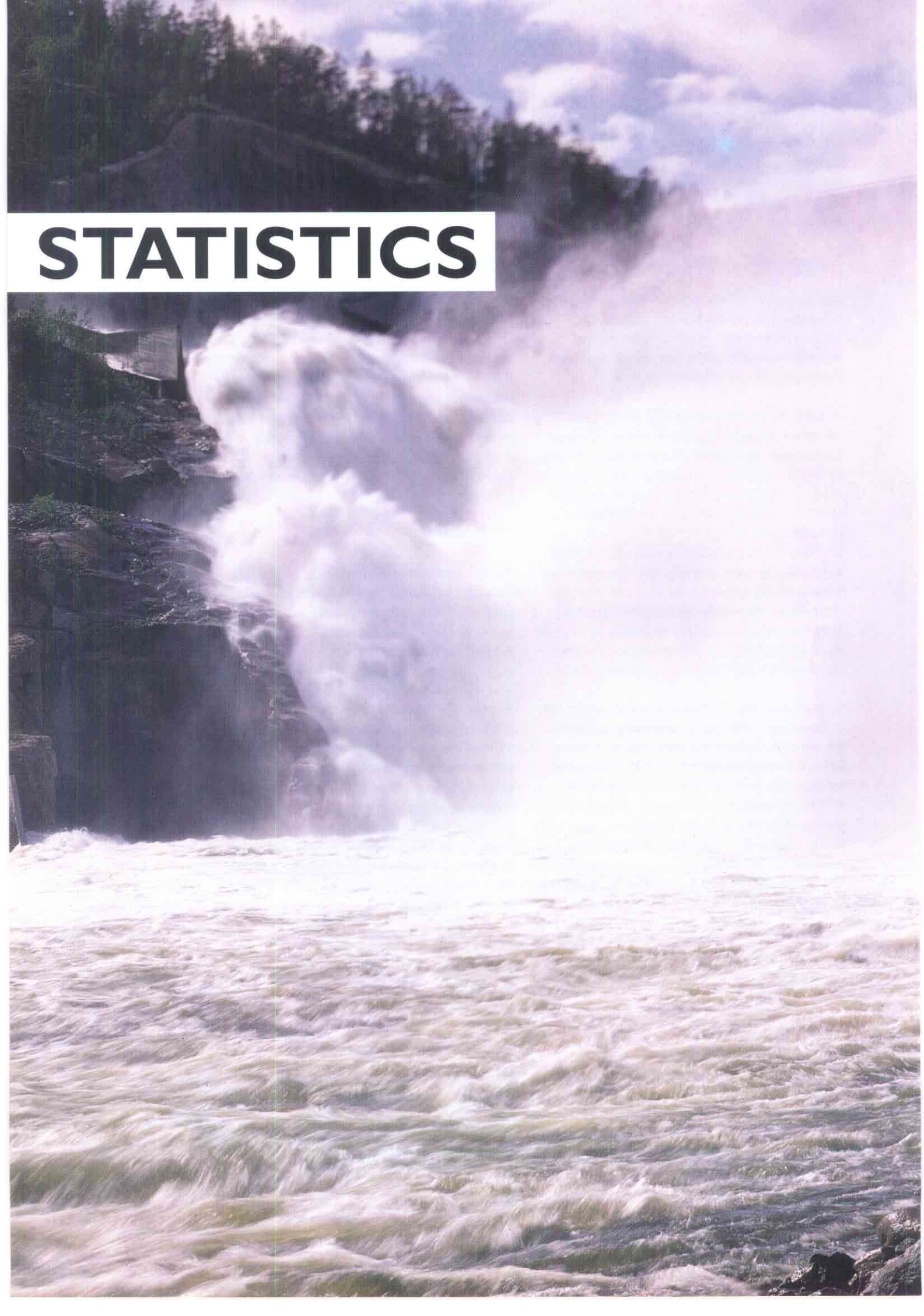


STATISTICS



Definitions

Expressions used in this report have the following meanings according to Nordel definitions:

Installed capacity is the installed generating capacity of a power station given in MW and constitutes the arithmetic sum of the rated capacity of the units installed.

Transmission capacity is the rated capacity in MW of a line with due regard taken to the limits imposed by the transformers connected to it.

Electricity generation is given in GWh and represents that output ex works the individual countries officially report, i.e. excluding own production at power station.

Back-pressure generation is the generation of electric energy by a generator set driven by steam which, when discharged from the turbine, is applied for a purpose irrelevant to power generation (such as district heating, process steam, etc.).

Condense power generation is defined as the output from a turbo-generator set operated by steam that is expanded in a cooling water condenser to enable the steam to be utilised exclusively for electric power generation.

Imports and exports is the exchange of power given in GWh for the commercial blocks of power delivered or received by the individual countries. **Net imports** is the difference between imports and exports.

Electrical energy turnover is given in GWh and is the sum of domestic generation and net imports.

Gross consumption of electrical energy is given in GWh and is the sum of domestic generation and net imports excluding electric boilers etc.

Net consumption of electrical energy is given in GWh and is the sum of power delivered to and metered at the consumers plus the power produced by industry for its own consumption.

Losses are defined as the difference between gross consumption and net consumption.

Occasional power to electric boilers is defined as intermittent deliveries of temporary surplus power for raising steam or district heating in electric boilers on terms agreed upon by the parties concerned.

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The statistics have been prepared before the individual countries' official statistics for 1993 are. Some figures in the annual report may therefore differ somewhat from the official statistics.

Units and Symbols

Power Units

kW = kilowatt

MW = megawatt = 1,000 kW

Energy Units

J = joule

kJ = kilojoule

PJ = petajoule = 10^{15} J = 23.9×10^3 toe

kWh = kilowatt-hour = 3,600 kJ

MWh = megawatt-hour = 1,000 kWh

GWh = gigawatt-hour = 1 million kWh

TWh = terawatt-hour = 1,000 GWh = 1 mia. kWh

Mtoe = 1 million tons of oil equivalent
corresponds to 11.63 TWh

Symbols

~ Alternating current (AC)

= Direct current (DC)

Installed capacity

In 1993 the total net capacity in the Nordel countries increased by 1 374 MW to 87 778 MW (including 522 MW wind power).

Of the total installed capacity almost 54% consisted of hydro power. At the end of the year, the nuclear capacity was 12 310 MW, installed in Sweden and Finland.

The distribution of hydro and thermal power differs considerably between the Nordel countries.

In Denmark the generating plants are almost entirely thermal, whereas in Norway they are hydro. In Iceland hydro power dominates, while Sweden has somewhat more thermal than hydro installations. In Finland thermal power was about 80% of the installed capacity.

