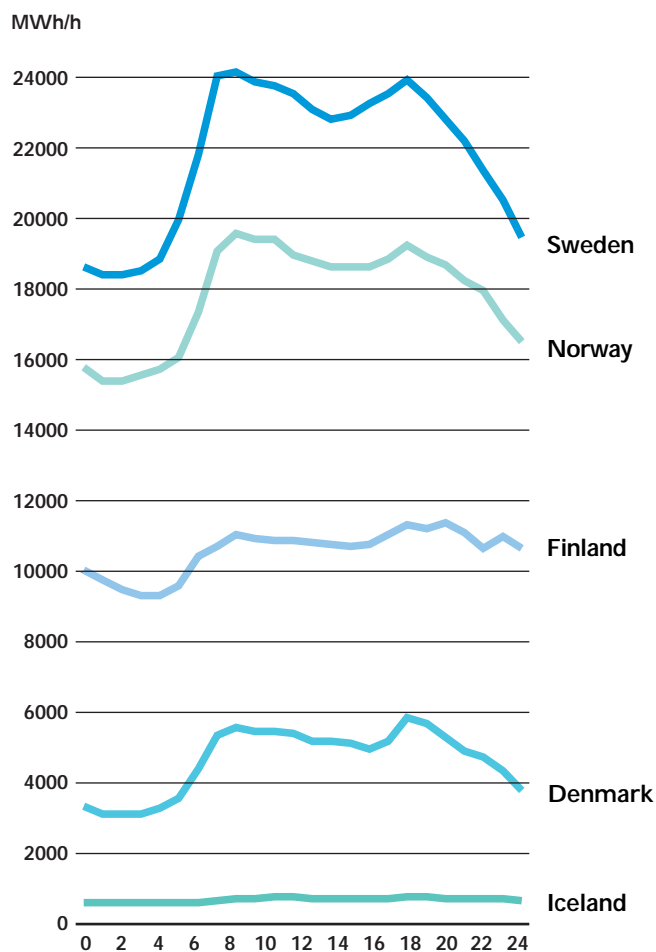
S4 POWER PLANTS (LARGER THAN 10 MW): DECISIONS TAKEN

Power category	Power plant	Capacity	Estimated start-up	Average-year generation (hydropower)	Type of fuel
		MW	Year	GWh	
Denmark CHP, district heating	Maribo / Sakskøbing Avedøreværket 2	10	2000		Biofuel Natural gas/Straw/ Wood chips/(Oil)
		570	2001		
Finland CHP, district heating	Valkeakoski	12	1999		Natural gas Natural gas Peat, waste wood
	Naistenlahti	80	2000		
	Pietarsaari	240	2001		
Iceland Hydropower	Sultartangi	120	1999	880	
Norway Hydropower	Berild	10	1999	45	
	Faukvatn	30	1999	108	
	Grøa	33	1999	96	
	Eid	11	2000	53	
Sweden CHP, district heating	Helsingborg	60	1999		Biofuel/Natural gas Biofuel Biofuel
	Eskilstuna	35	2000		
	Umeå / Däva	10	2000		

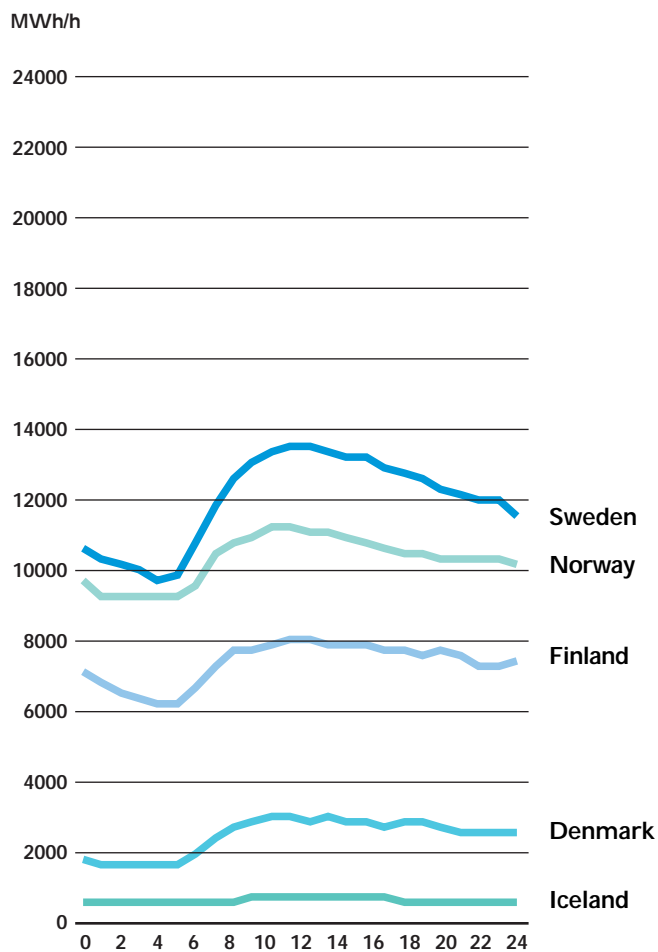
SYSTEM LOAD

S5 SYSTEM LOAD 3RD WEDNESDAY IN JANUARY AND 3RD WEDNESDAY IN JULY 1998

Average 24-hour load 3rd Wednesday in January (21-1-98)



Average 24-hour load 3rd Wednesday in July (15-7-98)

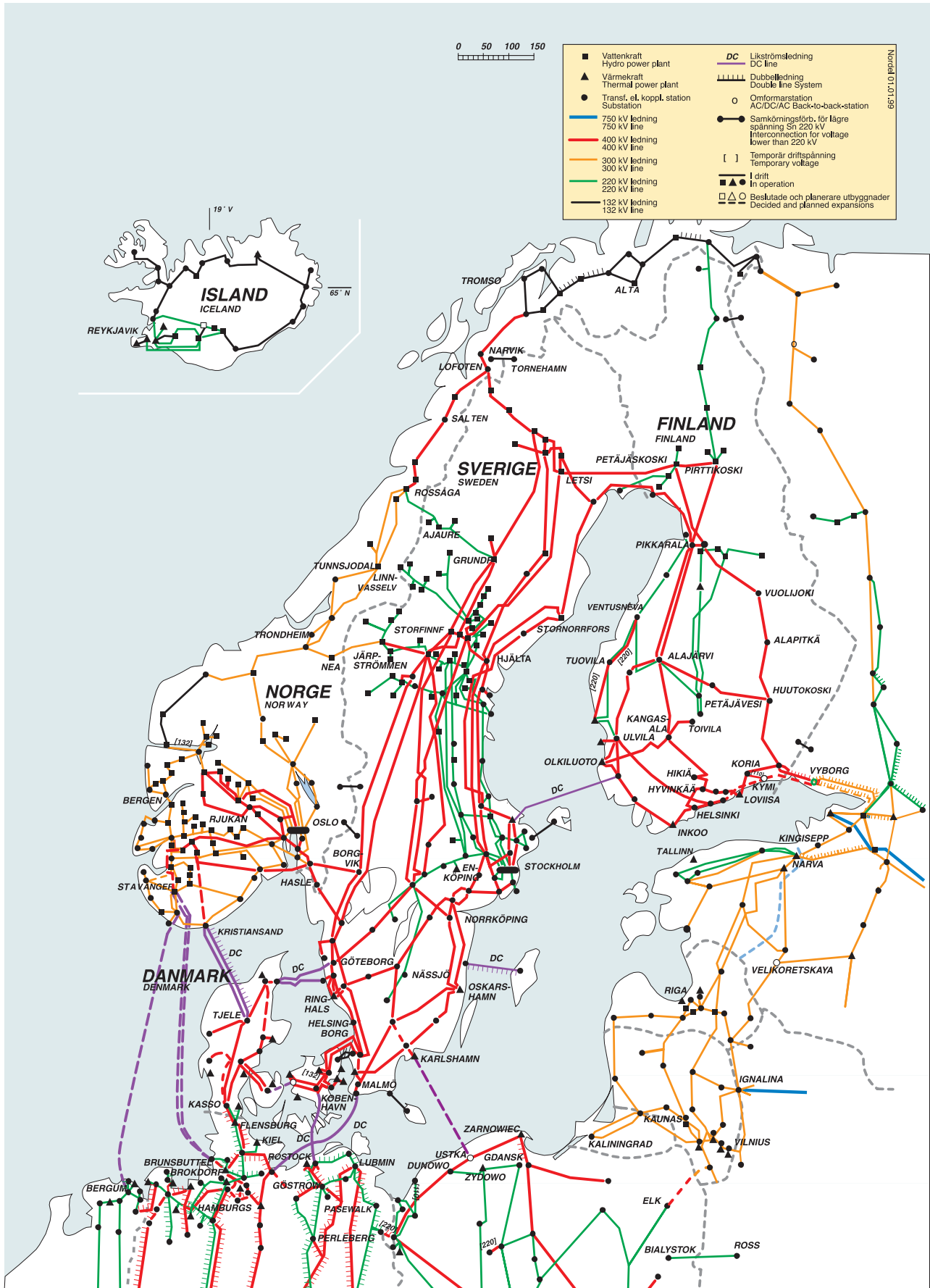


All hours are local time

	Installed net capacity ¹⁾	Maximum system load	Minimum system load
	31 Dec. 1998	3 rd Wednesday in January 1998 5:00-6:00 PM (CET)	3 rd Wednesday in July 1998 4:00-5:00 AM (CET)
	GW	GWh/h	GWh/h
Denmark	12.4	5.9	1.6
Finland	16.5	11.2	6.3
Iceland	1.2	0.8	0.6
Norway	27.7	19.3	9.2
Sweden	32.0	24.0	9.7
Nordel	89.8	61.2	27.4

¹⁾ Refers to the sum of the rated net capacities of the individual power plant units in the power system, and should not be considered to represent the total capacity available at any single time.

