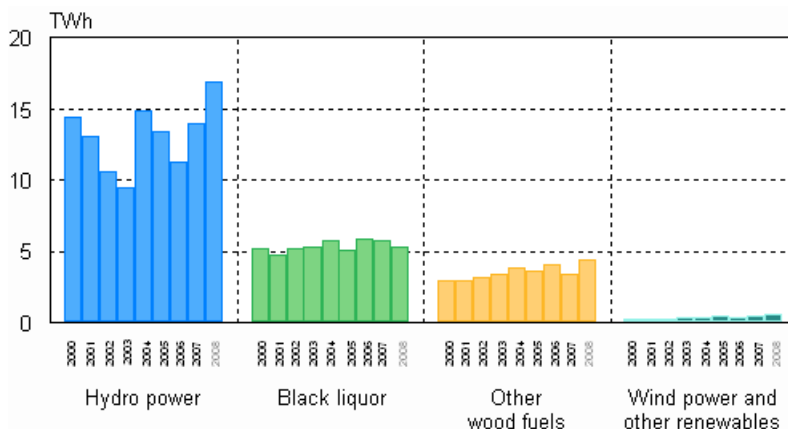


Production of electricity and heat 2008

Electricity production with renewable energy sources grew by 15 per cent in 2008

Electricity production with renewable energy sources grew by 15 per cent in 2008 from the previous year, as the use of wood fuels turned upwards and production of hydro power kept growing, reaching new records. Thirty-one per cent of the electricity needed by Finland was produced with renewable energy sources. In the production of renewable electricity hydro power accounts for 60 per cent, black liquor from the forest industry for 19 per cent and wood fuels for 16 per cent.

Electricity production with renewable energy sources 2000-2008



In 2008, total electricity consumption in Finland amounted to 87.2 terawatt hours (TWh) or billion kilowatt hours (kWh). Of this consumption, 85 per cent was covered by domestic production and the remaining 15 per cent by imported electricity. Electricity is imported to Finland from the Nordic countries, Russia and Estonia. Electricity is also exported from Finland to the Nordic countries and Estonia.

In 2008, the volume of electricity produced in Finland amounted to 74.5 TWh. The volume was 3 per cent down on the year before. The production of district heat stayed on level with the previous year, and industrial heat production was four per cent down on the year before. District heat production amounted to 33.4 TWh and that of industrial heat to 59.4 TWh.

Thirty-six per cent of electricity was produced with renewable energy sources, 30 per cent with nuclear power and 27 per cent with fossil fuels. In electricity production, hydro power accounted for 23 per cent, natural gas for 15 per cent and coal for 11 per cent.

In terms of water conditions, the year 2008 was favourable in the Nordic countries; domestic production of hydro power grew by 21 per cent. The production of electricity with wood fuels grew by 28 per cent. The production of wind power went up by 38 per cent from the year before. The production of electricity with coal diminished

by 37 per cent, and that produced with peat by 30 per cent. The consumption of both fell steeply in both combined heat and power plants and condensing power plants. The production of nuclear power decreased by 2 per cent.

Electricity produced with Nordic hydro power was amply available, so the production of domestic condensing power fell steeply by more than a third. The volume of electricity generated in combined heat and power production decreased by one per cent.

Combined heat and power production remained as the most significant mode of electricity generation; it accounted for 36 per cent of all electricity produced in 2008.

The past few years have been milder than the average, and in 2008 the need of heating energy remained on level with the year before. By contrast, the consumption of heat for industrial processes fell from the level of the year before due to the economic recession and decreased industrial production capacity.