SI Installed capacity on December 31, 1993 and corresponding average-year generation by hydro power

		Denmark	Finland	Iceland	Norway	Sweden	Nordel
● Hydro power	MW	10	2 802	875	27 013	16 451 ²⁾	47 151
● Nuclear power	MW	—	2 310	—	—	10 000	12 310
● Conv. thermal power	MW	9 794	9 200	119	278	8 354	27 745
of which:							
● Back-pressure	MW	856	4 748	—	165	3 676	9 445
● Condense	MW	8 639 ¹⁾	3 582	—	78	2 740	15 039
● Gasturbine, diesel etc.	MW	299	870	119	35	1 938	3 261
● Geothermal power	MW	—	—	50	—	—	50
Total installed capacity 1993	MW	9 804	14 312	1 044	27 291	34 805	87 256 ³⁾
Commissioned in 1993	MW	220	832	5	68	295	1 420
Decommissioned in 1993	MW	—	66	—	13	17	96
Hydro power, average-year generation	GWh	35	12 530	4 950	109 627	63 500	190 642
Hydro power generation, change	GWh	—	70	—	273	—	343

1) Incl. German share of Enstedværket (300 MW)

2) Incl. Norwegian share of Linnvasselv (25 MW)

3) In addition there is 522 MW wind power capacity, of which 486 MW in Denmark, 4 MW in Finland, 3 MW in Norway and 29 MW in Sweden.

S2. Changes in installed capacity 1993 (larger than 10 MW)

Power category/plant	Commissioned	Decommissioned	Change in average-year generation	Type of fuel 1)
	MW	MW	GWh	
DENMARK				
● Conv. thermal power, total	220	—		
of which:				
Decentralized CHP-stations	220	—		Different types
FINLAND				
● Hydro power, total	54	—	70	
of which:				
Isohaara	54	—	70	
● Wind power, total	4	—	8	
● Conv. thermal power, total	778	66		
of which:				
Meri-Pori	560			C
Uimaharju	105	12		W
Kotka	68			G/W
Kaukopää		13		W
Myllypuro		22		C
ICELAND				
● Geothermal power, total	5	—		
NORWAY				
● Hydro power, total	68	13		
of which:				
Different stations ²⁾	68	13	273	
SWEDEN				
● Hydro power, total	71	—		
of which:				
Trollhättan	56	—		
● Conv. thermal power, total	215	17		
of which:				
Halmstad	172	—		G

1) C=Coal, G=Gas, W= Waste, Garbage

2) 13 power stations, mainly modernization/expansion of existing plants

S3 Decided power plants (larger than 10 MW)

Power category/Plant	Capacity	Estimated commissioning	Average-year generation	Type of fuel ¹⁾
	MW	Year	GWh	
DENMARK				
● Conv. thermal power				
Svanemølleværket	80	1994		G
Østkraft	37	1995		C
Silkeborg	104	1995		G
Næstved	32	1995		W/G
Ringsted	18	1995		G
Sønderborg	52	1996		W/G
Skærbærværket	394	1997		G
Nordjyllandsværket	385	1998		C/O
FINLAND				
● Hydro power				
Koivukoski	25	1995	20	
Vuotos	35	2001	140	
● Conv. thermal power				
Mussalo	90	1994		G
Toppila 2	50	1995		P
Martinlaakso	70	1995		G
Rovaniemi	30	1996		P
Vuosaari B	450	1997		G
NORWAY				
● Hydro power				
Meråker ²⁾	97	1994	436	
Tevla ²⁾	50	1994	98	
Hekni ²⁾	56	1995	230	
Asebotn ²⁾	15	1995	85	
Svartisen II ²⁾	40	1998	251	
Different projects ³⁾	951		1610	
SWEDEN				
● Hydro power				
Klippen	27	1994	97	
● Conv. thermal power				
Nyköping	34	1994		
Linköping	50	1994		
Enköping	23	1994		
Kristianstad	15	1995		

1) O=Oil, C=Coal, G=Gas, P=Peat, W=Waste, Garbage

2) Under construction

3) Commissioning not yet decided

The Grid System in the Nordel Countries

At the end of the year, the total transmission capacity between the Nordel countries was about 5 600 MW in both directions.

Sweden is electrically connected to Denmark, Finland and Norway. Between Denmark and Norway there are 2 DC cable connections. Between Finland and Norway there is a 220 kV

link, and a few lines from Norway to Finland for local consumption. Between Denmark and Germany there are 220 kV and 400 kV interconnection links. Between Finland and Russia there are 85 kV and 110 kV interconnection links. Between Norway and Russia there is a 154 kV interconnection.

S4 Existing interconnections between the Nordel countries

Countries Terminal stations	Rated voltage, kV	Transmission capacity as per design rules ¹⁾ , MW		Total lines, km	Of which cable, km
DENMARK-NORWAY Tjele-Kristiansand	±250=	From Denmark	To Denmark 1 040	240/pol	127/pol
FINLAND-NORWAY Ivalo-Varangerbotn	220~	From Finland	To Finland 100	228	—
DENMARK-SWEDEN		From Sverige	To Sverige		
Teglstrupgård-Sofiero	132~	350 ¹⁾	350 ¹⁾	23	10
Hovegård-Helsingborg nr 1	400~	700 ¹⁾	1 100 ¹⁾	91	8
Hovegård-Helsingborg nr 2	400~			91	8
Vester Hassing-Göteborg	250=	290	280	176	87.5
Vester Hassing-Lindome	285=	380	360	149	87.1
Hasle (Bornholm)-Borby	60~	60	60	47.6	43.3
FINLAND-SWEDEN					
Ossauskoski-Kalix	220~	950	750	93	—
Petäjäskoski-Letsi	400~			230	—
Keminmaa-Svartbyn	400~			134	—
Hellesby(Åland)-Skattbol	70~	35	35	76.5	56
Raumo-Forsmark	400=	500	500	235	198
NORWAY-SWEDEN					
Sørnes-Tornehamn	132~	125	125	39	—
Ritsem-Ofoten	400~	550	550	58	—
Røssåga-Ajaure	220~	250 ²⁾	250 ²⁾	117	—
Linnvasselv, transformer	220/66~	50	50	—	—
Nea-Järpströmmen	275~	450 ²⁾	450 ²⁾	100	—
Lutufallet-Höljes	132~	40	20	17.5	—
Eidskog-Charlottenberg	132~	100	100	13	—
Hasle-Borgvik	400~	1500 ²⁾	1500 ²⁾	106	—
Halden-Skogssäter	400~			135	—
TOTAL		5605	5625		

^{*)} Maximum permissible exchange

¹⁾ The values 700 MW and 1 100 MW respectively apply to the interconnections in parallel operation of the 132 and 400 kV interconnections. The transmission capacity may often be higher. It depends on the actual situation of generation and load conditions.