THE GRID SYSTEM IN THE NORDIC COUNTRIES



INTERCONNECTIONS

S6 EXISTING INTERCONNECTIONS BETWEEN THE NORDEL COUNTRIES

Countries Stations	Rated voltage	Transmission capacity as per design rules ¹⁾		Total length of line km	Of which cable km
	kV	MW			
Denmark - Norway Tjele-Kristiansand	250/350	From Denmark 1040	To Denmark 1040	240/pol	127/pol
Denmark - Sweden Teglstrupgård - Mörarp 1 and 2 Hovegård - Söderåsen 1 Hovegård - Söderåsen 2 Vester Hassing - Göteborg Vester Hassing - Lindome Hasle (Bornholm) - Borrby	132~ 400~ 400~ 250= 285= 60~	From Sweden 350 ²⁾ 800 ²⁾ 800 ²⁾ 290 380 60	To Sweden 350 ²⁾ 800 ²⁾ 800 ²⁾ 270 360 60	23 91 91 176 149 48	10 8 8 88 87 43
Finland - Norway Ivalo - Varangerbotn	220~	From Finland 70	To Finland 70	228	.
Finland - Sweden Ossauskoski - Kalix Petäjaskoski - Letsi Keminmaa - Svartbyn Hellesby (Åland) - Skattbol Raumo - Forsmark	220~ 400~ 400~ 70~ 400=	From Sweden 1500 ³⁾ 35 550	To Sweden 700 ⁴⁾ 35 550	93 230 134 77 235	. . . 56 198
Norway - Sweden Sildvik - Tornehamn Ofoten - Ritsem Rössåga - Ajaure Linnvasselv, transformers Nea - Järpströmmen Lutufallet - Höljes Eidskog - Charlottenberg Hasle - Borgvik Halden - Skogssäter	132~ 400~ 220~ 220/66~ 275~ 132~ 132~ 400~ 400~	From Sweden 50 1350 285 ⁶⁾ 50 450 ⁶⁾ 40 100 1650 ⁶⁾	To Sweden 120 1350 ⁵⁾ 285 ^{5, 6)} 50 450 ⁶⁾ 20 100 1800 ^{6, 7)}	39 58 117 . 100 18 13 106 135

¹⁾ Maximum permissible transmission.
²⁾ Thermal limit. The total transmission capacity is 1775 MW to Denmark and 1700 MW to Sweden.
³⁾ In certain situations, the transmission capacity can be lower than the limit given here.
⁴⁾ 900 MW can be transmitted during reduced transmission in Finland.
⁵⁾ Thermal limit. Stability problems and generation in nearby power plants may lower the limit.

S7 EXISTING INTERCONNECTIONS BETWEEN THE NORDEL COUNTRIES AND OTHER COUNTRIES

Countries Stations	Rated voltage	Transmission capacity		Total length of line km	Of which cable km
	kV	MW			
Denmark - Germany Kassø - Audorf Kassø - Flensburg Ensted - Flensburg Bjæverskov - Rostock	2 x 400~ 220~ 220~ 400=	From Nordel 1200 600	To Nordel 800 600	107 40 34 166	. . . 166
Finland - Russia Imatra - GES 10 Ylilikkälä - Viborg Nellimö - Kaitakoski	110~ ±85= 110~	From Nordel . . 60	To Nordel 100 1000 60	20 . 20	. . .
Norway - Russia Kirkenes - Boris Gleb	154~	From Nordel 50	To Nordel 50	10	.
Sweden - Germany Västra Kärrstorp - Herrenwyk	450=	From Nordel 600 ¹⁾	To Nordel 600 ¹⁾	250	220

¹⁾ Owing to restrictions in the German network, transmission capacity is currently limited to 450 MW from Nordel and 400 MW to Nordel.

S8 INTERCONNECTIONS: DECISIONS TAKEN

Countries Stations	Rated voltage	Transmission capacity as per design rules	Total length of line	Of which cable	Estimated commis- sioning
	kV	MW	km	km	Year
Denmark - Denmark (Storebælt / The Great Belt) Eltra - Elkraft System	400=	500 - 600	ca 70	ca 70	¹⁾
Finland - Sweden Tingsbacka (Åland) - Senneby (Väddö)	110~	80 ²⁾	81	60	2000
Finland - Russia Ylikkalä - Viborg	±85=	300	43		1999
Norway - The Netherlands (NorNed Kabel) Feda - Eemshaven	400-600=	min 600	ca 550	ca 550	2002
Norway - Germany (EuroKabel / Viking Cable) Øksendal (Tonstad) ³⁾ - Brunsbüttel	400-600=	min 2 x 600	ca 600	ca 550	2004
Sweden - Poland (SwePol Link) Stårnö- Slupsk	450=	600	252	237	2000

¹⁾ According to plans, the Great Belt connection will be in operation in 2003. The Minister of the Environment and Energy has the authority to decide on the connection.

²⁾ At present 63 MW.

³⁾ Bi-pol, cable to Lista, overhead line to Tonstad.

LINE LENGTHS

S9 TRANSMISSION LINES OF 110-400 KV IN SERVICE ON 31 DEC. 1998

	400 kV, AC and DC	220-300 kV, AC and DC	110, 132, 150 kV
	km	km	km
Denmark	1 320 ¹⁾	453 ²⁾	3 940 ³⁾
Finland	4 038 ⁴⁾	2 665	14 960
Iceland	94 ⁵⁾	496	1 315
Norway	2 113	5 639 ²⁾	10 400
Sweden	10 807 ⁴⁾	4 602 ²⁾	15 000

¹⁾ Of which 2 km in service with 150 kV and 53 km with 132 kV.

²⁾ Of which 80 km in Denmark and 96 km in Sweden (KontiSkan), 89 km in Denmark and 382 km in Norway (Skagerrak) in service with 250 kV DC, and 75 km in Denmark and 74 km in Sweden (KontiSkan 2) in service with 285 kV DC.

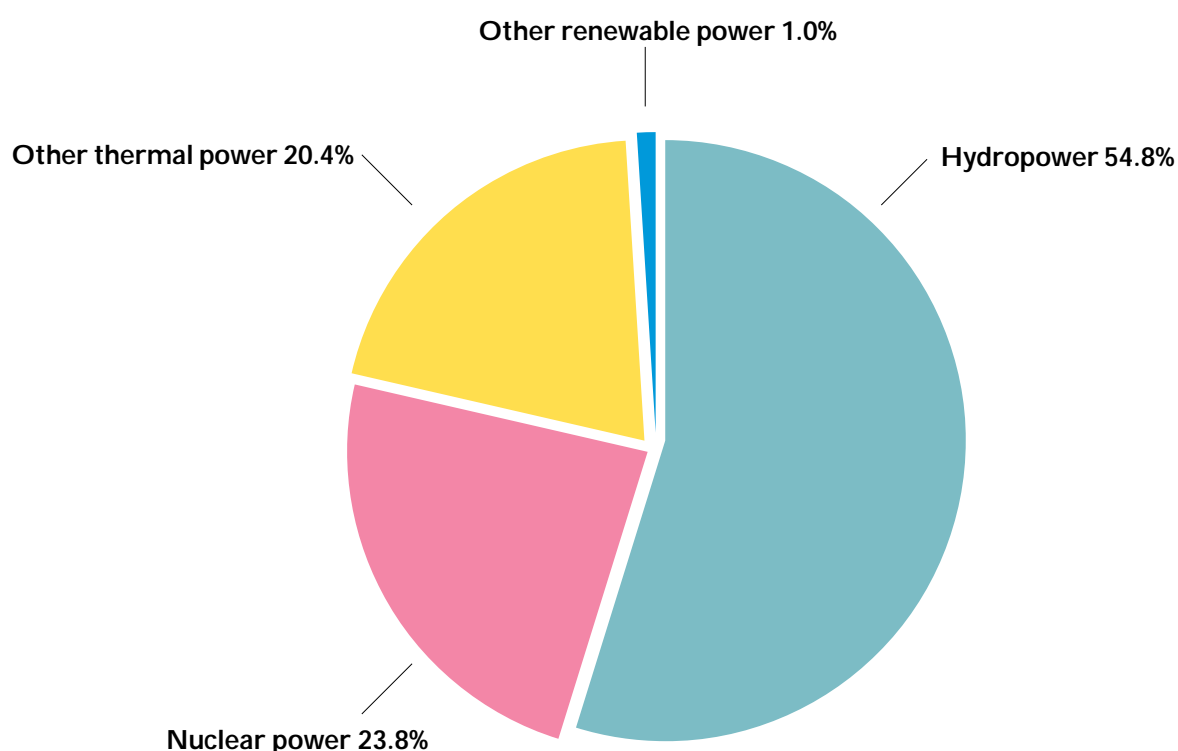
³⁾ Of which 13 km in service with 60 kV and 118 km with 50 kV.

⁴⁾ Consisting of submarine cable (DC), 99 km in Finland and 99 km in Sweden; and land cable (DC), 34 km in Finland and 2 km in Sweden (Fenno-Skan).

⁵⁾ At present in service with 220 kV.