Electricity and heat production by production mode in 2008

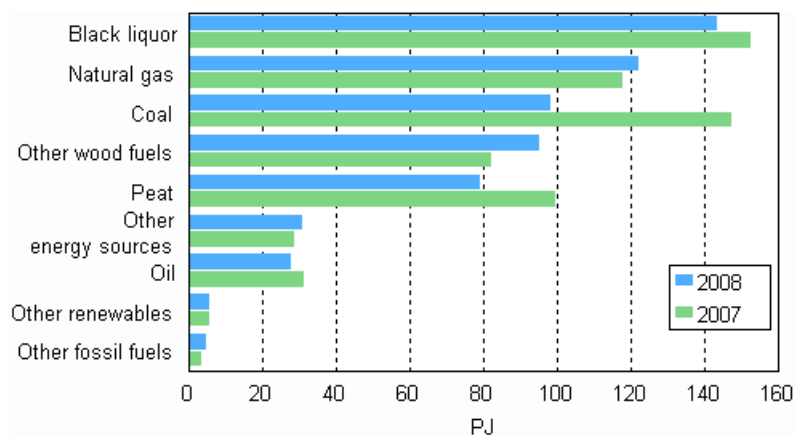
| | Electricity, TWh | District heat, TWh | Industrial heat, TWh | Total fuels used, PJ ¹ |
|------------------------------------|------------------|--------------------|----------------------|-----------------------------------|
| Separate production of electricity | | | | |
| - Hydro power | 16,9 | – | – | – |
| - Wind power | 0,3 | – | – | – |
| - Nuclear power | 22,1 | – | – | – |
| - Condensing power ² | 8,8 | – | – | 87,9 |
| - Total | 48,0 | – | – | 87,9 |
| Combined heat and power production | 26,5 | 25,5 | 47,3 | 437,7 |
| Separate heat production | – | 7,9 | 12,1 | 85,7 |
| Total production | 74,5 | 33,4 | 59,4 | 611,3 |
| Net imports of electricity | 12,8 | – | – | – |
| Total | 87,2 | 33,4 | 59,4 | 611,3 |

1) In calculating total primary energy used, hydro power, wind power and net imports of electricity are made commensurate with fuels according to directly obtained electricity (3.6 PJ/TWh). Total nuclear energy used is calculated at the efficiency ratio of 33 per cent from produced nuclear power (10.91 PJ/TWh).

2) Condensing power includes condensing power plants, shares of condensing electricity of combined heat and power production plants, and peak gas turbines and similar separate electricity production plants.

The use of fuels in the production of electricity and heat decreased by 9 per cent in 2008. The use of coal and peat declined most, or by 33 and 20 per cent respectively. The use of oil and black liquor from forestry decreased as well. By contrast, the use of wood grew by 15 per cent.

Fuel use in electricity and heat production 2007 and 2008



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Appendix tables

Table 01. Electricity and heat production by production mode and fuel in 2008

| | | Electricity, GWh | District heat, GWh | Industrial heat, GWh | Fuels used, GWh | Fuels used, TJ |
|--|--|---------------------|-----------------------|-------------------------|--------------------|-------------------|
| Condensing power production ¹ | Oil | 144 | .. | .. | 408 | 1 469 |
| | Coal ² | 4 686 | .. | .. | 12 550 | 45 179 |
| | Natural gas | 378 | .. | .. | 967 | 3 481 |
| | Other fossil ³⁴ | 53 | .. | .. | 138 | 496 |
| | Peat | 1 786 | .. | .. | 5 021 | 18 077 |
| | Black liquor and other concentrated liquors | 315 | .. | .. | 1 006 | 3 620 |
| | Other wood fuels | 1 159 | .. | .. | 3 257 | 11 726 |
| | Other renewables ³⁵ | 94 | .. | .. | 250 | 898 |
| | Other energy sources ⁶ | 163 | .. | .. | 826 | 2 972 |
| | Total | 8 779 | .. | .. | 24 421 | 87 917 |
| Combined heat and power production ⁷ | Oil | 248 | 272 | 806 | 1 643 | 5 914 |
| | Coal ² | 3 864 | 6 979 | 1 360 | 14 367 | 51 720 |
| | Natural gas | 10 557 | 8 315 | 5 486 | 28 430 | 102 348 |
| | Other fossil ³⁴ | 162 | 454 | 296 | 1 209 | 4 353 |
| | Peat | 3 043 | 5 189 | 4 182 | 15 296 | 55 066 |
| | Black liquor and other concentrated liquors | 4 935 | 222 | 25 250 | 38 632 | 139 074 |
| | Other wood fuels | 3 187 | 3 474 | 8 443 | 18 720 | 67 391 |
| | Other renewables ³⁵ | 186 | 307 | 375 | 1 197 | 4 311 |
| | Other energy sources ⁶ | 295 | 290 | 1 056 | 2 096 | 7 546 |
| | Total | 26 476 | 25 502 | 47 255 | 121 590 | 437 723 |
| Separate production of heat ⁸ | Oil | .. | 1 474 | 2 403 | 5 815 | 20 933 |
| | Coal ² | .. | 315 | 195 | 568 | 2 046 |
| | Natural gas | .. | 2 510 | 1 459 | 4 669 | 16 807 |
| | Other fossil ³⁴ | .. | 45 | 30 | 106 | 381 |
| | Peat | .. | 904 | 624 | 1 794 | 6 460 |
| | Black liquor and other concentrated liquors | .. | .. | 225 | 292 | 1 052 |
| | Other wood fuels | .. | 1 410 | 2 441 | 4 541 | 16 347 |
| | Other renewables ³⁵ | .. | 111 | 75 | 227 | 819 |
| | Other energy sources ⁶ | .. | 1 112 | 4 643 | 5 795 | 20 863 |
| | Total | .. | 7 882 | 12 097 | 23 808 | 85 708 |
| Total | Oil | 392 | 1 746 | 3 209 | 7 865 | 28 315 |
| | Coal ² | 8 550 | 7 293 | 1 555 | 27 485 | 98 945 |
| | Natural gas | 10 935 | 10 826 | 6 946 | 34 066 | 122 636 |
| | Other fossil ³⁴ | 215 | 499 | 326 | 1 453 | 5 230 |
| | Peat | 4 829 | 6 093 | 4 807 | 22 112 | 79 603 |
| | Black liquor and other concentrated liquors | 5 250 | 222 | 25 475 | 39 929 | 143 746 |
| | Other wood fuels | 4 346 | 4 884 | 10 884 | 26 518 | 95 464 |
| | Other renewables ³⁵ | 280 | 418 | 451 | 1 674 | 6 028 |
| | Other energy sources ⁶ | 457 | 1 403 | 5 699 | 8 717 | 31 382 |
| | Total | 35 255 | 33 385 | 59 352 | 169 819 | 611 348 |

