

ENERGY IN NORWAY

Production and consumption of electric energy in 2008

	Preliminary figures	
	GWh	% change 2007/2008
Hydropower production	140522	4.3
+ Thermal power production	1228	
+ Wind power production	917	
= Total power production	142667	4.0
+ Imports	3414	
- Exports	17291	
= Gross consumption (total)	128790	1.3
- Non-priority power ¹⁾	8000	
- Pumped storage power	1384	
- Losses	10507	
= Net consumption, firm power	108899	0.4
Of which:		
Energy intensive industry	32151	
General consumption	76748	
Gross consumption, firm power	117539	0.0
Of which:		
Energy intensive industry	33116	-0.6
General consumption	84423	0.3
General consumption, gross, adjusted for temperature conditions	88288	1.1

¹⁾ Estimated by NVE

2009 - EDITION

The production of electric energy in 2008 was 142.7 TWh, an increase of 4.0 percent compared to 2007. 98.5 percent of the production was hydropower. Total inflow in 2008 was 110 percent of normal as against 118 percent in 2007. The energy content of the reservoirs at the end of 2008 was 57.3 TWh, which is 68.0 percent of the total capacity, a decrease of 7.6 TWh from the end of previous year.

During the past 10 years (1998-2008) an average annual increase in production of 2.0 percent is observed.

At the end of 2008, the production from the Norwegian hydropower system is estimated at 122.7 TWh for years with average inflow.

Domestic gross consumption was 128.8 TWh, an increase of 1.3 percent compared to 2007. The gross general consumption increased by 0.3 percent. However, 2008 was considerable warmer than normal. Adjusted for temperature conditions, the general consumption increased by 1.1 percent. Average annual increase over the past 10 years has been 0.9 percent.

The maximum system power load in 2008 related to domestic consumption was 21589 MW.

In 2008, the power station installed capacity increased by 452 MW, an increase of 1.5 percent. Average annual increase in installed capacity over the past 10 years has been 1.1 percent.

As of 31 December 2008, the total installed capacity of the Norwegian power system (hydro, wind and thermal power stations) was 30807 MW, of which 95.7 percent is hydropower.

Data in this folder concerning the electricity supply for 2007 and earlier years, are all taken from Norwegian Official Statistics (Electricity Statistics). Information about individual power stations and reservoirs is obtained directly by the Norwegian Water Resources and Energy Directorate. The figures for 2008 are based on preliminary data from Statistics Norway and other sources, and must be regarded as approximate values. The table on oil and gas resources is based on information from the Directorate of Petroleum.

Statistics Norway is also the source for the tables giving district heating, production of important forms of energy, domestic deliveries of petroleum products, final energy consumption and the energy balance.

Units for power:
1 W (watt) = 1 Nm/s (newtonmeter/second)

Units for energy:
1 J (joule) = 1 Nm

Prefixes:

k	= kilo	= 10^3
M	= mega	= 10^6
G	= giga	= 10^9
T	= tera	= 10^{12}
P	= peta	= 10^{15}

Units for electric energy:
1 kWh = 3.6 · 10⁶ J

E = exa = 10¹⁸

Eg.: 1 kWh = 3.6 · 10⁶ J = 3.6 MJ

Energy content of selected fuels:

Coal	28.1 MJ/kg
Fuel wood	16.8 MJ/kg
Petrol	43.9 MJ/kg
Light fuel oil	43.1 MJ/kg
Heavy fuel oil	40.6 MJ/kg
Crude oil	36.0 GJ/Sm ³
Natural gas	40.4 MJ/Sm ³

Hydropower potential as of 12.31.2008 (Mean annual production in GWh)