ELECTRICITY GENERATION

S10 TOTAL ELECTRICITY GENERATION WITHIN NORDEL 1998



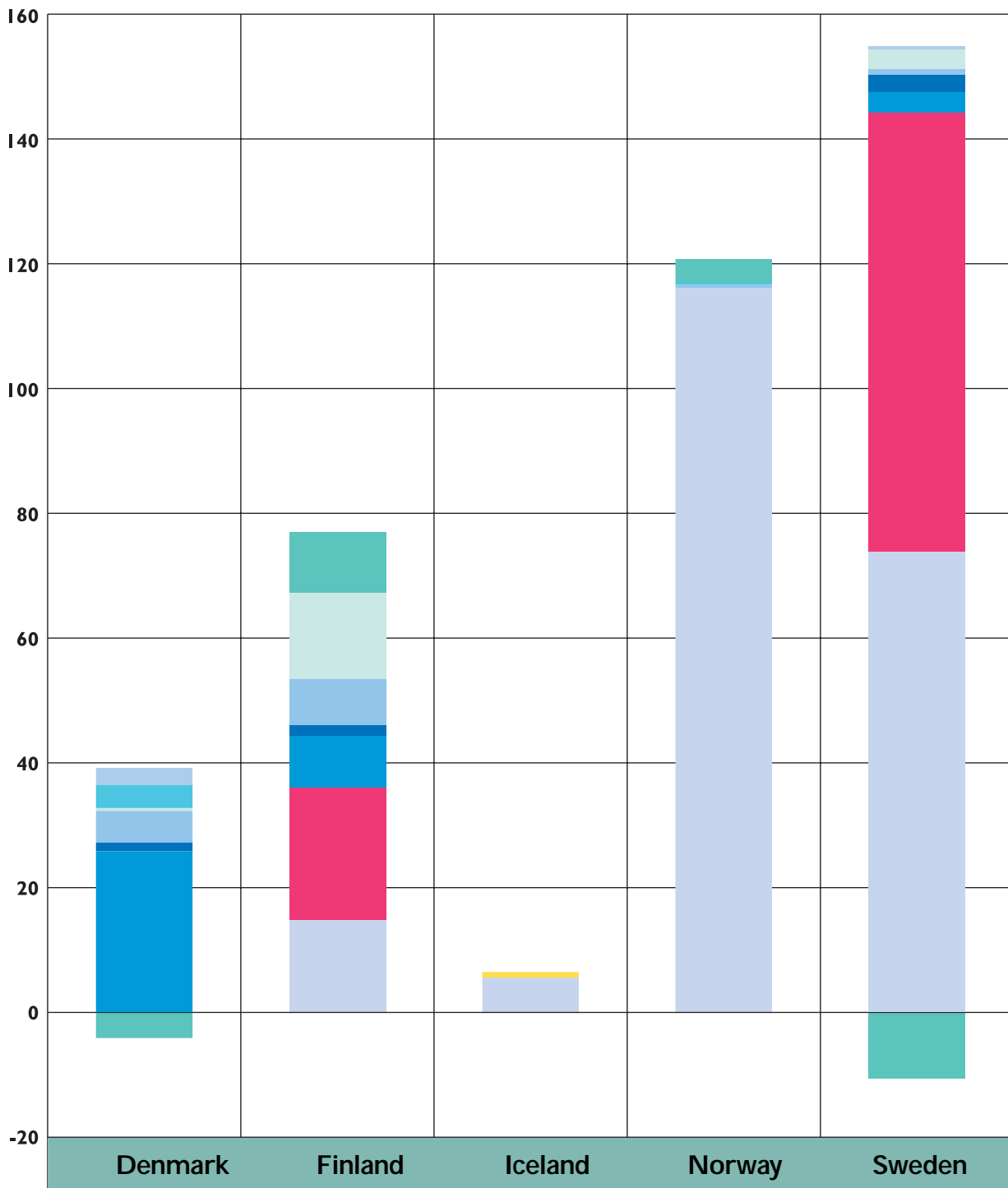
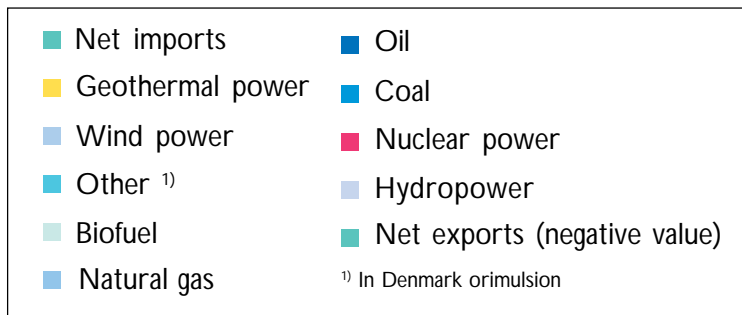
S11 ELECTRICITY GENERATION 1998, GWH

	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Total generation	39 040	67 183	6 277	116 953	154 340	383 793
Hydropower	27	14 602	5 618	116 277	73 727	210 251
Nuclear power	.	20 985	.	.	70 464	91 449
Other thermal power	36 360	31 572	4	668	9 849	78 453
- condensing power	35 003 ¹⁾	6 473	.	109	272	41 857
- CHP, district heating	..	13 076	.	.	5 083	18 159
- CHP, industry	1 357	12 009	.	345	4 487	18 198
- gas turbines, etc.	-	14	4	214	7	239
Other renewable power ²⁾	2 653	24	655	8	300	3 640
Total generation 1997	41 747	65 950	5 580	112 008	144 926	370 211
Change as against 1997	-6.5%	1.9%	12.5%	4.4%	6.5%	3.7%

¹⁾ Includes generation in combined heat and power stations

²⁾ Wind power and, for Iceland, geothermal power

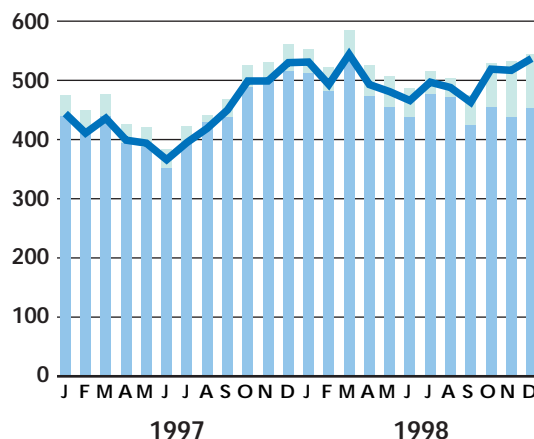
**S12 TOTAL ELECTRICITY GENERATION
BY ENERGY SOURCE, AND NET IMPORTS AND EXPORTS 1998, TWH**



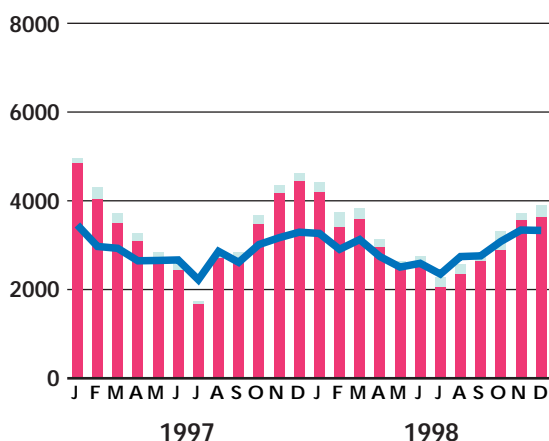
S13 MONTHLY GENERATION AND GROSS CONSUMPTION OF ELECTRICITY 1997-1998, GWH

- Gross consumption
- Wind power or geothermal power
- Nuclear power and other thermal power
- Hydropower