1) Condensate parts produced in connection with combined heat and power production were calculated with condensing power.

2) In addition to hard coal, coal includes blast furnace gas and coke oven gas and coke.

3) Mixed fuels (such as recycled fuel) are divided into renewable and fossil fuels in ratio to the fossil and biodegradable coal contained in them.

4) Other fossil fuels include plastics fuels and other waste fuels and the fossil part of mixed fuels.

5) Other renewable fuels comprise the bio part of mixed fuels and biogas.

6) Other energy sources include hydrogen, electricity, and reaction and secondary heat of industry.

7) Combined heat and power production includes pure combined production.

8) Reduction heat produced in connection with condensate production and combined heat and power production were calculated in separate production of heat.

Table 02. Fuel use in electricity and heat production, TJ

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Fossil fuels | | | | | | | | | |
| - Oil | 33 695 | 38 138 | 37 874 | 38 015 | 35 995 | 33 117 | 31 033 | 31 924 | 28 315 |
| - Coal | 104 612 | 123 888 | 140 591 | 199 594 | 175 841 | 86 498 | 172 691 | 147 656 | 98 945 |
| - Natural gas | 117 387 | 129 063 | 127 718 | 143 158 | 138 375 | 124 230 | 131 457 | 118 038 | 122 636 |
| - Other fossil | 2 464 | 3 334 | 3 788 | 4 305 | 4 679 | 4 276 | 3 728 | 4 059 | 5 230 |
| - Fossil fuels total | 258 158 | 294 422 | 309 971 | 385 071 | 354 889 | 248 120 | 338 908 | 301 677 | 255 126 |
| Peat | 61 056 | 84 475 | 89 831 | 99 122 | 87 856 | 67 492 | 91 082 | 100 097 | 79 603 |
| Renewable fuels | | | | | | | | | |
| - Black liquor and other concentrated liquors | 137 929 | 126 744 | 140 115 | 141 194 | 148 217 | 132 127 | 156 030 | 153 060 | 143 746 |
| - Other wood fuels | 76 455 | 76 149 | 80 026 | 81 923 | 89 111 | 85 499 | 93 475 | 82 716 | 95 464 |
| - Other renewables | 2 460 | 3 148 | 3 158 | 3 997 | 4 543 | 6 205 | 5 331 | 6 290 | 6 028 |
| - Renewable fuels total | 216 844 | 206 041 | 223 299 | 227 113 | 241 870 | 223 832 | 254 836 | 242 067 | 245 238 |
| Other energy sources | 19 598 | 18 990 | 20 863 | 24 728 | 25 875 | 24 443 | 28 076 | 29 299 | 31 382 |
| Total | 555 655 | 603 928 | 643 965 | 736 035 | 710 491 | 563 887 | 712 903 | 673 139 | 611 348 |