County	Developed	Development licence granted	Remaining *)	Protected	Total
Østfold	4 118	141	12	20	4 291
Akershus	925	0	0	72	997
Oslo	22	0	0	0	22
Hedmark	2 402	78	696	2 923	6 099
Oppland	5 895	26	2 803	4 103	12 826
Buskerud	8 372	184	1 347	1 108	11 012
Vestfold	16	0	146	34	197
Telemark	11 301	4	1 429	782	13 515
Aust-Agder	4 453	235	1 149	643	6 481
Vest-Agder	9 402	66	969	986	11 423
Rogaland	12 107	601	1 667	2 250	16 626
Hordaland	16 401	234	4 548	7 889	29 072
Sogn og Fjordane	14 115	718	6 304	6 433	27 570
Møre og Romsdal	6 479	259	2 109	4 621	13 467
Sør-Trøndelag	4 534	53	629	2 219	7 434
Nord-Trøndelag	3 192	85	702	3 144	7 124
Nordland	14 771	433	7 098	5 028	27 330
Troms	2 665	63	2 005	2 129	6 861
Finnmark	1 518	26	545	1 296	3 384
Total Norway	122 687	3 206	34 158	45 680	205 732

*) Including the following: Under licencing, under planning and remaining.

Oil and gas resources as of 12.31.2008

	Oil		Gas		Total	
	mill. Sm ³ o.e.	EJ	mill. Sm ³ o.e.	EJ	mill. Sm ³ o.e.	EJ
Originally reserves	4914	177	3548	128	8462	305
+ Resources in fields	391	14	181	7	572	21
+ Resources in discoveries	263	9	512	18	775	28
+ Increased extraction	145	5	77	3	222	8
+ Undiscovered	1525	55	1875	68	3400	122
- Sold	3722	134	1333	48	5055	182
= Remaining resources	3516	127	4860	175	8376	302

Changes in production capacity in 2008 and 2009

Power station and county	Maximum capacity (MW)	Mean annual production (GWh)
Changes in 2008		
Hunsofoss, Vest-Agder	15	35
Sønnå, Rogaland	211	414
Bessakerfjellet (wind power), Sør-Trøndelag	28	75
Leirfossene, Sør-Trøndelag	49	138
Hundhammerfjellet ((wind power), Nord-Trøndelag	17	45

Other changes	155	586
Decommissioned	-23	-85
Net increase in production capacity in 2008	452	1208
Expected changes in 2009		
Borregaard, Østfold	20	55
Sønnå (transfer), Rogaland	0	260
Boullanjåkka (transfer), Troms	0	27
Other changes	117	412
Expected net increase in production capacity in 2009	137	754

The largest hydropower stations in Norway as of 12.31.2008

Power station	County	Max. capacity (MW)	Mean ann. production (GWh)
Kvilldal	Rogaland	1240	3517
Sima	Hordaland	1120	3441
Tonstad	Vest-Agder	960	4169
Aurland I	Sogn og Fjordane	840	2419
Saurdal ¹⁾	Rogaland	640	1300
Rana	Nordland	500	2123
Tokke	Telemark	430	2221
Tyin	Sogn og Fjordane	374	1398
Svartisen	Nordland	350	1996
Brokke	Aust-Agder	330	1407
Evanger	Hordaland	330	1380
Nedre Vinstra	Oppland	308	1206
Skjomen	Nordland	300	1164
Vinje	Telemark	300	1003
Kobbelv	Nordland	300	733
Aura	Møre og Romsdal	290	1774

¹⁾ Pumped storage power station

The largest reservoirs in Norway as of 12.31.2008

Reservoir	County	Max. reservoir capacity	
		mill. m ³	GWh
Storglomvatn	Nordland	3506	4589
Blåsjø	Aust-Agder/Rogaland	3105	7759
Tustervatn-Røsvatn	Nordland	2363	2063
Svartevatn	Vest-Agder/Rogaland	1398	2923
Mjøsa	Hedmark/Oppland/Akershus	1312	337
Akersvatn	Nordland	1276	1531
Vatnedalsvatn	Aust-Agder	1150	1967
Møsvatn	Telemark	1064	2270
Altevatn	Troms	1027	1145
Kalvatn	Nordland	706	847