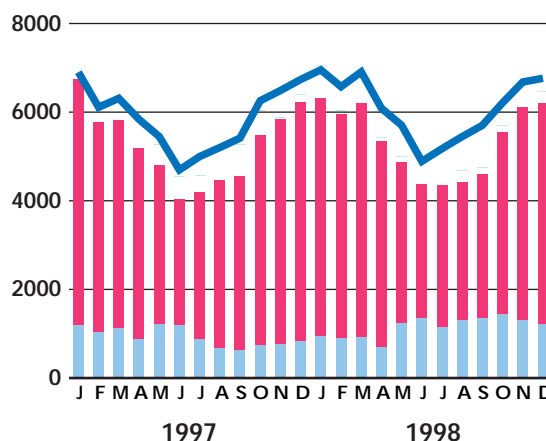
Iceland



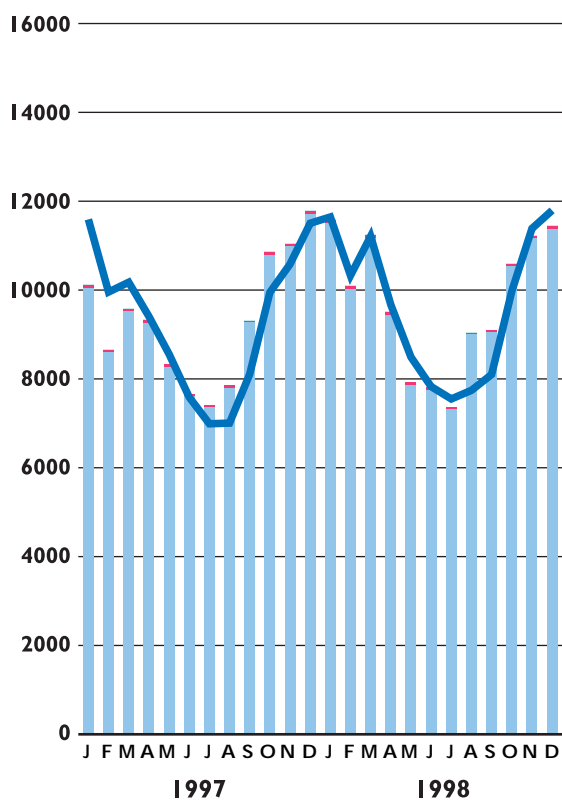
Denmark



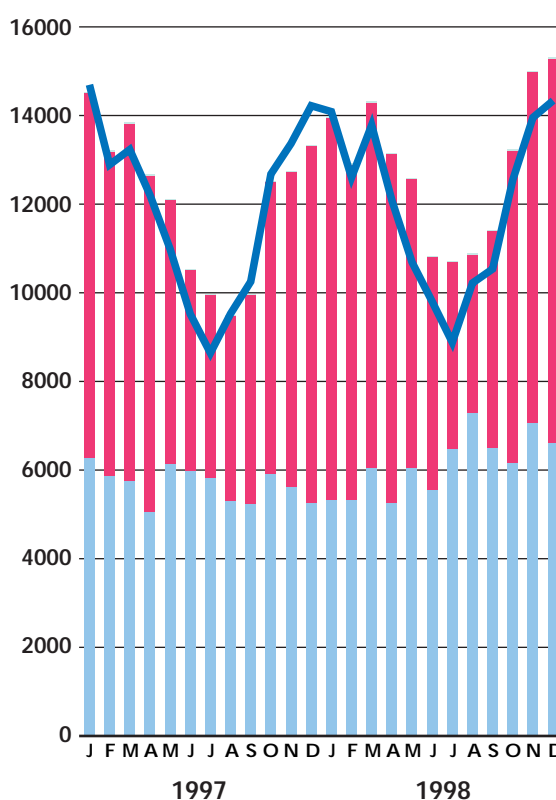
Finland



Norway



Sweden ¹⁾

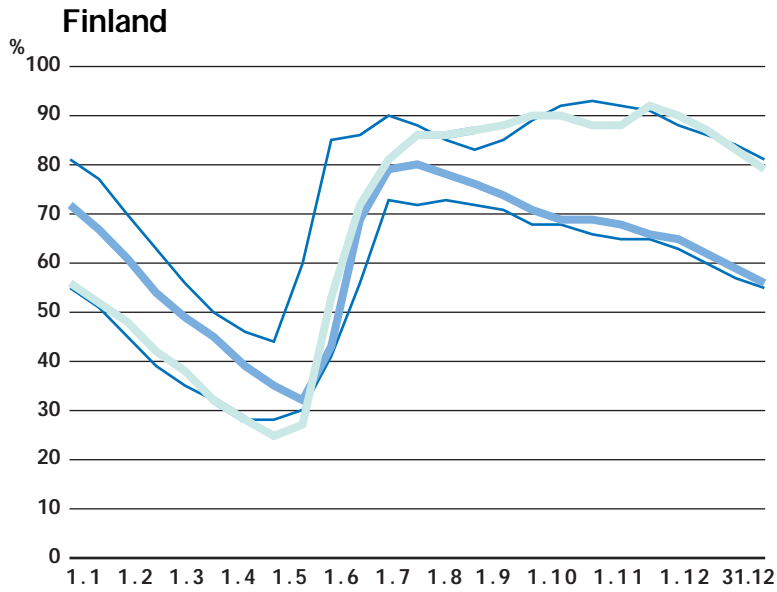


¹⁾ Consumption also includes supply to electric boilers

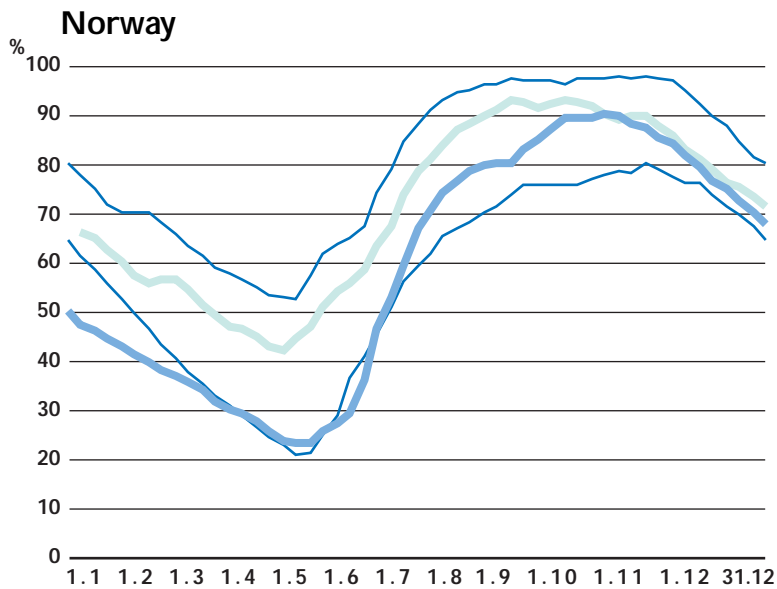
WATER RESERVOIRS

S14 WATER RESERVOIRS 1998

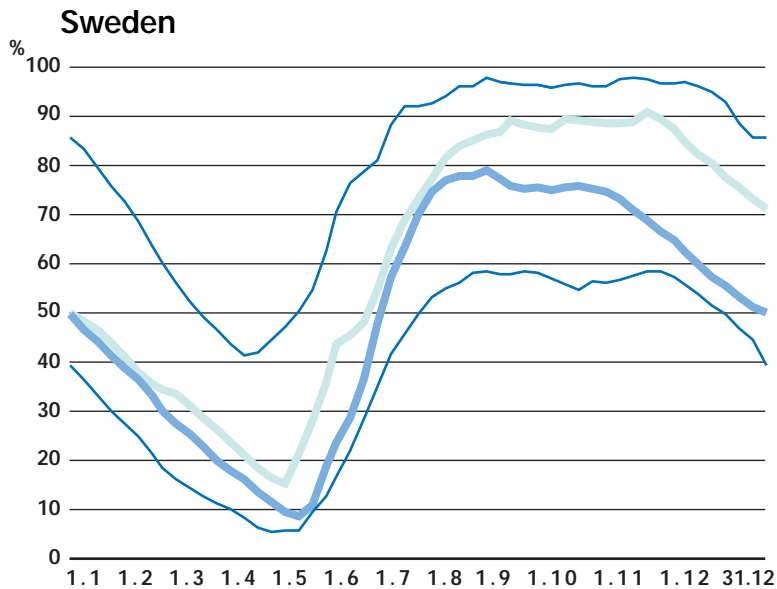
- Water reservoirs 1998 expressed in %
- Water reservoirs 1997 expressed in %
- Minimum and maximum values in %



Reservoir capacity 4 900 GWh
 Minimum and maximum limits are based on values for the years 1988-1997



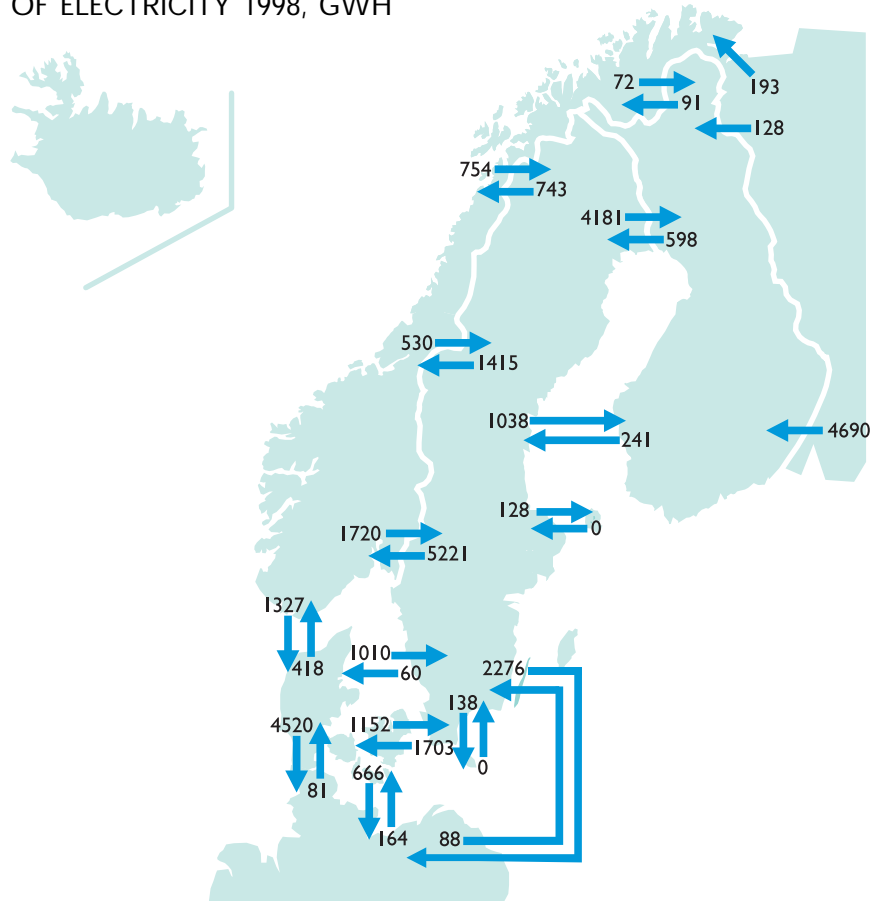
Reservoir capacity
 1.1.1998 80 356 GWh
 31.12.1998 81 489 GWh
 Minimum and maximum limits are based on values for the years 1982-1991



Reservoir capacity 33 550 GWh
 Minimum and maximum limits are based on values for the years 1950-1996