Table 03. Supply and production of electricity, GWh

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Nuclear power | 21 575 | 21 854 | 21 395 | 21 830 | 21 814 | 22 356 | 22 004 | 22 501 | 22 050 |
| Fossil fuels | | | | | | | | | |
| - Oil | 540 | 610 | 836 | 910 | 570 | 454 | 439 | 431 | 392 |
| - Coal | 8 636 | 10 556 | 12 437 | 18 487 | 15 946 | 6 687 | 15 842 | 13 615 | 8 550 |
| - Natural gas | 9 856 | 11 182 | 11 273 | 13 435 | 12 372 | 10 896 | 11 941 | 10 250 | 10 935 |
| - Other fossil | 69 | 111 | 120 | 170 | 188 | 167 | 127 | 158 | 215 |
| - Fossil fuels total | 19 100 | 22 459 | 24 667 | 33 002 | 29 075 | 18 204 | 28 349 | 24 454 | 20 092 |
| Peat | 3 689 | 5 797 | 6 141 | 6 827 | 6 118 | 4 206 | 6 206 | 6 917 | 4 829 |
| Renewable energy sources | | | | | | | | | |
| - Hydro power | 14 453 | 13 018 | 10 623 | 9 455 | 14 865 | 13 428 | 11 313 | 13 991 | 16 909 |
| - Wind power | 77 | 70 | 63 | 92 | 120 | 168 | 153 | 188 | 261 |
| - Black liquor and other concentrated liquors | 5 126 | 4 765 | 5 140 | 5 255 | 5 778 | 5 060 | 5 900 | 5 711 | 5 250 |
| - Other wood fuels | 2 923 | 2 882 | 3 191 | 3 364 | 3 821 | 3 647 | 4 068 | 3 408 | 4 346 |
| - Other renewables | 101 | 148 | 143 | 188 | 209 | 280 | 230 | 297 | 280 |
| - Renewables total | 22 679 | 20 882 | 19 160 | 18 353 | 24 794 | 22 584 | 21 664 | 23 595 | 27 046 |
| Other energy sources | 234 | 237 | 255 | 364 | 369 | 307 | 400 | 349 | 457 |
| Electricity produced total | 67 278 | 71 229 | 71 618 | 80 377 | 82 171 | 67 657 | 78 623 | 77 817 | 74 475 |
| Net imports of electricity | 11 880 | 9 959 | 11 925 | 4 852 | 4 870 | 17 015 | 11 401 | 12 557 | 12 772 |
| Total | 79 158 | 81 188 | 83 543 | 85 229 | 87 041 | 84 672 | 90 024 | 90 374 | 87 247 |

Table 04. District heat production, GWh

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Fossil fuels | | | | | | | | | |
| - Oil | 1 774 | 2 302 | 2 334 | 2 488 | 2 005 | 1 848 | 2 217 | 2 227 | 1 746 |
| - Coal | 7 520 | 8 497 | 8 782 | 9 089 | 8 304 | 7 767 | 8 935 | 8 344 | 7 293 |
| - Natural gas | 9 628 | 10 083 | 10 449 | 10 354 | 11 073 | 11 088 | 9 849 | 9 904 | 10 826 |
| - Other fossil | 185 | 218 | 213 | 263 | 298 | 298 | 241 | 241 | 499 |
| - Fossil fuels total | 19 108 | 21 101 | 21 779 | 22 194 | 21 680 | 21 001 | 21 243 | 20 716 | 20 365 |
| Peat | 4 850 | 5 622 | 6 012 | 6 433 | 6 009 | 5 441 | 6 103 | 6 980 | 6 093 |
| Renewable energy sources | | | | | | | | | |
| - Black liquor and other concentrated liquors | 367 | 396 | 282 | 286 | 286 | 267 | 375 | 205 | 222 |
| - Other wood fuels | 2 655 | 2 774 | 3 231 | 3 456 | 3 756 | 4 170 | 4 381 | 3 917 | 4 884 |
| - Other renewables | 208 | 231 | 228 | 280 | 339 | 600 | 441 | 529 | 418 |
| - Renewables total | 3 230 | 3 402 | 3 741 | 4 022 | 4 381 | 5 037 | 5 197 | 4 652 | 5 524 |
| Other energy sources | 944 | 826 | 876 | 1 043 | 1 012 | 1 096 | 1 092 | 1 056 | 1 403 |
| Total | 28 131 | 30 950 | 32 408 | 33 692 | 33 082 | 32 575 | 33 635 | 33 404 | 33 385 |