Investment, price indices (1998 =100) and prices

	1995	2000	2005	2007
Gross investment in electricity supply (mill. NOK)	4114	3915	7496	11195
Acquisition of fixed assets (mill. NOK)				
- production plants	1180	834	3818	6280
- transmission lines	365	269	369	1226
- distribution network	2140	2160	2364	2939
- other	987	1081	1254	1401
Gross investment in % of total domestic investment	2.2	1.4	2.1	2.4
Repair and maintenance in				

electricity supply (mill. NOK)	1481	-	-	-
Electricity price index, households	93	95	140	141
Oil price index, light fuel oil	86	150	208	194
Consumer price index	94	106	115	119
Price of electric energy to households (øre/kWh)	49.7	50.4	74.8	75.0
Price of useful energy ^{*)} for light fuel oil (øre/kWh)	37.0	64.9	89.5	83.9

^{*)} Efficiency rate 0.8

Energy balance 2008 in PJ

	Total	Coal and coke	Crude oil	Petroleum products	Natural gas and other gases	Water-fall energy	Electricity	Other
Primary production	9699	92	4377	493	4091	595	-	52
Imports	234	49	32	140	-	-	12	1
Exports	8593	95	3732	881	3822	-	62	0
Bunkers and stock changes	35	-2	14	24	0	-	-	-
Primary energy supply	1306	48	663	-272	269	595	-50	53
Conversion	1274	2	551	110	2	595	3	10
Secondary production	1220	6	-	642	44	-	514	13
Energy sector own use	276	-	-	1	253	-	23	0
Non-energy use	65	-	-	40	26	-	-	-
Statistical differences and losses	90	2	112	-66	4	-	37	3
Final energy consumption	819	50	-	286	28	-	401	53
Of which:								
Industry and mining	297	50	-	26	24	-	178	19
Transport	229	-	-	224	2	-	2	-
Other consumer groups	293	0	-	36	2	-	221	34

District heating 1995 - 2008

	Unit	1995	2000	2005	2007	2008
Establishments	Number	21	25	38	40	44
Net production of district heating		4668	5777	9224	11037	12177
Losses	TJ	399	531	765	1109	1241
Delivered consumer:	"					
Total	"	4269	5246	8460	9927	10936
Households	"	977	758	1422	1842	2526
Industry and mining		1122	810	1077	1155	1169
Services		2154	3643	5956	6921	7231
Other	"	17	34	4	10	10
Average price (excl. VAT)	øre/kWh	26.3	30.6	45.9	50.5	57.0
Investment	mill. NOK	75.6	236.0	750.0	820.2	940.7

Domestic deliveries of petroleum products 1995 - 2008 in mill. liter

Products	1995	2000	2005	2007	2008
Petrol	2204	2189	2138	1950	1835
Auto-diesel	1622	1862	2431	2955	3163
Kerosine	201	150	130	103	77
Marine gas oil	1323	1494	1348	1482	1381
Light fuel oil	736	564	542	488	440
Heavy fuel oil	344	193	283	421	298
Other petroleum products	1519	1654	1690	1859	1714
Total	7949	8106	8562	9258	8908

Production of important forms of energy 1995 - 2008

	Unit	1995	2000	2005	2007	2008
Coal	1000 t	292	632	1471	3995	3282
Crude oil	Mill. Sm ³	156776	181181	148137	128277	122673
Natural gas	Mill. Sm ³	27814	49748	84963	89662	99233
Electricity	GWh	123011	142816	137811	137164	142667

Final energy consumption^{*)} 1995 - 2008 in PJ

	1995	2000	2005	2007	2008
Coal and coke	57	54	44	43	50
Wood and black liquor	42	50	45	43	43
Gases	12	21	24	26	28
Petroleum products	257	268	279	294	286
Electricity	374	394	399	398	401
District heating	4	5	9	10	10
Total	746	791	799	814	819

^{*)} Consumption by energy producing industries, consumption for non-energy purposes and losses in transportation and distribution are not included in the figures.