EXCHANGE OF ELECTRICITY

S15 EXCHANGE OF ELECTRICITY 1998, GWH

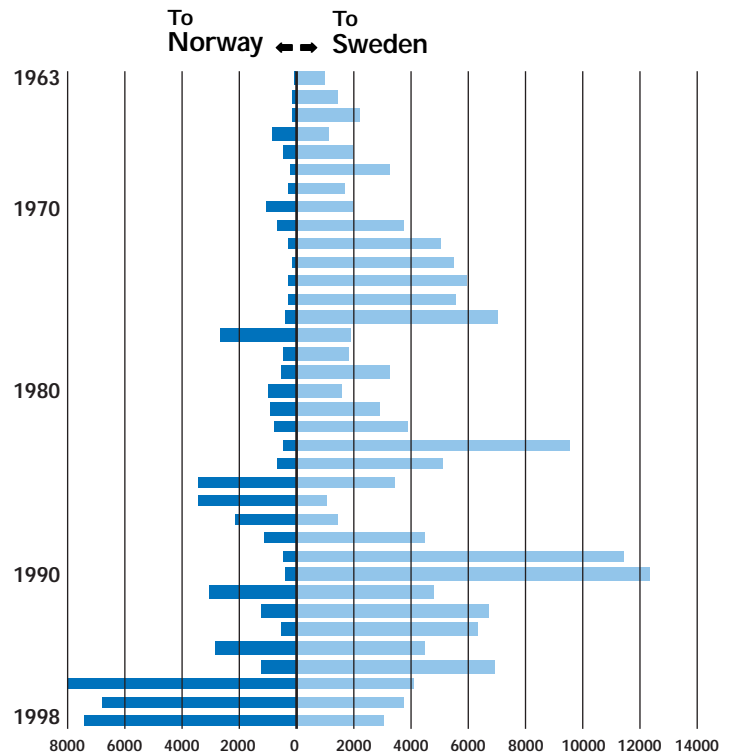
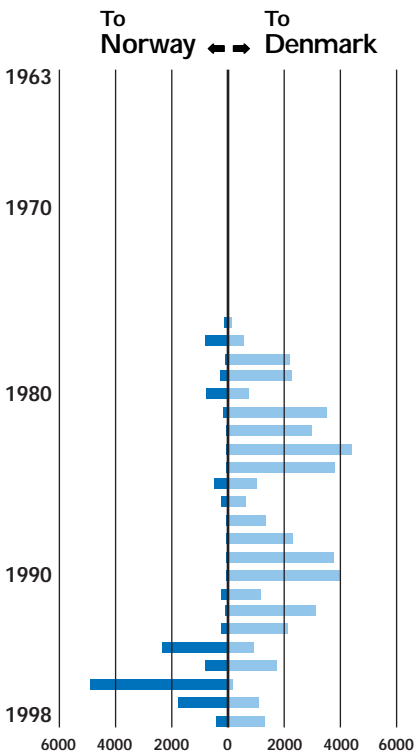
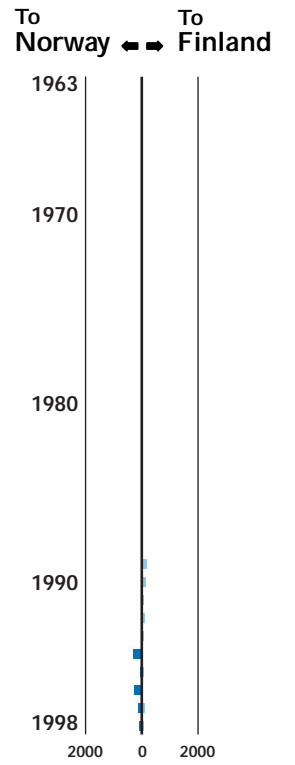
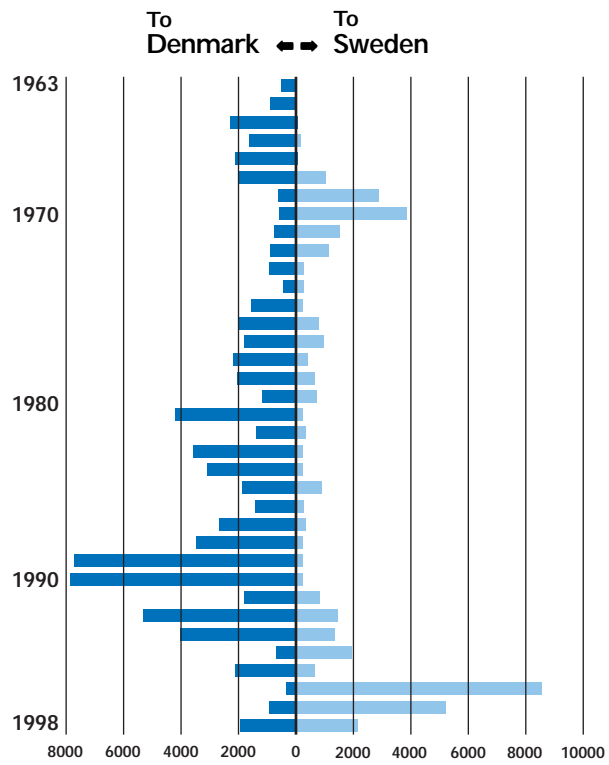
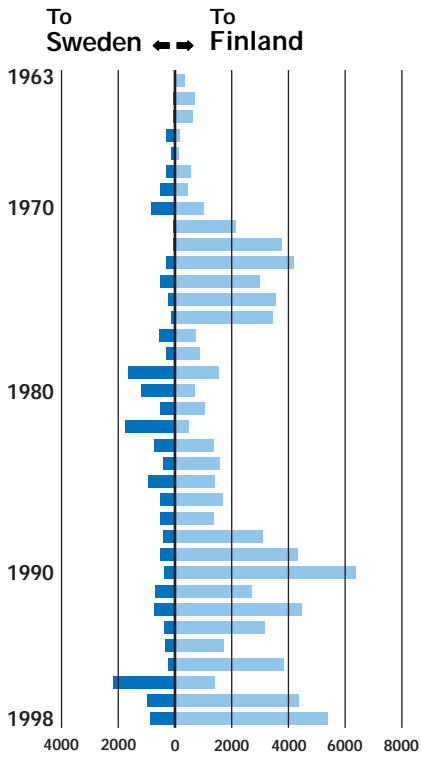


S16 IMPORTS AND EXPORTS 1998, GWH

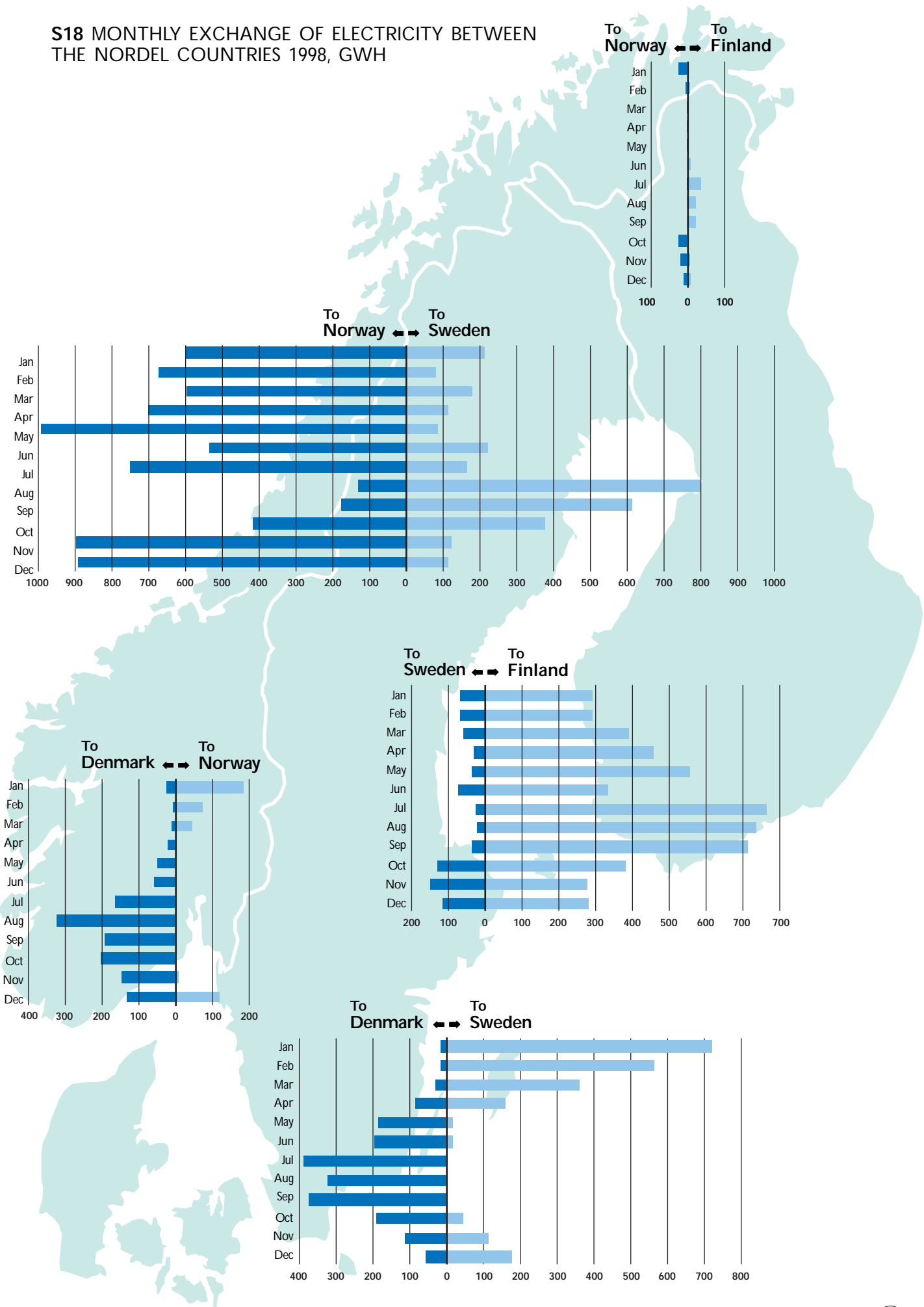
	Imports to:					S Exports
	Denmark	Finland	Norway	Sweden	Other countries ¹⁾	
Exports from:						
Denmark	.	.	418	2 162	5 186	7 766
Finland	.	.	91	839	.	930
Norway	1 327	72	.	3 004	.	4 403
Sweden	1 901	5 347	7 379	.	2 276	16 903
Other countries ¹⁾	245	4 818	193	88	.	5 344
S Imports	3 473	10 237	8 081	6 093	7 462	35 346
	Denmark	Finland	Norway	Sweden	Nordel	
Total imports	3 473	10 237	8 081	6 093	27 884	
Total exports	7 766	930	4 403	16 903	30 002	
Net imports	-4 293	9 307	3 678	-10 810	-2 118	
Net imports / gross consumption	-12.4%	12.2%	3.2%	-7.6%	-0.6%	