Table 05. Industrial heat production, GWh

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Fossil fuels | | | | | | | | | |
| - Oil | 4 769 | 4 637 | 4 649 | 4 232 | 4 381 | 4 176 | 3 832 | 3 808 | 3 209 |
| - Coal | 2 488 | 2 217 | 2 167 | 1 958 | 1 957 | 1 854 | 1 672 | 1 656 | 1 555 |
| - Natural gas | 7 958 | 8 313 | 7 753 | 7 471 | 7 936 | 7 243 | 7 504 | 7 387 | 6 946 |
| - Other fossil | 162 | 252 | 322 | 381 | 392 | 333 | 281 | 346 | 326 |
| - Fossil fuels total | 15 376 | 15 419 | 14 891 | 14 041 | 14 666 | 13 606 | 13 289 | 13 197 | 12 036 |
| Peat | 4 185 | 4 412 | 5 006 | 5 261 | 4 406 | 4 061 | 4 738 | 5 249 | 4 807 |
| Renewable energy sources | | | | | | | | | |
| - Black liquor and other concentrated liquors | 23 177 | 21 259 | 23 730 | 23 626 | 24 659 | 22 015 | 26 632 | 26 571 | 25 475 |
| - Other wood fuels | 10 869 | 10 562 | 10 521 | 10 385 | 11 009 | 10 125 | 11 216 | 10 615 | 10 884 |
| - Other renewables | 239 | 284 | 313 | 398 | 416 | 463 | 454 | 470 | 451 |
| - Renewables total | 34 285 | 32 105 | 34 564 | 34 409 | 36 083 | 32 603 | 38 302 | 37 656 | 36 810 |
| Other energy sources | 3 703 | 3 668 | 3 959 | 4 475 | 4 710 | 4 369 | 5 235 | 5 682 | 5 699 |
| Total | 57 549 | 55 604 | 58 420 | 58 186 | 59 865 | 54 638 | 61 564 | 61 785 | 59 352 |

