

Statistics Norway  
Department of Industry Statistics

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**Energy consumption in the  
services sector. 2000**

Documents

## **Preface**

This report is based on contract "ETAP B4-1040/D/2000-011NO, Part A" between Eurostat and Statistics Norway. It is a result of a desire to strengthen the energy statistics with better figures for the energy consumption in the services sector. The energy consumption in this report is specified by use (energy used for heating and so on), in addition to total figures.

Pål Marius Bergh has been responsible for this report. Anne Sofie Abrahamsen has been responsible for the sampling plan and estimation described in Appendix B.

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## Contents

1. Background and purpose .....	5
2. Commerce, hotels and restaurants. Branches 1 and 6 .....	6
2.1. Statistics production .....	6
2.2. Variables and classifications.....	7
2.3. Sources of error and uncertainty.....	7
2.4. Comparability and correlation .....	8
3. Other services sector. Branches 2-5 .....	9
3.1. Energy balances.....	9
3.2. Project: Measurement of energy use in 26 buildings.....	9
3.3 The buildings network .....	10
3.4 Statistics production .....	10
4. Tables .....	11
4.1. Branches 1 and 6.....	11
4.2. Branches 2-5 .....	15
4.3. Aggregated figures. Branches 1-6 .....	18
Appendices .....	20
Appendix A. Questionnaire for commerce, hotel and restaurants .....	20
Appendix B. Documentation of sampling plan and estimation .....	22
Appendix C. Table: Specific energy use in the buildings network.....	42
Appendix D. NACE-codes .....	44
Appendix E. Links to Internet sites .....	45



## 1. Background and purpose

This report is delivered according to a contract with Eurostat: ETAP B4-1040/D/2000-011NO. It is a result of a desire to strengthen the energy statistics with better figures for the energy consumption in the services sector. With the exception of the consumption of electric energy, where the figures are quite good, in the energy accounts and energy balance there are relatively uncertain figures for services. With financial help from Eurostat Statistics Norway has therefore as part of the project made a one-time survey for commerce, hotels and restaurants. In addition to a special publishing of the statistics of this particular survey on the Internet, at the address [http://www.ssb.no/vhrenergi\\_en/](http://www.ssb.no/vhrenergi_en/), this report is carried out to cover all the services sector described in the contract.

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In chapter 2 the statistics production and methods used for collecting data for the survey for commerce, hotels and restaurants are described, branches 1 and 6. Chapter 3 deals with the other services sectors, branches 2 to 5. In chapter 4 the statistical results for all these services sectors are presented.

In the survey data have also been collected for heated area in the enterprises. This has made it possible to calculate average consumption of energy per square metre heated area (specific energy consumption).

The NACE-codes included in the different branches in this report are listed in table 1.1.

**Table 1.1. NACE codes vs. branches**

Branches	Industry	NACE
1	Hotels and restaurants	55
2	Health and social work	85
3	Education	80
4	Other community, social and personal service activities	90-93
5	Offices and administration	60-67, 70-75
6	Commerce	50-52

## **2. Commerce, hotels and restaurants. Branches 1 and 6**

In this section the statistics production and methods used for collecting data from the survey for commerce, hotels and restaurants are described. The Statistics Act §2-2 and §2-3 ("Statistikkloven §2-2 og §2-3") has been used when collecting these data.

### **2.1. Statistics production**

#### **2.1.1. Scope**

The population consists of 69 185 enterprises distributed between 60 405 enterprises in commerce and 8 780 enterprises in hotels and restaurants. These are units registered in the Business and enterprise register within the industries 50, 51, 52 and 55 according to Standard for industries classification (SN94/NACE).

#### **2.1.2 Data sources**

A survey on energy use for a selection of enterprises in trade, hotel and restaurant services is carried out. To estimate total figures for the whole population preliminary figures from the Standard Industry Form are used, and also other information from the structure statistics (division 440 and 460) for these services. See Appendix C.

#### **2.1.3. Sampling**

Statistics Norway has collected data by a questionnaire from a selection of 2 863 enterprises in trade, hotels and restaurant services. This was distributed between 590 in hotel and restaurant services and the rest in trade. The selection is chosen to cover all the largest enterprises while the smaller enterprises are selected randomly. This is done to cover the population as well as possible without sending out too many questionnaires. 2 171 of those who have answered the questionnaire are included in the statistics.

#### **2.1.4. Collection of data**

The questionnaire is sent on paper by mail and received by mail. Reminders have been sent by mail. 2 209 enterprises answered the questionnaire with data, or 77 per cent.

#### **2.1.5. Quality control and revision**

Max, min and average values are checked. They have also been checked against the Standard Industry Form, both during the revision and the final control. Sales figures from 1998 were used to rank the companies during the revision. Decimal separators, thousand separators and denomination are checked.

The prices of electric energy are compared with the prices in the quarterly and annual electricity statistics. The prices for district heating are compared with the prices from the annual district heating statistics. The prices of petroleum products are compared with a list of prices from the Norwegian Petroleum Institute.

Specific energy consumption is checked against the annual report from Enovas operator for energy saving in buildings (see the table in Appendix C). The production of this statistics is a co-operation between Enovas operator for energy saving in buildings and Statistics Norway, based on data from a network of buildings.

Enova is, according to <http://www.enova.no>: "a new agency for promoting energy savings, new renewable energy and environmentally friendly natural gas solutions. The name of the new agency is Enova; it is located in the city of Trondheim; and owned by the Government of Norway - represented by the Ministry of Petroleum and Energy. Enova has been operational since January 1, 2002."