¹⁾ Germany and Russia

S17 EXCHANGE OF ELECTRICITY BETWEEN THE NORDEL COUNTRIES 1963 - 1998, GWH



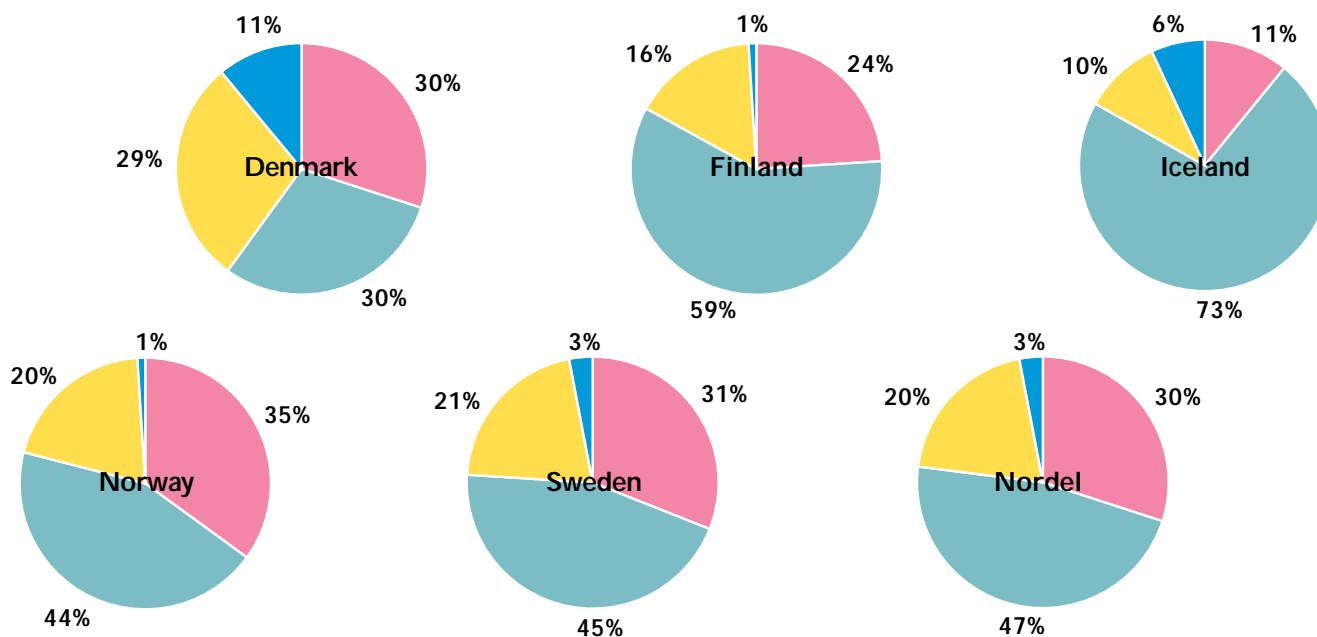
S18 MONTHLY EXCHANGE OF ELECTRICITY BETWEEN THE NORDEL COUNTRIES 1998, GWH



ELECTRICITY CONSUMPTION

S19 NET CONSUMPTION OF ELECTRICITY 1998, BY CONSUMER CATEGORY

- Housing
- Industry (incl. energy sector)
- Trade and services (incl. transport)
- Other (incl. agriculture)

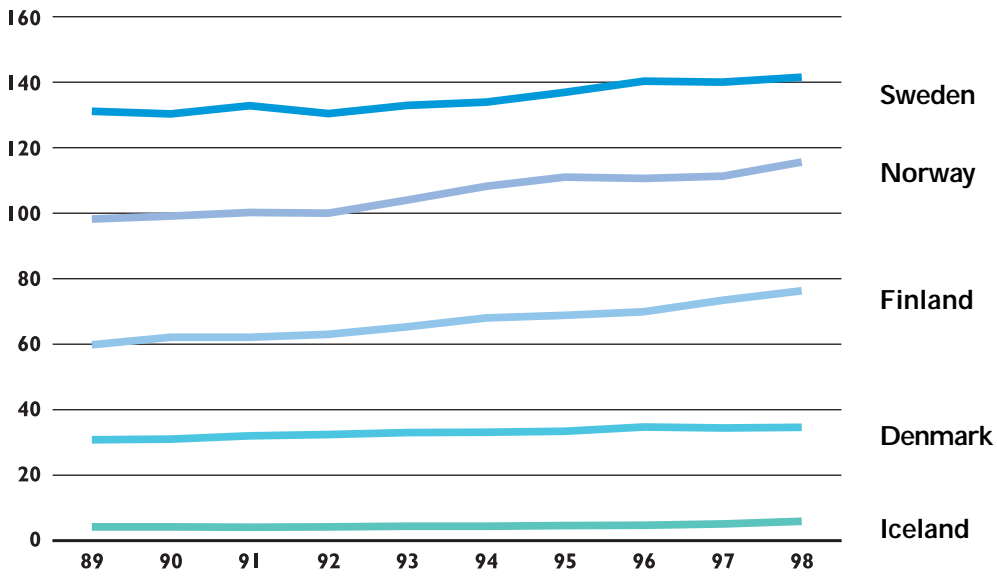


S20 ELECTRICITY CONSUMPTION 1998, GWH

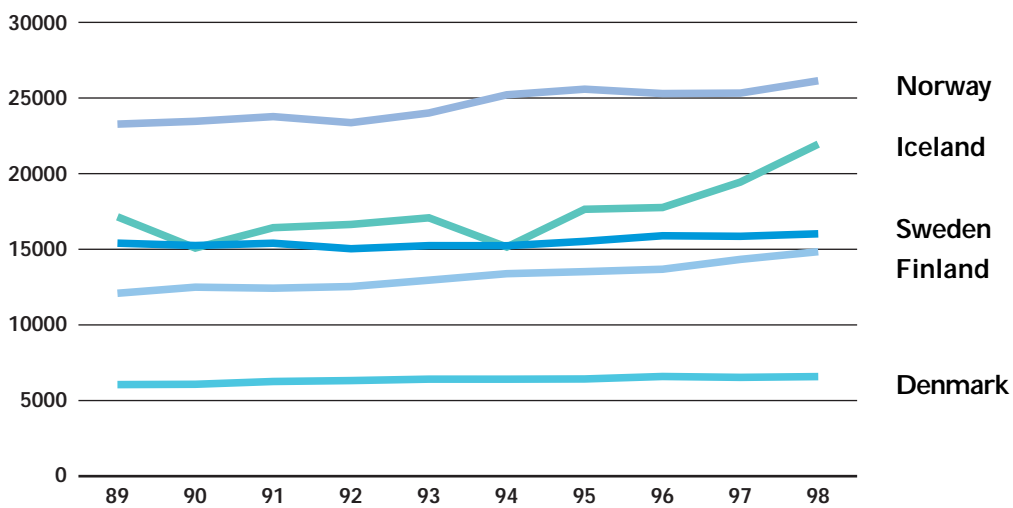
	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Total consumption	34 747	76 490	6 277	120 631	143 530	381 675
Occasional power to electric boilers	.	138	248	4 916	1 900 ¹⁾	7 202
Gross consumption	34 747	76 352	6 029	115 715	141 630	374 473
Losses, pumped storage power	1 997	2 840	468	10 003	10 672	25 980
Net consumption	32 750	73 512	5 561	105 712	130 958	348 493
- housing	9 810	17 950	590	36 788	40 500	105 638
- industry (incl. energy sector)	9 770	43 388	4 069	46 408	58 600	162 235
- trade and services (incl. transport)	9 690	11 574	535	20 916	28 358	71 073
- other (incl. agriculture)	3 480	600	367	1 600	3 500	9 547
Population (million)	5.3	5.1	0.3	4.4	8.9	24.0
Gross consumption per capita, kWh	6 556	14 814	21 924	26 115	15 996	15 594
Gross consumption 1997	34 480	73 532	5 242	111 415	140 119	364 788
Change as against 1997, %	0.8%	3.8%	15.0%	3.9%	1.1%	2.7%

¹⁾ Only electric boilers at district heating plants shown

S21 GROSS CONSUMPTION 1989 - 1998, TWH



S22 GROSS CONSUMPTION PER CAPITA 1989 - 1998, KWH

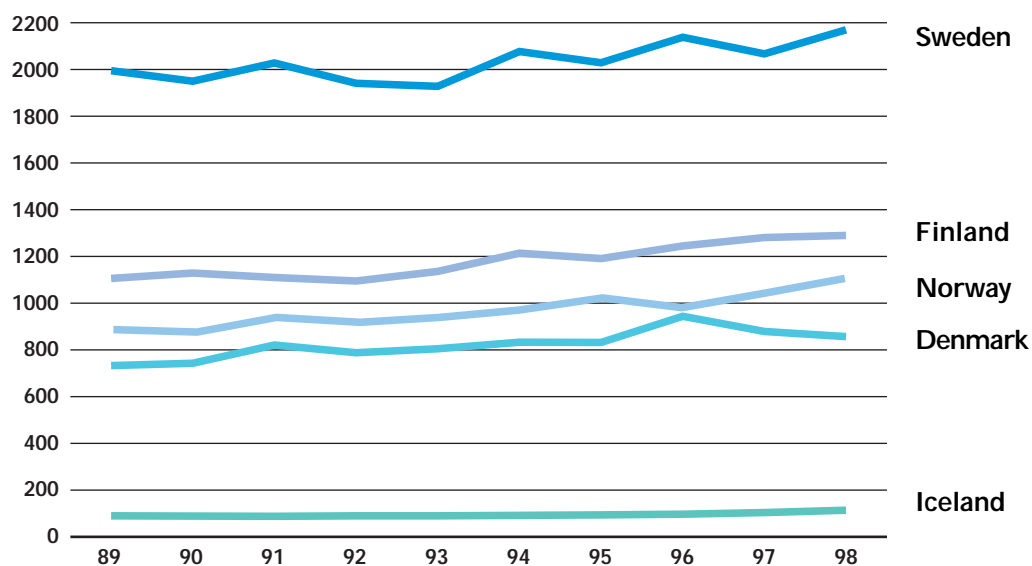


S23 TOTAL CONSUMPTION 1998, GWH

	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Generation 1998	39 040	67 183	6 277	116 953	154 340	383 793
Net imports 1998	-4 293	9 307		3 678	-10 810	-2 118
Total consumption 1998	34 747	76 490	6 277	120 631	143 530	381 675
Generation 1997	41 747	65 950	5 580	112 008	144 926	370 211
Net imports 1997	-7 255	7 655		4 017	-2 707	1 710
Total consumption 1997	34 492	73 605	5 580	116 025	142 219	371 921