²⁾ The transmission capacity may under certain operating conditions be reduced due to transit of Norwegian supply through the Swedish network

The Grid System in the Nordel Countries

S5 Existing interconnections between Nordel and other countries

Countries Terminal stations	Rated voltage kV	Transmission capacity MW		Total lines km	Of which cable km
		From Nordel	To Nordel		
DENMARK-GERMANY					
Kassø-Audorf	2 x 400~] 1 400 ¹⁾] 1 400 ¹⁾	107	—
Kassø-Flensburg	220~			40	—
Ensted-Flensburg	220~			34	—
FINLAND-RUSSIA					
Imatra-GES 10	110~	—	100	20	—
Ylikkälä-Viborg	±85=	—	900	—	—
Nellimö-Kaitakoski	110~	60	60	20	—
NORWAY-RUSSIA					
Kirkenes-Boris Gleb	154~	50	50	10	—

1) Transmission capacity alters between 1 200 and 1 500 MW due to prevailing operating conditions.

S6 Decided interconnections between Nordel countries

Countries Terminal stations	Rated voltage kV	Transmission capacity as per design rules MW		Total lines km	Of which cable km	Brought into service year
		To/From ELKRAFT To/From ELSAM				
DENMARK-DENMARK ELSAM - ELKRAFT	400=	600	600	70	70	1997

The Grid System in the Nordel Countries

S7 Decided interconnections between Nordel and other countries

Countries Terminal stations	Rated voltage kV	Transmission capacity		Total lines km	Of which cable km	Brought into service year
		MW				
		From Nordel	To Nordel			
DENMARK - GERMANY Bjæverskov - Rostock	400 =	600	600	181	166	1995
NORWAY - GERMANY Lista - Unterweser	400-500 =	600	600	approx. 500	approx. 500	2003 ¹⁾
SWEDEN - GERMANY Arrie - Lübeck	450 =	600	600	250	220	1994

^{*)} The contract starts in 1998 by 400 MW transmission capacity through Skagerak 1 and 2 as transit through Denmark.
This contract terminates when the cable interconnection is completed in 2003

S8 Transmission lines 110 - 400 kV

	400 kV, AC and DC In service Dec. 31, 1993 km	220-300 kV, AC and DC In service Dec. 31, 1993 km	110, 132, 150 kV In service Dec. 31, 1993 km
● Denmark	1 082 ¹⁾	247 ²⁾	3 700 ³⁾
● Finland	3 587 ⁴⁾	2 660	14 600
● Iceland	—	492	1 315
● Norway	1 986 ³⁾	5 228 ^{2) 5)}	10 000
● Sweden	10 587 ⁴⁾	4 621 ²⁾	15 000

1) Of which 129 km in service with 150 kV and 46 km with 132 kV

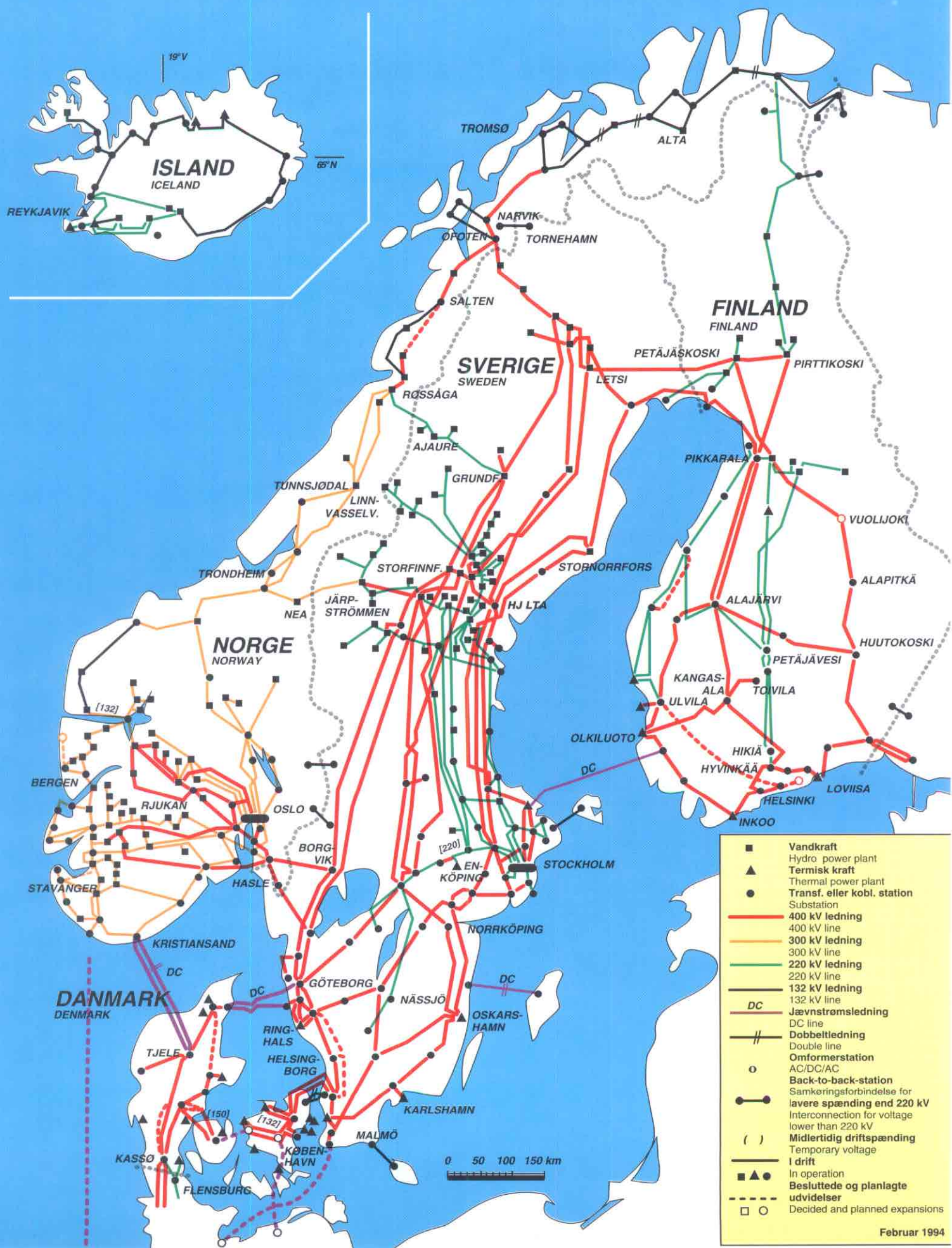
2) Of which 80 km in Denmark and 96 km in Sweden (Kontiskan), 89 km in Denmark and 151 km in Norway (Skagerrak) in service with 250 kV DC and 75 km in Denmark and 74 km in Sweden (Kontiskan 2) in service with 285 kV DC.