Figures

Figure 01. Electricity production by energy sources 2008

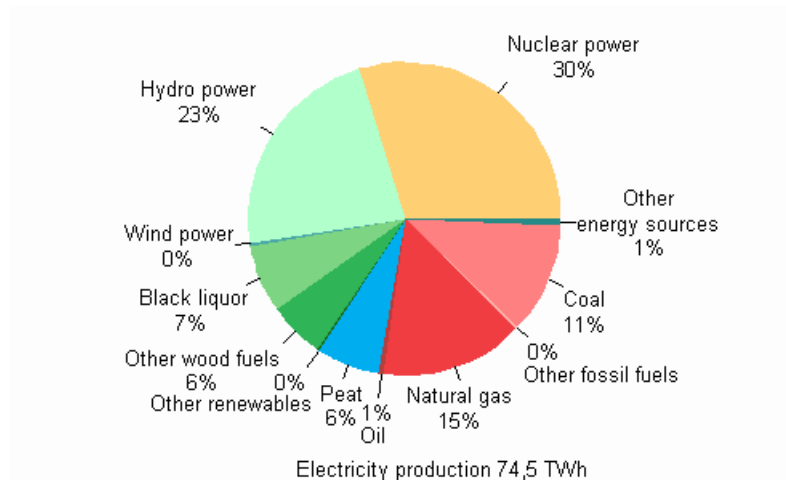


Figure 02. Electricity production by energy type 2000–2008

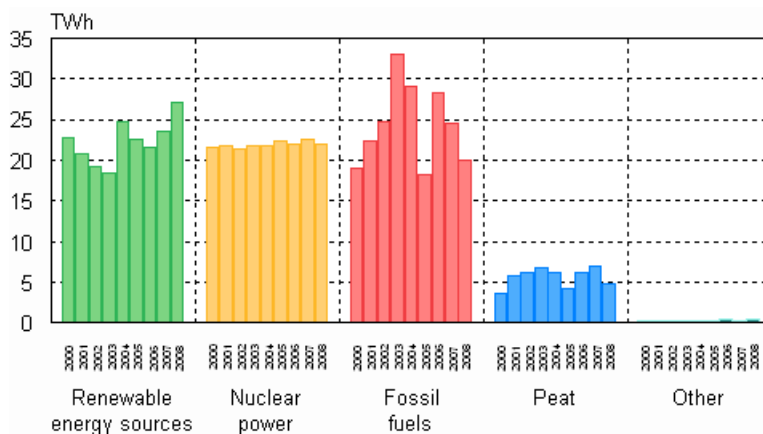


Figure 03. Electricity production by production mode 2000–2008

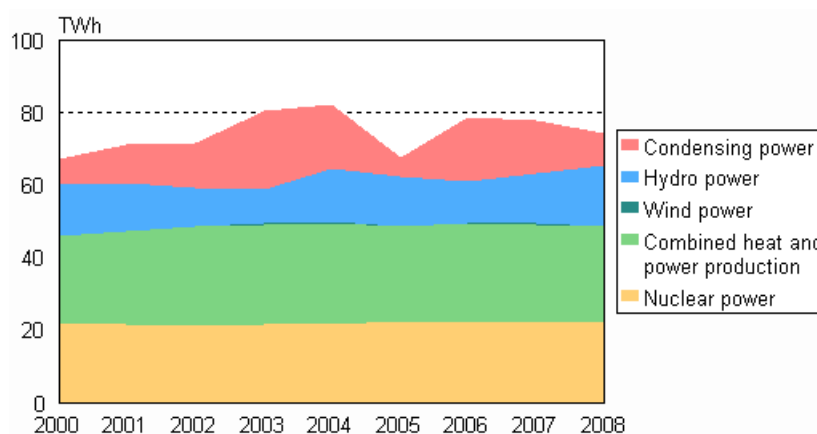


Figure 04. Electricity production with renewable energy sources 2000–2008

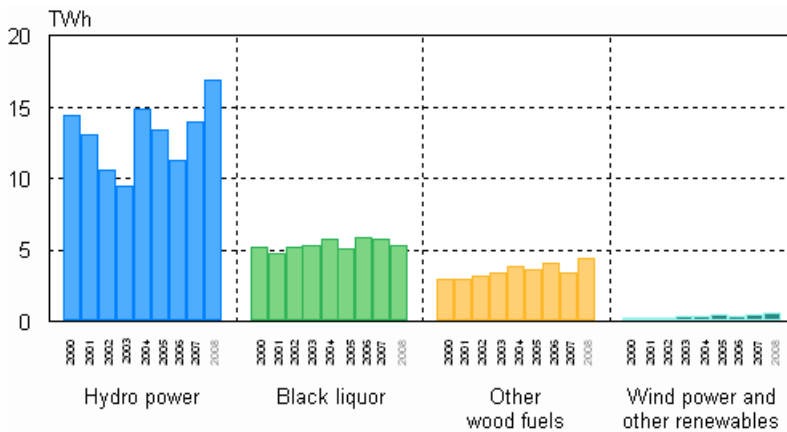


Figure 05. Electricity production with renewable energy sources 2000–2008

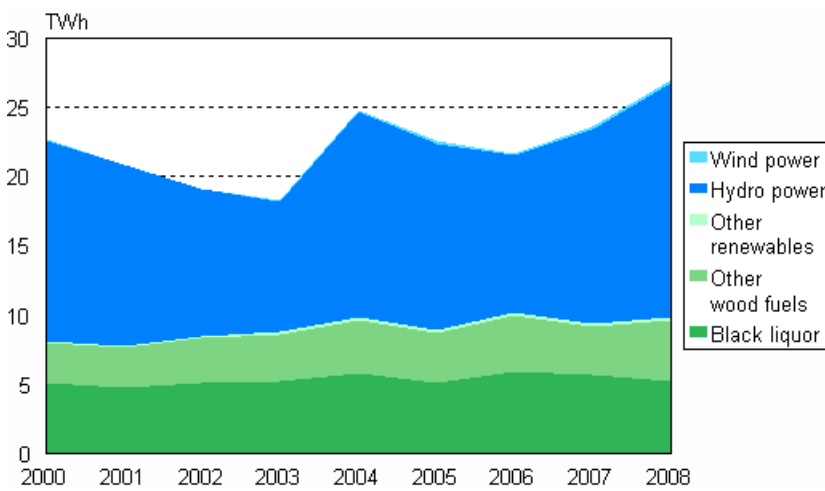
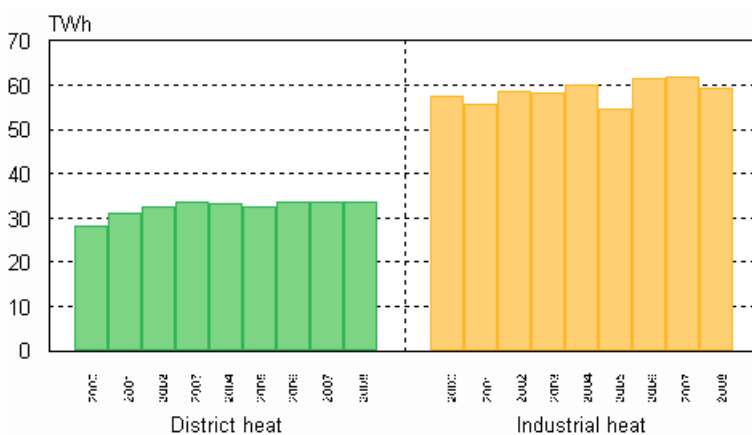