TOTAL ENERGY SUPPLY

S24 TOTAL ENERGY SUPPLY 1989 - 1998, PJ



PROGNOSES

S25 GROSS CONSUMPTION OF ELECTRICITY 1998 AND PROGNOSES FOR 2000 AND 2005, TWH

Year	Denmark	Finland	Iceland	Norway ¹⁾	Sweden
1998	35	76	6.0	116	142
2000	35	78	7.3	116	146 ²⁾
2005	37	85	7.6	120	148 ²⁾

¹⁾ Excl. pumped storage power
²⁾ Prognoses based on the Climate Report issued by NUTEK.

S26 MAXIMUM SYSTEM LOAD 1998 AND PROGNOSES FOR 2000 AND 2005, MW

Year	Denmark	Finland	Iceland	Norway	Sweden
1998	7 350	12 190	961	21 600	24 600
2000 ¹⁾	7 460	13 700	1 070	21 900 ²⁾	27 450 ³⁾
2005 ¹⁾	7 760	15 000	1 125	22 800 ²⁾	27 890 ³⁾

1) Includes supply to electric boilers only for Iceland.
2) Consumption during a cold winter.
3) Prognoses based on the Climate Report issued by NUTEK.

S27 INSTALLED CAPACITY¹⁾ 1998 AND PROGNOSES FOR 2000 AND 2005, MW

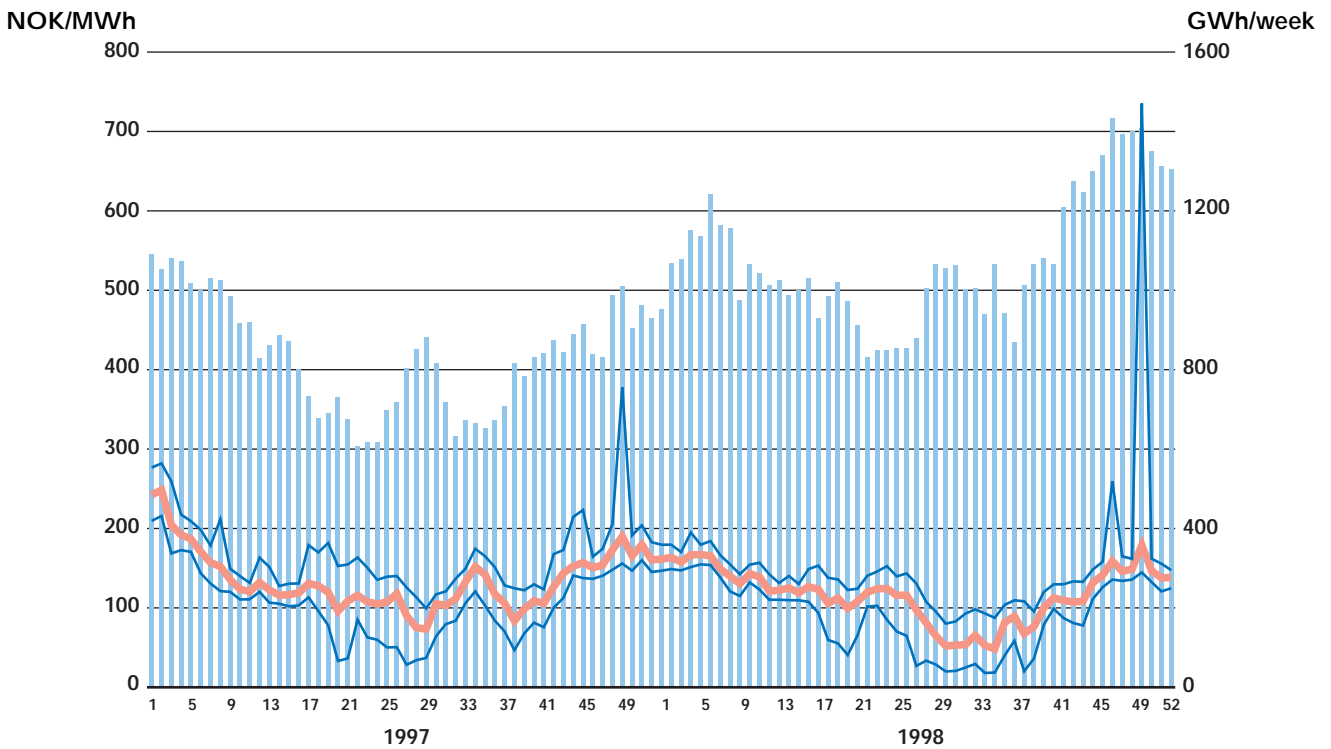
Year	Denmark	Finland	Iceland	Norway	Sweden
1998	12 423	16 458	1 213	27 690	31 994
2000	11 780	17 150	1 309	27 715	31 000
2005	11 650	²⁾	1 309	29 675	31 100

¹⁾ Refers to the sum of the rated net capacities of the individual power plant units in the power system, and should not be considered to represent the total capacity available at any single time.
²⁾ Prognoses not available.

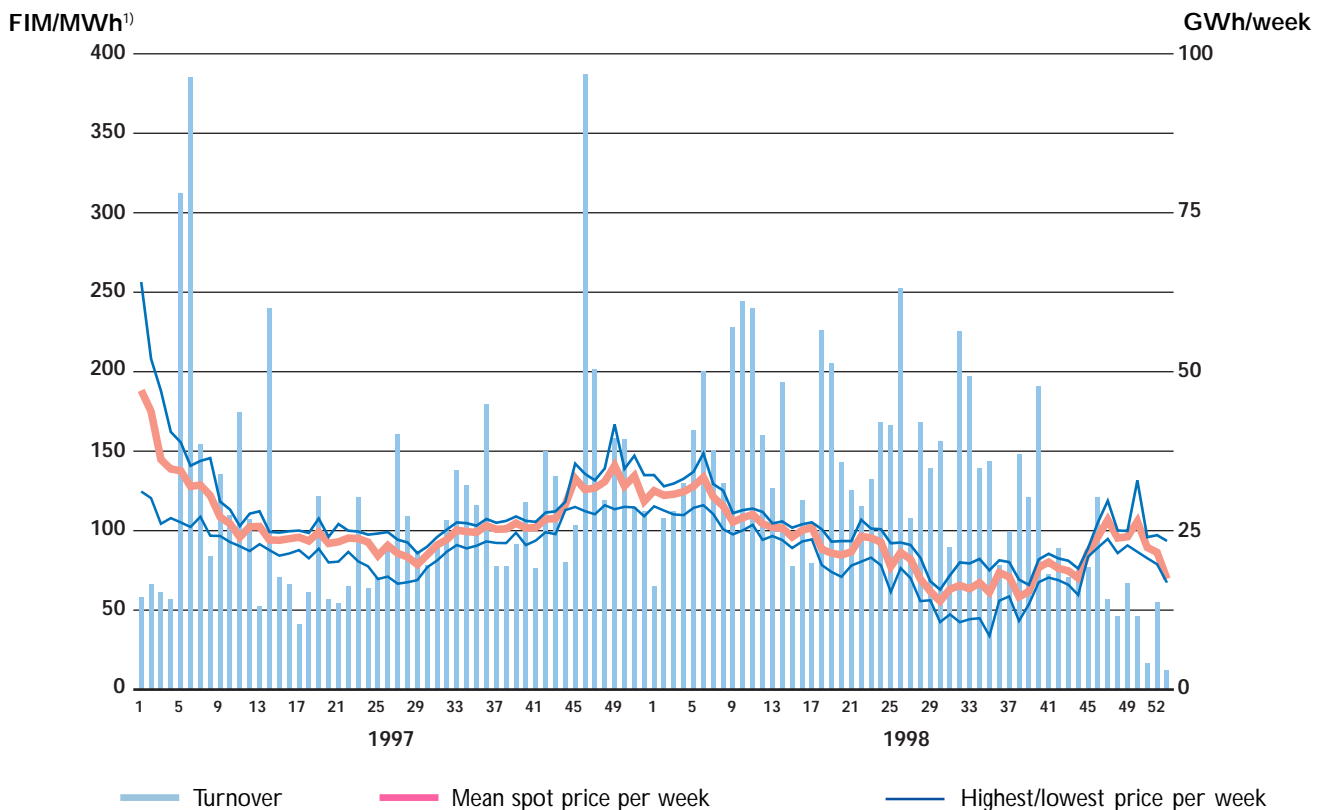
SPOT PRICES

S28 SPOT PRICES AND TURNOVER ON THE NORDIC ELECTRICITY EXCHANGES 1997 - 1998

Nord Pool ASA's spot market: Mean price (system price) and turnover per week



EL-EX's spot market: Mean price and turnover ²⁾ per week



¹⁾ The average NOK/FIM currency exchange rate was 0.7339 in 1997 and 0.7078 in 1998.