3) Of which 13 km in service with 60 kV and 113 km with 50 kV

4) Of which 99 km in Finland and 99 km in Sweden DC submarine cable, and 34 km in Finland and 2 km in Sweden DC land-cable (Fenno-Skan)

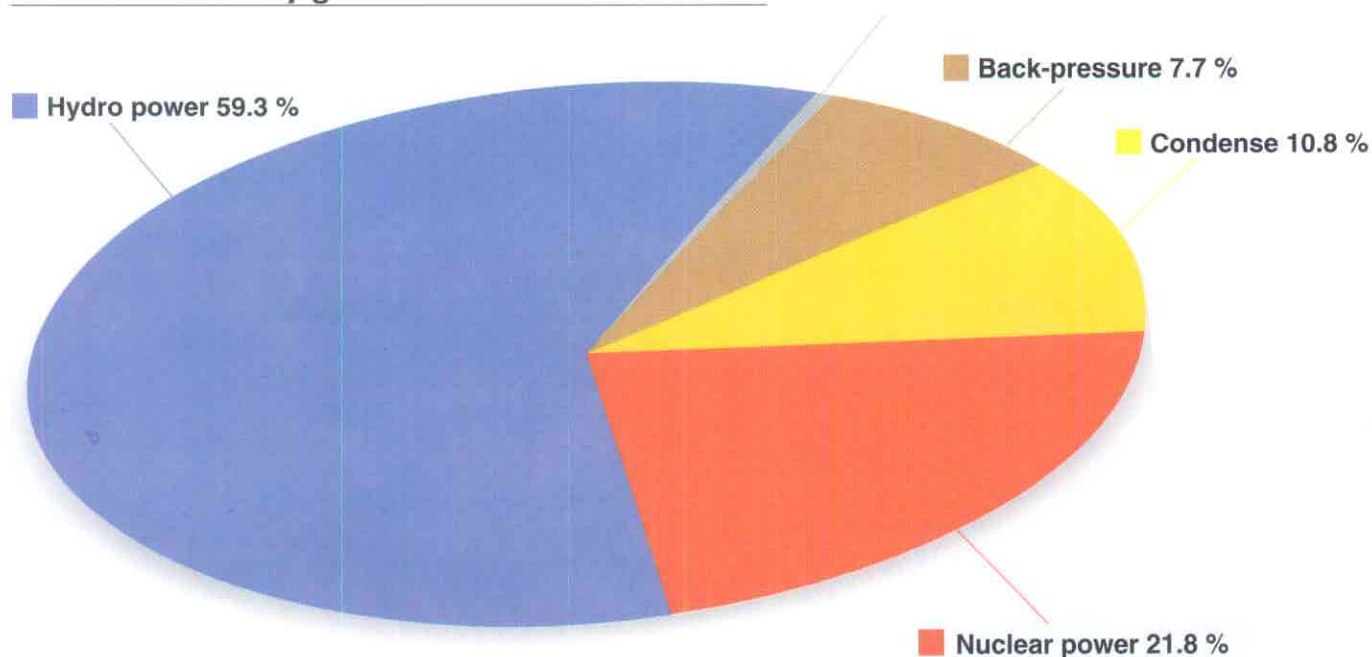
5) Of which 106 km in service with 66 kV.

The Nordel main grid



Electricity generation

S10 Total electricity generation within Nordel 1993 ■ Others 0.4 %



S 11 Electricity generation 1993, GWh

	Denmark	Finland	Iceland	Norway	Sweden	Nordel
● Hydro power	26	13 460	4 463	119 670	73 262 ³⁾	210 881
● Nuclear power	—	18 766	—	—	58 883	77 649
● Conv. thermal power of which:	30 954	25 871	—	416	8 483	65 724
● Condense	30 454 ¹⁾	7 309	—	128	468	38 359
● Back-pressure	500	18 562	—	288	8 015	27 365
● Others of which:	1 014	9	258	7	193	1 481
● Wind power	1 014	4	—	—	51	1 069
● Geothermal power	—	—	254	—	—	254
● Gasturbine, diesel etc.	—	5	4	7	142	158
Total generation 1993	31 994 ²⁾	58 106	4 721	120 093	140 821	355 735
Change as against 1992	11.3%	5.7%	4.0%	2.3%	- 0.5%	2.4%