The leading hydropower producing countries in 2007

(Source: IEA)

Country	Hydropower production		Total electricity production	
	TWh	Ann. change 1997-2007 (%)	TWh	Ann. change 1997-2007 (%)
China	485	9.5	3279	11.2
Brazil	374	3.0	445	3.7
Canada	369	0.5	640	1.1
USA	276	-1.8	4323	1.7
Russia	179	1.3	1013	2.0
Norway	135	2.0	137	2.1
India	124	5.2	803	5.7
Japan	84	-0.7	1123	0.9
Venezuela	83	3.8	125	4.8
Sweden	66	-0.5	145	-0.3
World	3162	2.1	19771	3.5

Energy and electricity consumption for selected countries in 2007

(Source: IEA)

Country	Total energy consumption ^{*)}		Electricity consumption ^{**)}	
	Per capita (GJ)	Ann. change 1997-2007 (%)	Per capita (kWh)	Ann. change 1997-2007 (%)
Canada	342	0.2	16995	0.2
USA	324	-0.5	13616	0.3
Finland	289	0.7	17164	1.7
Australia	246	0.4	11216	1.9
Norway	239	0.3	24997	0.2
Sweden	231	-0.5	15238	-0.1
Russia	199	1.6	6338	2.5
France	174	-0.2	7573	0.8
Germany	169	-0.5	7185	1.1
Japan	168	-0.2	8475	0.7
New-Zealand	168	-1.4	9722	1.2
Denmark	151	-1.0	6671	0.1
United Kingdom	146	-1.0	6142	0.8
Spain	134	1.6	6296	3.6
Italy	126	0.4	5718	1.8
South-Africa	118	0.7	5013	0.9
Poland	107	-0.5	3662	1.3
Argentina	77	1.0	2658	3.7
Thailand	68	3.0	2157	4.3
China	62	5.2	2328	10.5
Turkey	57	1.9	2210	4.9
Brazil	51	1.7	2154	1.8
Egypt	37	3.2	1468	5.6
Vietnam	28	3.9	728	13.3
Angola	26	0.0	190	10.8
India	22	1.0	543	3.2
Pakistan	21	1.5	475	3.1
Tanzania	19	-0.2	83	4.4
Mosambique	18	0.5	483	24.5
World	76	1.0	2752	2.1

^{*)} Total primary energy supply (excl. bunkers)

^{**)} Total domestic consumption (excl. losses in distribution system)

Production and consumption of electric energy

County	Max. capacity	Production		Net consumption in 2007 incl. non-priority power					
		12.31.2008	2008	2007	Energy intensive industry	General consumption			
	Total					Other industries	Services and transport	Households and agriculture	
								Total	Per capita
(MW)	(GWh)	(GWh)	(GWh)	(GWh)	(GWh)	(GWh)	(GWh)	(GWh)	(kWh)
Østfold	828	4978	4 804	393	6 004	2 611	1 462	1 931	6 603
Akershus	183	983	999	107	7 035	388	2 761	3 886	7 285
Oslo	15	92	87	64	8 839	395	4 482	3 962	7 207
Hedmark	534	2459	2 489	-	3 017	629	915	1 473	6 452
Oppland	1526	7570	7 425	-	3 379	655	1 099	1 625	6 889
Buskerud	1994	10930	11 163	-	5 575	2 032	1 409	2 134	7 096
Vestfold	4	21	17	32	3 360	445	1 124	1 791	7 169
Telemark	2568	15051	13 009	2 796	2 646	347	910	1 389	7 515
Aust-Agder	1171	5899	5 169	196	1 529	218	523	788	6 767
Vest-Agder	2090	11544	9 755	3 255	2 557	496	807	1 254	7 036
Rogaland	4015	13599	11 883	5 069	6 042	873	1 972	3 197	6 995
Hordaland	4119	17787	19 896	4 030	9 463	3 668	2 316	3 479	7 132
Sogn og Fjordane	3791	15825	15 716	4 612	1 671	285	561	825	6 640
Møre og Romsdal	1533	7964	7 553	6 001	3 767	685	1 210	1 872	7 009
Sør-Trøndelag	1197	4513	5 341	1 191	4 166	352	1 675	2 139	6555 ¹⁾
Nord-Trøndelag	781	2994	3 486	-	3 594	1 904	669	1 021	6555 ¹⁾
Nordland	3276	15950	14 068	5 492	4 318	770	1 437	2 111	8 382
Troms	571	2670	2 382	582	2 636	206	1 031	1 399	8 569
Finnmark	612	1757	1 844	-	1 462	105	637	720	9 380
Svalbard	20	81	78	-	68	6	28	34	-
Total Norway	30827	142667	137164	33818	81129	17069	27029	37031	7158