Figure 06. Heat production 2000–2008



District heat production 33,4 TWh

Industrial heat production 59,4 TWh

Figure 07. District heat production by fuels 2000–2008

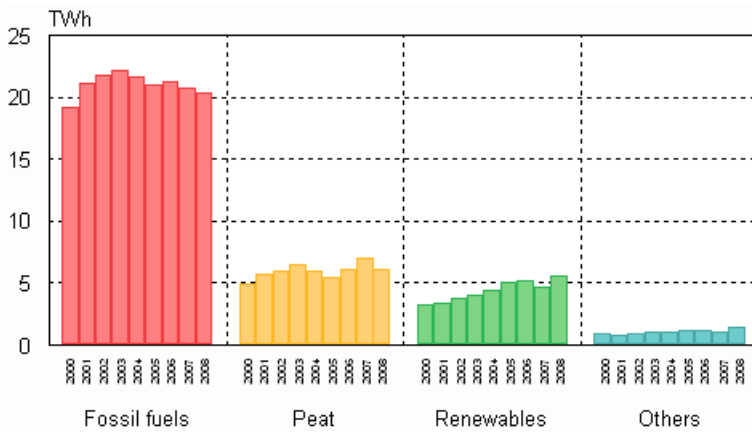


Figure 08. Industrial heat production by fuels 2000–2008

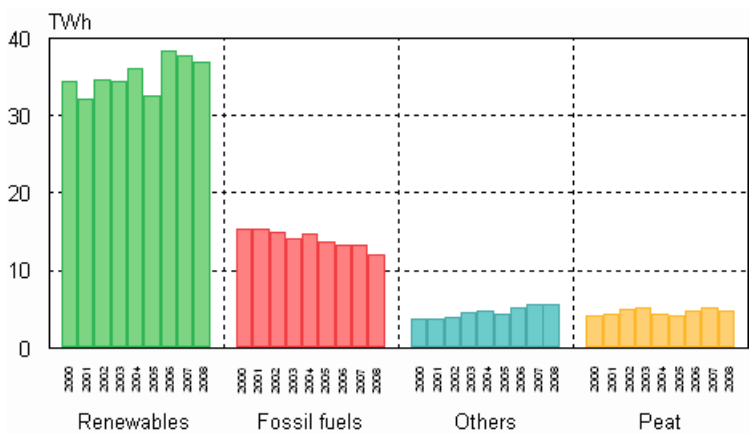


Figure 09. Fuel use by production mode in electricity and heat production 2008

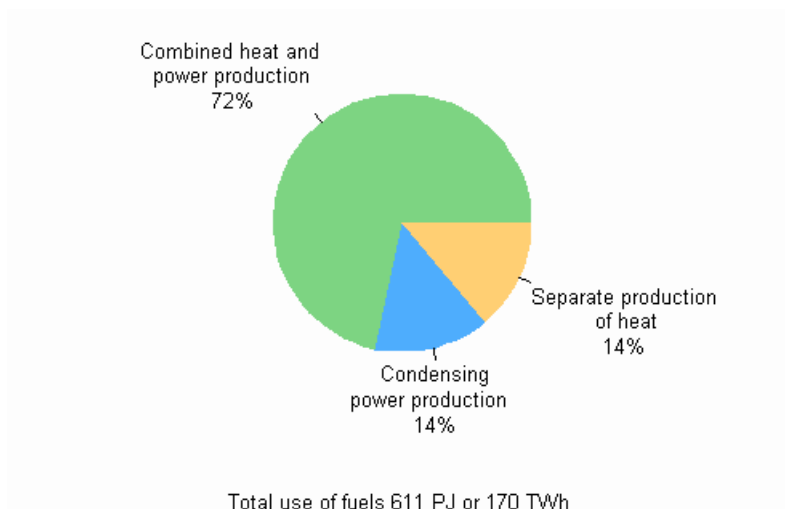