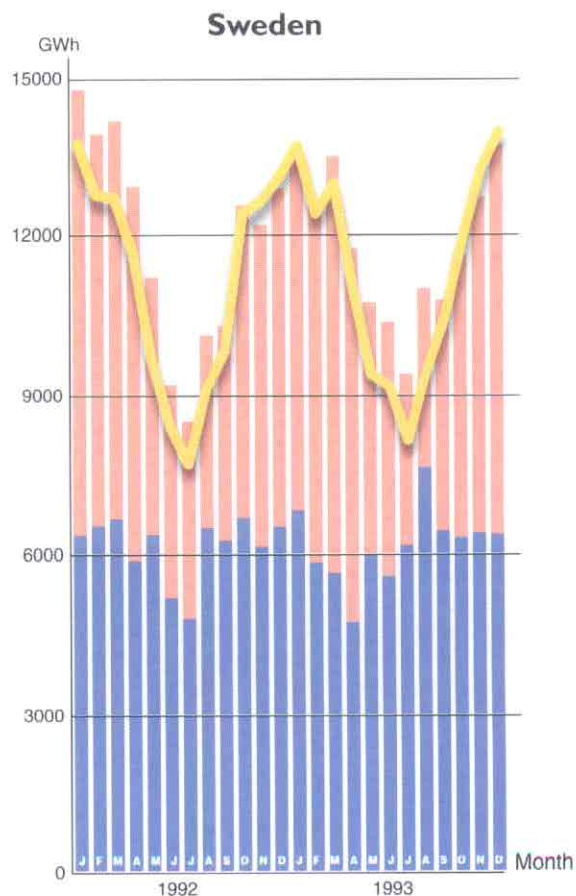
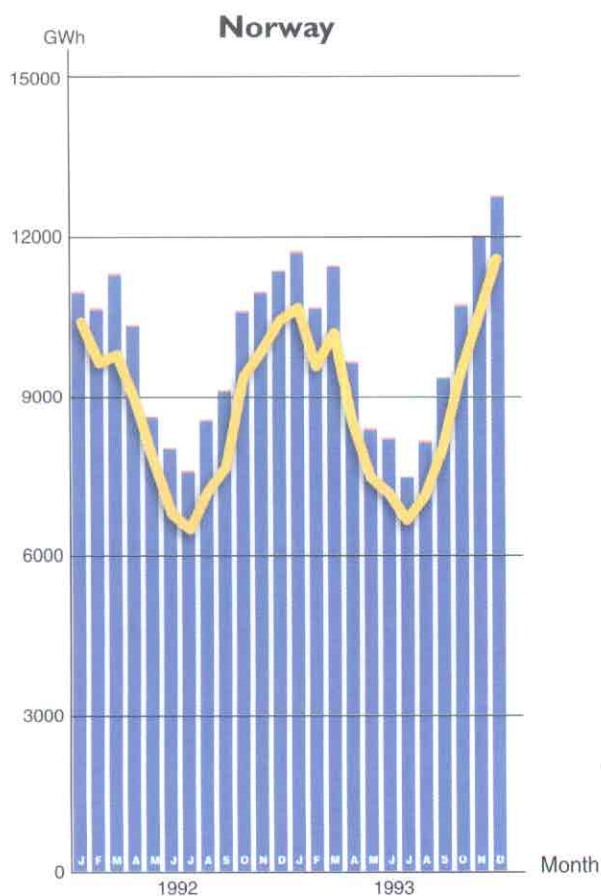
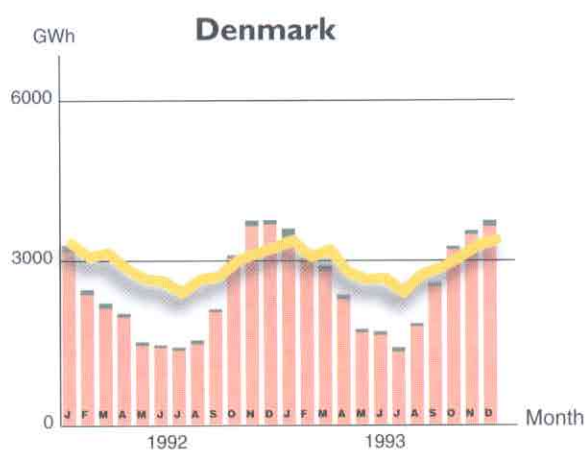
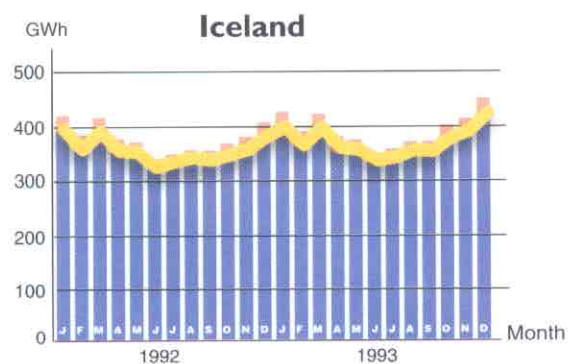
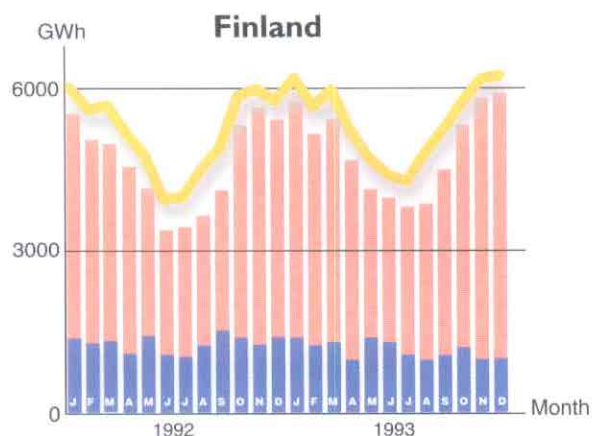
1) Incl. generation in combined heat and power stations

2) Of which German share of Enstedværket 2 158 GWh

3) Of which Norwegian share of Linnvasselv 108 GWh

S12 Monthly electricity generation and gross consumption 1992-1993, GWh

■ Hydro power ■ Wind power
■ Thermal power ■ Gross consumption



Load, electrical energy turnover

SI4 Maximum og minimum load on the 3rd Wednesday in January and in July 1993

	Installed capacity 31.12.93 MW	Maximum og minimum system load 1993							
		3rd Wednesday in January				3rd Wednesday in July			
		Local time	Max MW	Local time	Min MW	Local time	Max MW	Local time	Min MW
● Denmark ¹⁾									
West of the Great Belt (ELSAM)	5 200 ²⁾	08-09	3 084	02-03	1 569	09-10	2 099	03-04	1 196
East of the Great Belt excl. Bornholm (ELKRAFT)	3 914	17-18	2 294	02-03	1 229	11-12	1 470	04-05	787
● Finland	14 316	08-09	9 712	03-04	7 688	11-12	6 205	04-05	4 696
● Iceland	1 044	18-19	584	03-04	472	15-16	467	05-06	373
● Norway	27 294	09-10	16 534	03-04	13 176	11-12	9 422	02-03	7 582
● Sweden	34 834 ³⁾	08-09	21 004	02-03	14 010	11-12	11 996	04-05	7 847
Nordel excl. Iceland Central-European time	85 558	08-09	52 527	03-04	37 798	11-12	31 229	04-05	22 185

1) Public utilities excl. wind power. To some extent the capacity is not available, e.g. foreign owned plants, and plants out of operation for long-term

2) Of which German share of Enstedværket 300 MW

3) Of which Norwegian share of Linnvasselv 25 MW

SI5 Electrical energy turnover in 1993, GWh

	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Generation	31 994	58 106	4 721	120 093	140 821	355 735
Imports	6 247	7 926	—	697	7 979	4 858 ²⁾
Exports	5 093 ¹⁾	385	—	8 488	8 566	4 541 ²⁾
Total electrical energy turnover	33 148	65 647	4 721	112 302	140 234	356 052
Change as against 1992	1.9%	3.9%	4.0%	3.1%	1.0%	2.3%