²⁾ Trading on EL-EX is based on the principle of continuous trading, which means that the turnover may be greater than the physical supply.

INFORMATION ON THE ENVIRONMENT

Environmental aspects play a central role in the electricity sector. Actors in this sector take an active part in the work under way within the European Union for development of programmes and rules in order to limit emissions harmful for the environment. Similarly, long-range measures have been taken to reduce emissions from power generation by introducing new combustion and purification techniques and by utilising CHP plants of high efficiency. The active trade in power between the Nordel countries has also helped reduce environmental impacts by ensuring that effective use is made of production resources.

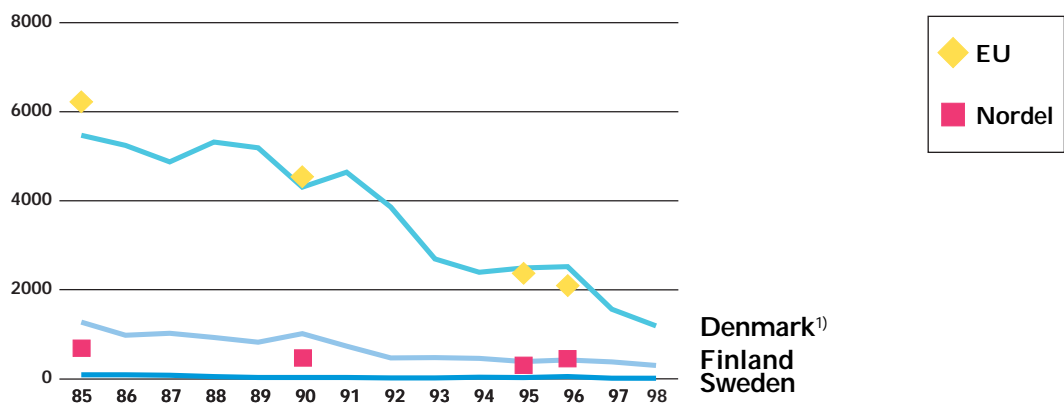
The diagrams below show the emissions of SO₂, NO₂ and CO₂ in relation to total electricity generation in each country. The high proportion of thermal power in the Danish and Finnish systems increases the emission figures in these countries. The Norwegian

and Icelandic emissions are negligible because virtually all electricity generation is based on hydropower and geothermal power.

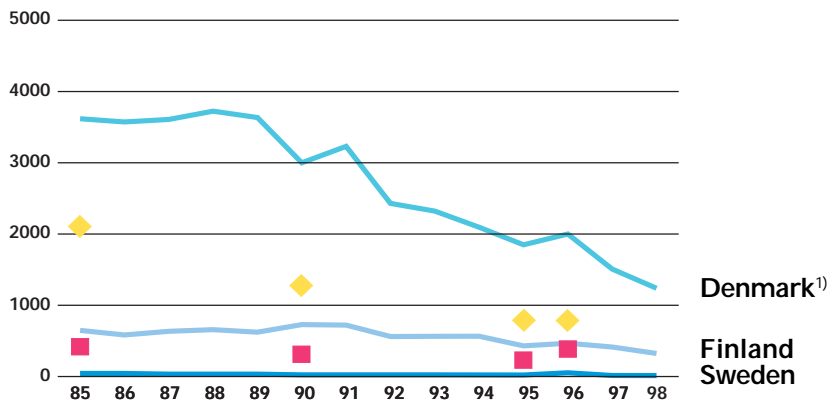
The emissions show a steady downward trend in the long term. The year 1996 was an exception because the unusually dry weather conditions led to a sharp increase in the consumption of fossil fuels. However, the data for 1997 and 1998 show that the general trend follows the previous pattern.

Average emissions within the EU and within Nordel are given for some reference years. On the whole, emissions from the Nordel countries seem to be somewhat lower. However, the diagrams should merely be considered as indicating a trend because, for instance, the exact proportions of emissions from combined heat and power generation cannot be defined without ambiguity.

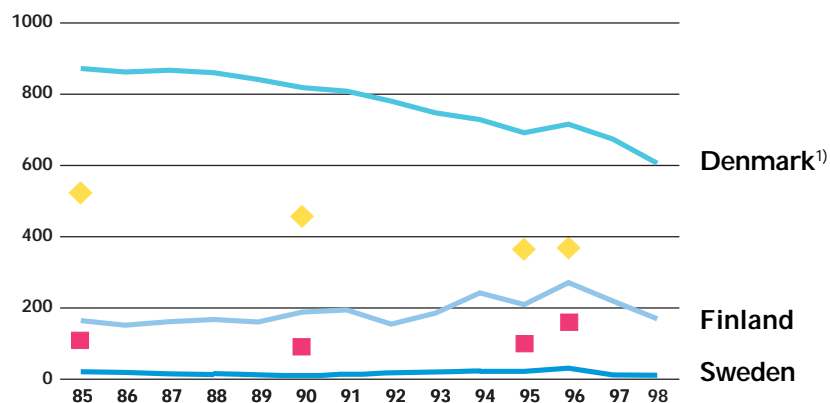
SO₂ - mg/kWh



NO₂ - mg/kWh



CO₂ - g/kWh



¹⁾ For Denmark, the figure shows only power production owned by power utilities, which represents about 90% of the total production.

THE NORDIC TRANSMISSION GRID TARIFFS ON 1 JANUARY 1999

Opening of the electricity market in the Nordic countries proceeds very rapidly. Norway, Sweden and Finland already have a joint electricity market, including an open grid, power exchange and balancing service/regulating market. Major changes are under way in Denmark, leading to a complete opening of the market in 2002. Development has proceeded rapidly in Jutland, and the Nordic Power Exchange, Nord Pool, is planning to establish the price area Jutland/Fyn by 1 July 1999. In Iceland, this process has not yet started.

Setting of transmission tariffs constitutes a very important aspect in the development of the Nordic electricity market. The most important goal in tariff setting is to promote competition on the electricity market. All Nordic transmission grid companies (except in Iceland) have therefore introduced the connection point tariff as an important element in an efficient electricity market. The basic principle is that actors pay for the right to feed in or to take out power at a connection point. Through this point, they have access to the entire network system and to the entire electricity market.

Another important element in implementation of an open and efficient Nordic electricity market is elimination of problems associated with transborder tariffs. In consequence, the transborder tariffs between Norway and Sweden and between Finland and Sweden have now been set at zero. There is also the goal to set the tariffs between Jutland and Zealand at zero.

Either counter trading or the price area model is applied for clearing bottlenecks within the Nordic power exchange area.

As the market is developed, competition works better and price setting becomes more effective. Differences between the alternatives available to various actors become sharper with time. The transmission grid tariff is one such differentiating factor.

Both the level and the structure of transmission grid tariffs vary from one Nordic country to the next. The extent of the national grid in relation to regional grids also plays a major role, and the structure of the regional grid tariffs is at least as important as the national grid tariff.

Figure 1 below shows a comparison between the mean transmission fees in the various countries. There are differences both in the total cost level and in the distribution of fees between feeding in and taking out power. In Finland about half of the 110 kV system as well is included in the comparison. Depending on these ownership relations, a network customer operating on the same voltage level in different countries may need to pay only the national grid fee or the regional grid tariff which includes the national grid fee.

The Nordic grid companies have launched harmonisation work in order to determine whether the differences in the setting of transmission grid tariffs distort competition on the electricity market in the Nordic countries and in order to make proposals for improvements with respect to the existing laws and regulations.

Mean transmission fees in the Nordic transmission grids

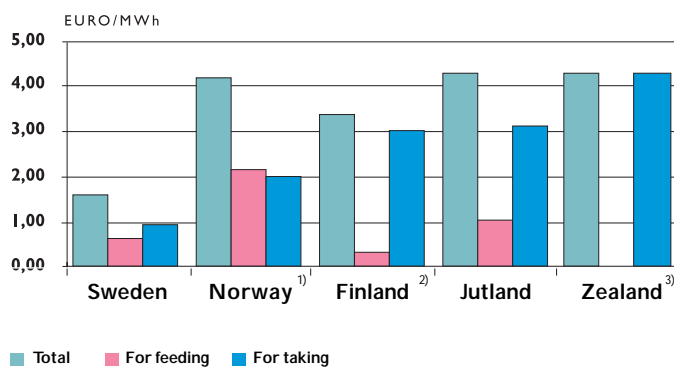


Figure 1

- 1) Statnett's tariff rose by ca. 1 öre/kWh because returns in 1998 were too low.
- 2) A considerable proportion of the 110 kV network, with switch plants and transformation from 110 kV up, is included in Fingrid's tariff.
- 3) The 400 kV network is included in Elkraft's tariff.

Mean fees at the most expensive and the cheapest points

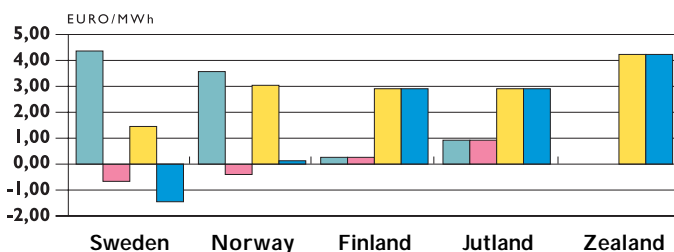


Figure 2

The mean fees over the year at the most expensive and at the cheapest connection points. Note the marked differences between the most expensive and the cheapest points in both Sweden and Norway.

More information on the transmission network tariffs in the individual countries is obtainable from the following Internet pages:

www.eltra.dk
www.elkraft-system.dk
www.fingrid.fi
www.statnett.no
www.svk.se

Exchange rates at the turn of the year:
 SEK 9,4969 / NOK 8,8770 / FIM 5,94573 / DKK 7,4497