Figure 10. Fuel use in electricity and heat production 2007–2008

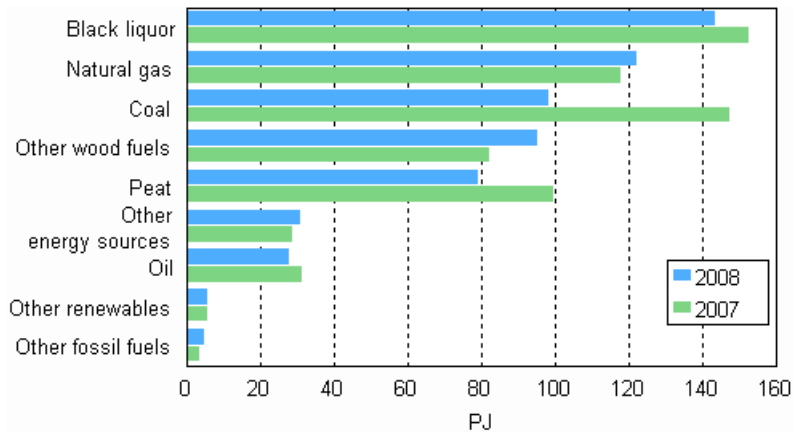


Figure 11. Fuel use in separate electricity production 2007–2008

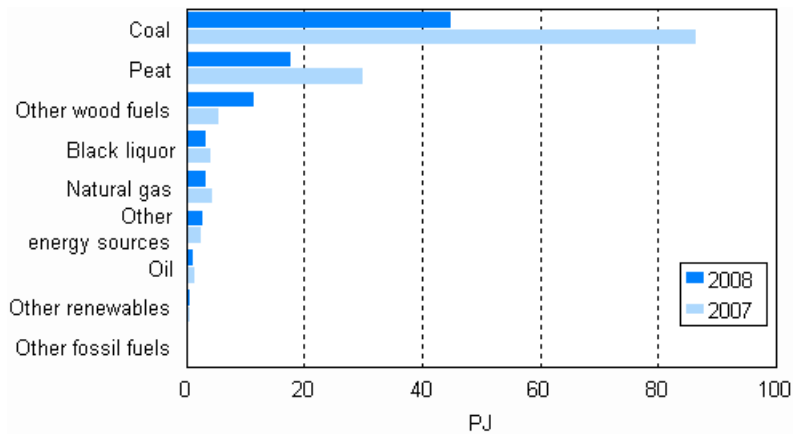


Figure 12. Fuel use in combined heat and power production 2007–2008

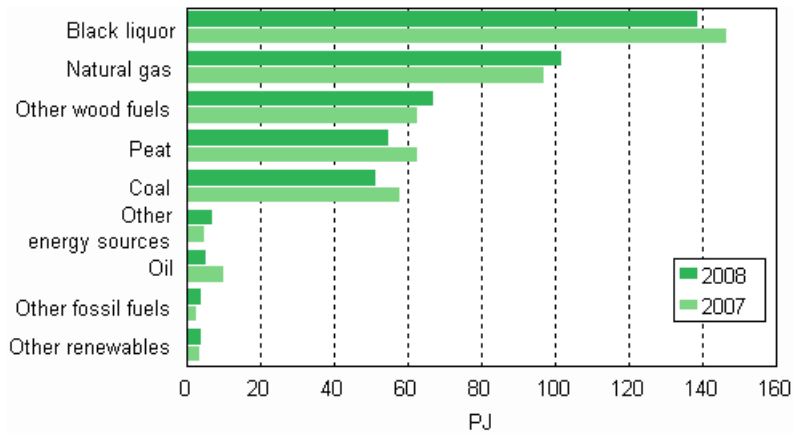
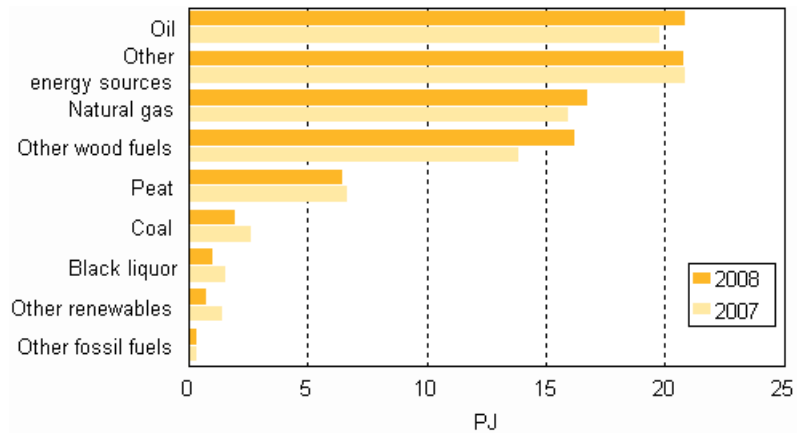


Figure 13. Fuel use in separate heat production 2007–2008



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