1) Of which German share of Enstedværket 2 158 GWh

2) Imports/exports to and from countries outside Nordel

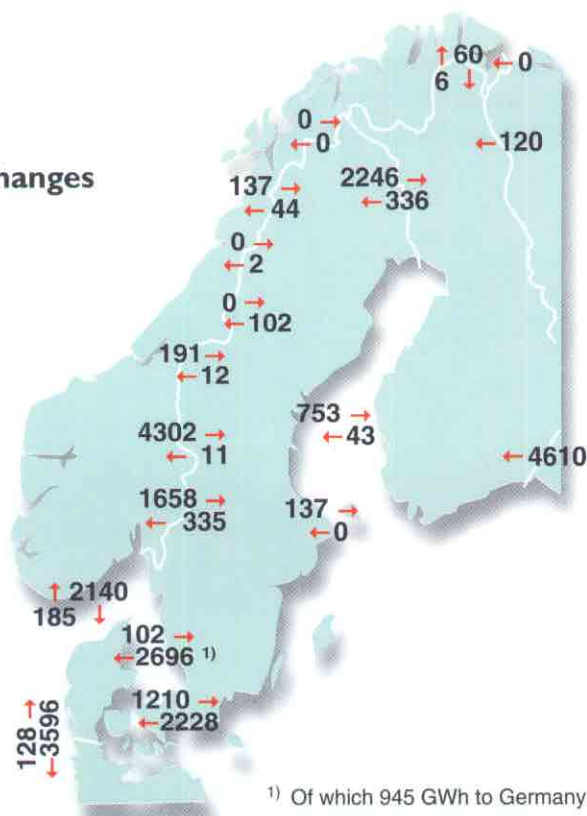
Exchange of electrical energy

S16 Exchange of electrical energy between the Nordel countries 1963 - 1993, GWh



Exchange of electrical energy

S17 Electrical energy exchanges within Nordel in 1993, GWh



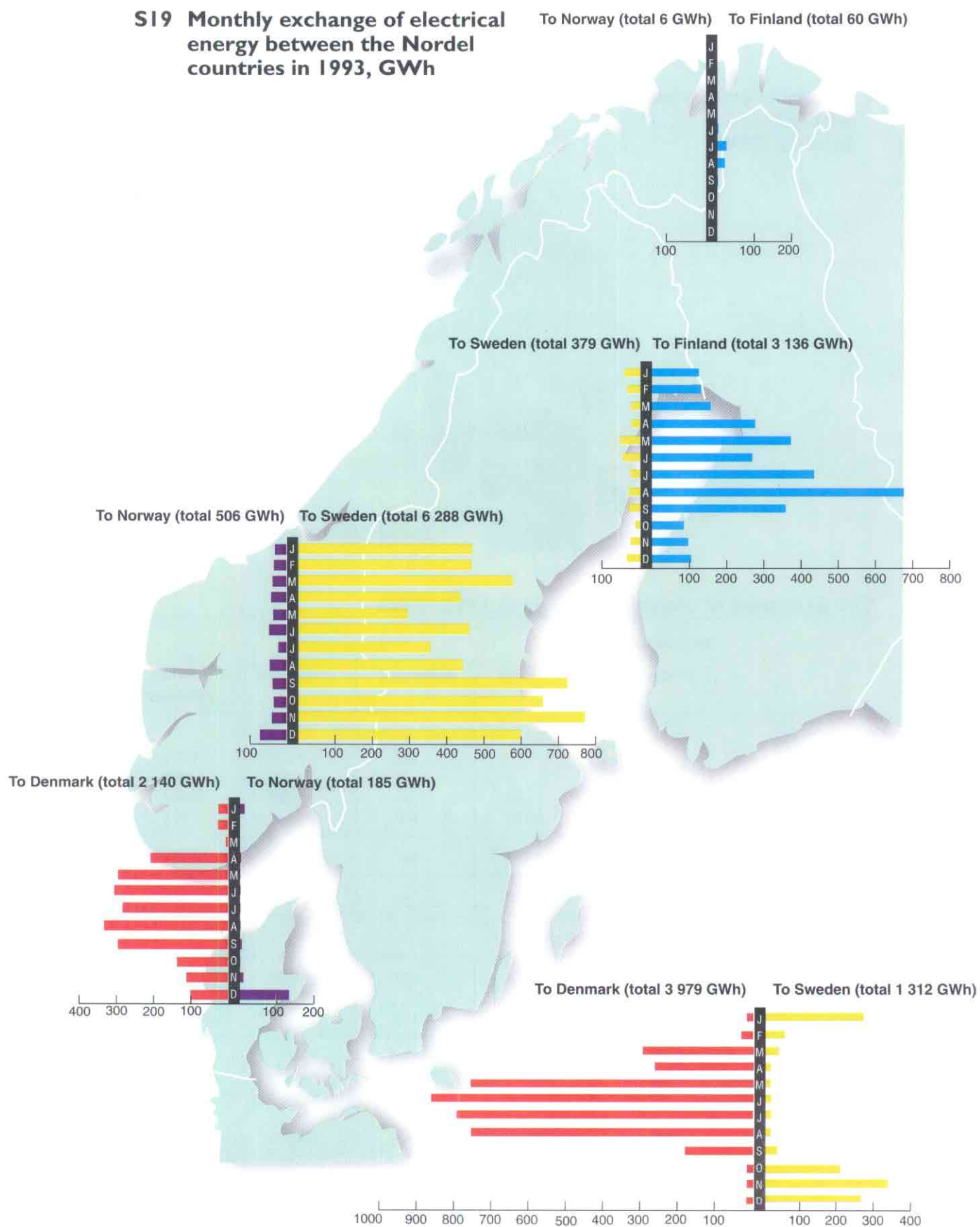
S18 Exchange of electrical energy in 1993, GWh

	Imports to:				Nordel countries	Other countries
	Denmark	Finland	Norway	Sweden		
Exports from:						
Denmark	—	—	185	1 312	1 497	3 596 ¹⁾
Finland	—	—	6	379	385	—
Norway	2 140	60	—	6 288	8 488	—
Sweden	3 979	3 136	506	—	7 621	945
Nordel countries	6 119	3 196	697	7 979	17 991	4 541
Other countries	128	4 730	—	—	4 858	—
Total imports 1993	6 247	7 926	697	7 979	22 849	
Total exports 1993	5 093 ¹⁾	385	8 488	8 566	22 532	
Net imports 1993						
Imports(+) - Exports(-)	1 154	7 541	- 7 791	- 587	317	
Net imports/ Gross consumption	3.5%	11.5%	- 7.5%	- 0.4%	0.1%	