¹⁾ Total Sør- and Nord-Trøndelag

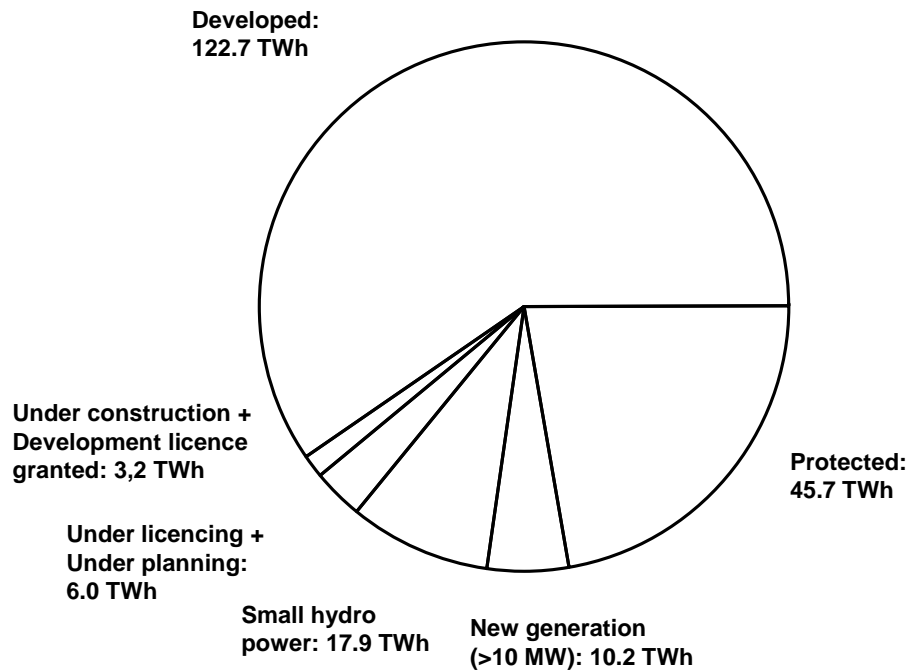
Production and consumption of electric energy 1990 - 2007 in GWh

	1990	1995	2000	2005	2006	2007	Ann. change 1997-2007 (%)
Hydropower production	121382	122487	142289	136452	119729	134736	2.0
+ Thermal power production	466	514	496	860	1035	1536	
+ Wind power production	-	10	31	499	636	892	
= Total production	121848	123011	142816	137811	121400	137164	2.1
+ Imports	334	2300	1474	3653	9802	5284	
- Exports	16241	8962	20529	15695	8947	15320	
= Gross consumption (total)	105941	116349	123761	125769	122255	127128	1.0
- Electric boilers	6670	7514 ¹⁾	10518 ¹⁾	5592 ¹⁾	4763 ¹⁾	6461 ¹⁾	
- Pumped storage power	339	1367	673	1091	515	1543	
- Losses	7894	10018	10732	10633	10640	10637	
= Net consumption, firm power	91038	97450	101838	108453	106337	108487	1.0
- Energy intensive industry	29584	28369	30521	34984	33243	32359	1.2
= General consumption	61454	69081	71317	73469	73094	76128	0.8
Of which:							
Households and agriculture	30864	35587	35685	35404	35100	36371	0.3
Pulp and paper industry, mining and other industry, construction site power	13903	14115	14172	15512	15020	16018	0.9
Services and transport	16687	19379	21460	22553	22974	23739	1.7
General consumption adjusted for temperature conditions	64565	69557	75406	76670	76634	79023	1.0

¹⁾ Non-priority power

Hydropower potential as of 12.31.2008

(mean annual production)



Useful energy excluding energy intensive industry and transport