1) Of which German share of Enstedværket 2 158 GWh

Exchange of electrical energy

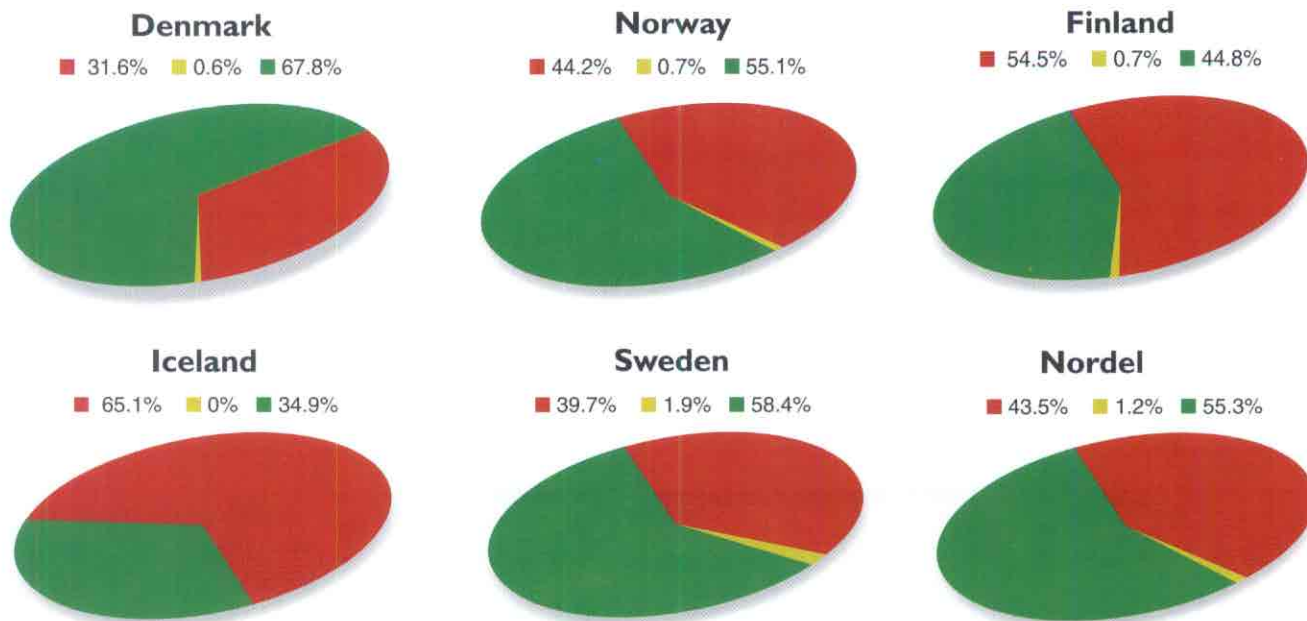
S19 Monthly exchange of electrical energy between the Nordel countries in 1993, GWh



Electricity consumption

S20 Net consumption distributed on consumer groups in 1993

■ Industry
■ Traction
■ Domestic, commercial etc.

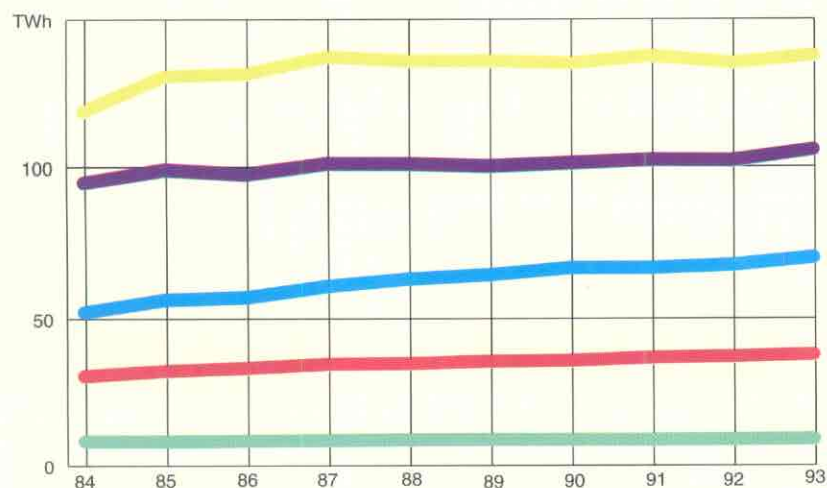


S21 Electricity consumption in 1993, GWh

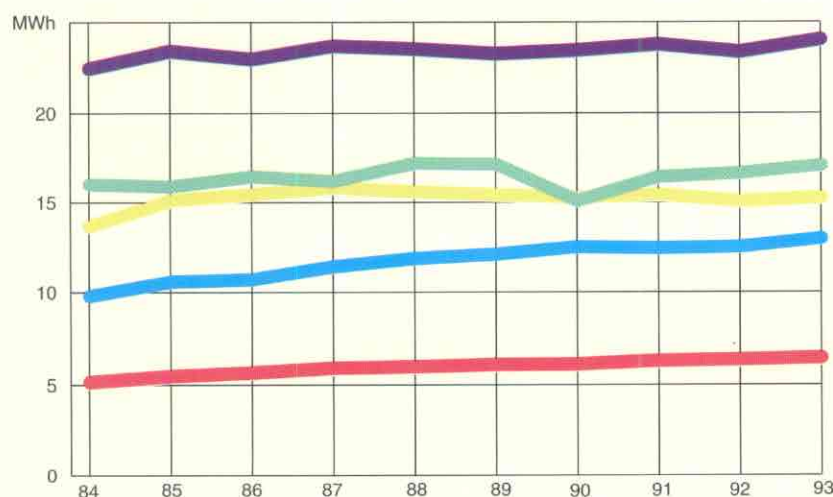
	Denmark	Finland	Iceland	Norway	Sweden	Nordel
Electrical energy turnover	33 148	65 647	4 721	112 302	140 234	356 052
Occasional power to electric boilers etc.	—	124	219	8 861 ¹⁾	7 187	16 391
Gross consumption	33 148	65 523	4 502	103 441	133 047	339 661
Losses etc.	2 050	2 793	386	8 399	8 381	22 009
Net consumption of which:	31 098	62 730	4 116	95 042	124 666	317 652
■ Industry	9 817	34 180	2 679	42 005	49 452	138 133
■ Traction	200	450	—	680	2 400	3 730
■ Domestic, commercial etc.	21 081	28 100	1 437	52 357	72 814	175 789
Change in gross consumption as against 1992	2.0 %	3.9 %	4.2 %	3.4 %	2.0 %	2.8 %
Average change in gross consumption during the last 10 years	2.6 %	3.9 %	1.8 %	1.5 %	2.1 %	2.2 %
Gross consumption per inhabitant (kWh)	6 387	12 929	17 053	23 984	15 214	14 405
Average population 1993 (mill. inh.)	5.19	5.07	0.26	4.31	8.75	23.58

1) Of which pumped storage power 550 GWh

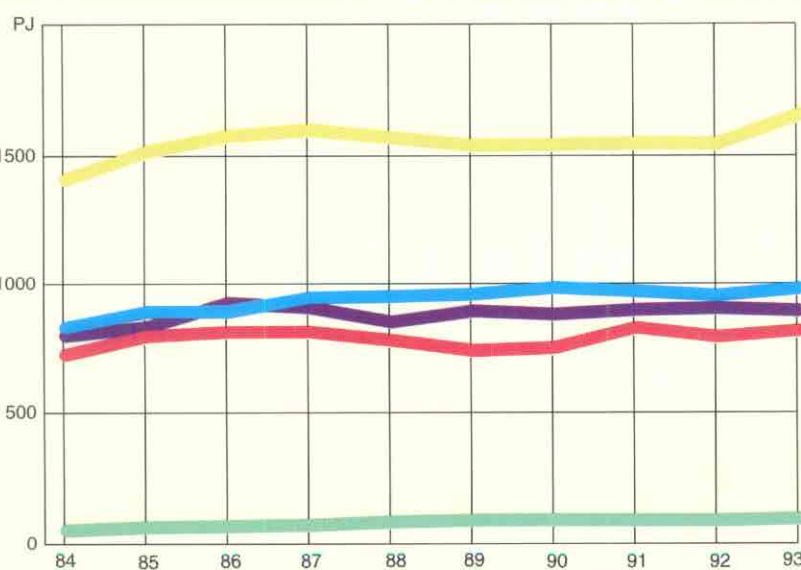
Electricity consumption



S22
Gross consumption
1984-1993, TWh



S23
Gross consumption
per inhabitant
1984 - 1993, MWh

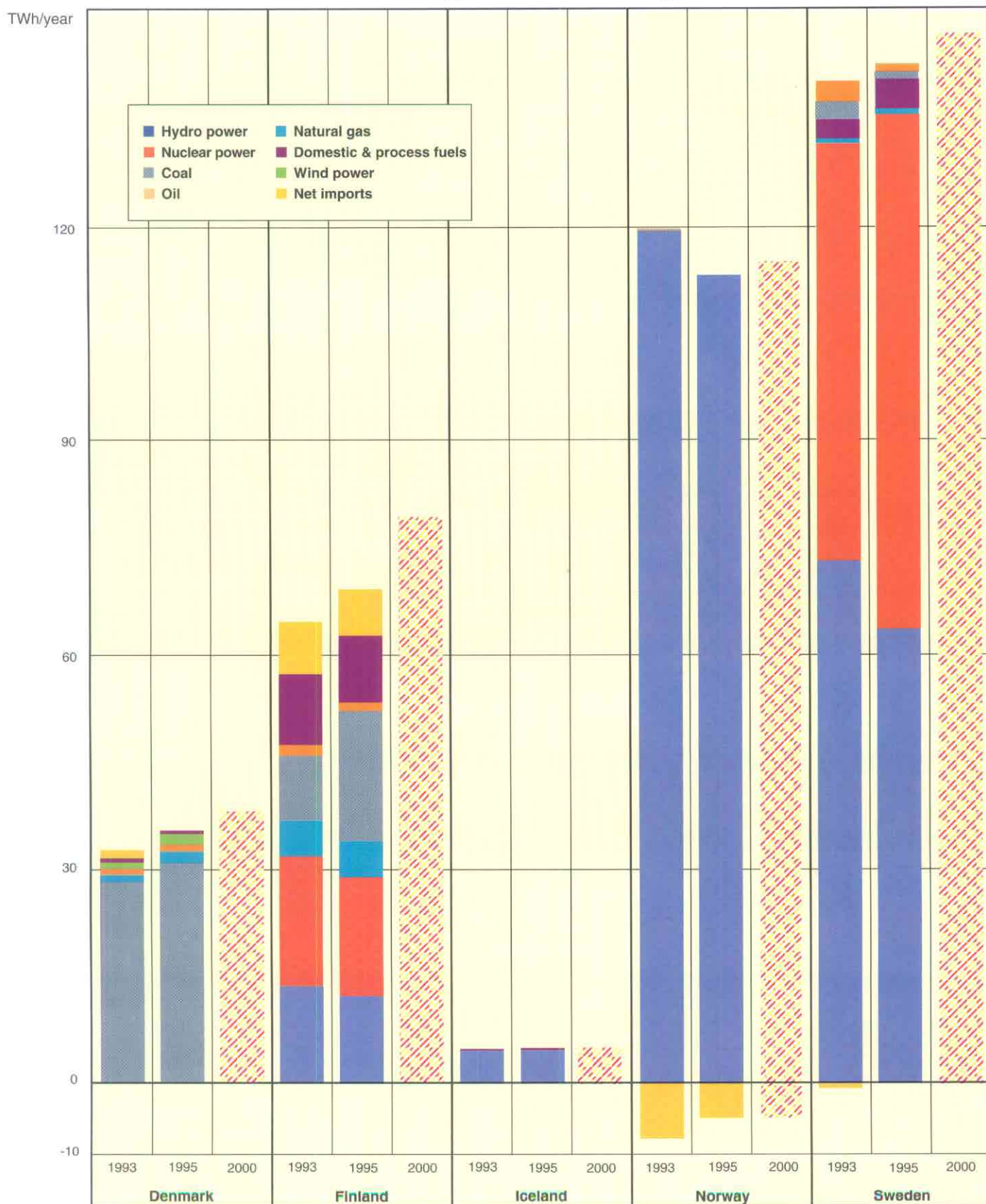


S24
Total energy supply
1984 - 1993, PJ

■ Denmark
■ Sweden
■ Norway
■ Finland
■ Iceland

Forecasts

S25 Distribution of electrical energy turnover on energy sources, 1993, 1995 and 2000



S26 Gross consumption in 1993 and forecast for 1995 and 2000, TWh/year

Year	Denmark	Finland	Iceland	Norway	Sweden	Nordel
1993	33.1	65.5	4.5	103.4	133	339.5
1995	36	70.5	4.6	104-106	137	352-354
2000	39	79	4.8	106-112	147	376-382

S27 Peak load demand in 1993 and forecast for 1995 and 2000, MW

Year	Denmark	Finland	Iceland	Norway	Sweden	Nordel
1993	6 050	10 400	670	18 040	24 400	59 560
1995	7 158	12 400	690	18 600-19 000	27 500	66 348-66 748
2000	7 810	13 900	740	20 100-21 500	29 000	71 550-72 950

S28 Installed capacity in 1993 and forecast for 1995 and 2000, MW

Year	Denmark	Finland	Iceland	Norway	Sweden	Nordel
1993	9 804	14 312	1 044	27 291	34 805	87 256
1995	9 650	14 700	1 050	27 509	35 400	88 309
2000	11 050	16 400	1 050	27 549	35 900	91 949

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