Total figures for the consumption were compared with the energy accounts and energy balance, annual electricity statistics and district heating statistics.

Statistics Norway wanted to know more about on what basis it was answered the questions about what the energy was used for. E-mail was sent to 25 companies asking on what basis they answered the question about what the energy was used for (heat, light and so on). 14 answered. 11 of these wrote that judgement was used to distribute between the different uses. 2 wrote that the use of electricity was made on judgement, but the rest was precise. 1 had used a programme for energy economizing. When the statistics were produced only those reporting percentages summing up to 100 per cent were used, and the obviously wrong figures were excluded.

When the reported values and quantities of energy use in the questionnaires were revised, prices of energy from different sources were used as a reference. The annual electricity statistics and the quarterly electricity statistics in Statistics Norway were used when checking the electricity prices in the reported data. Some of the companies reported figures indicating too low price of electric energy. These companies were contacted. The reason for the low prices was often that grid rent was not included.

In Norway the sales of electric energy and the transport of electric energy are split. There are competition between those selling electricity so that the consumers can choose which company they buy electricity from. The transport of the electricity (grid rent) is a natural monopoly and the consumers of electricity have to use the local grid company. According to annual electricity statistics the grid rent is quite different in different parts of the country. Therefore some differences in the total price of electric energy were accepted during the revision.

Annual district heating statistics for 2000 from Statistics Norway were used when checking the prices of district heating. Prices of petroleum products published by the Norwegian Petroleum Institute were used when checking the prices of petroleum products in the reported data.

The use of energy less than 100 kWh per m<sup>2</sup> is low and in some cases we asked the companies if this was correct. Figures from an annual report for 2000 from Enovas byggoperatør (Enovas operator for energy economizing in buildings) were used for information about energy use per square meter.

Some of the wholesale companies also have some manufacturing industries. These may be difficult to extract from the figures. At least one company was excluded from the statistics because of this.

Average prices for different energy goods were at the end calculated from all the approved data. For companies where we missed value or quantity these average energy prices were used to calculate value or quantity.

#### **2.1.6. Analysis**

Missing questionnaires are not imputed. Average prices and specific energy consumption are calculated based on reported quantities, values and square metres.

### **2.2. Variables and classifications**

#### **2.2.1. Definition of the main variables**

Specific energy consumption: Consumption of energy per square metre heated area.

Area: When calculating specific energy consumption the following is measured: Heated gross area (used in more than 6 months of the year) the enterprise had used in 2000 (cold-storage chamber included but exclusive of garage and storage not heated and so on).

Energy cost included in rent/common costs: With regard to the fact that some of the enterprises have energy costs included in the rent/common costs it is asked how much this amounted to.. Therefore it is possible to consider this when the tables are published.

1 TWh (TerraWatt hour) = 1000 GWh (GigaWatt hour)

1 GWh = 1000 MWh (MegaWatt hour)

1 MWh = 1000 kWh (kiloWatt hour)

#### **2.2.2. Standard classification**

“Standard Industrial Classification” (SN94/NACE) is used in the classification of industries. The division of energy commodities is the same as in what is usual in the energy statistics in Statistics Norway and with regard to the division Eurostat wants in their report.

### **2.3. Sources of error and uncertainty**

#### **2.3.1. Collection and processing errors**

The reported values are supposed to be inclusive of public taxes except for value added tax. The value of the costs of electric energy is inclusive of grid rent. One possible source for errors is that some include or exclude things that are supposed to be excluded or included. The figures from the population used for the measuring of total figures are preliminary (final figures are made in the end of June 2002). Therefore it will be some errors in these figures. This has been taken into consideration when the total figures have been produced (strange figures have been corrected or not included).

In many of the questionnaires the data for the distribution of energy by use was missing, and for many of those reporting these data the figures were uncertain. This is because many of the enterprises do not have this kind of information. Because of this the statistics for energy by use is more uncertain than the statistics for the total use of energy.

### ***2.3.2. Sampling errors***

Variance and distortion: See "Appendix B. Documentation of sampling plan and estimation".

Missing questionnaires: Missing questionnaires are not imputed.

## **2.4. Comparability and correlation**

### ***2.4.1. Comparability over time and place***

The statistics result in a one-time survey for the year 2000. It has been compared with the energy balance from Statistics Norway. This is an annual statistics explained in more detail in chapter 3.1. The energy balance divides the use of energy by NACE-codes and different types of energy commodities. The result of the one-time survey for NACE 50-52 and 55 was higher than the energy balance for some energy commodities (electricity) and lower for others. The statistics from the one-time survey has also been compared with the annual report from Enovas operator for energy saving in buildings.

### ***2.4.2. Correlation with other statistics***

Internally the statistics can be used in the energy account and the energy balance. It can also be used to compare with other countries reporting similar statistics to Eurostat. But different measuring years have been used in the different countries.

### 3. Other services sector. Branches 2-5

In this section the statistics production and methods used for producing energy statistics for branches 2 to 5 are described. To cover the use of energy in these branches – figures from the energy balances for Norway from Statistics Norway are used. In addition figures from a project carried out by Enovas operator for energy saving in buildings are used to split the use of energy between different uses. Statistics from a buildings network explained in chapter 3.3 are also used.

#### 3.1. Energy balances

The energy balances for Norway are described in the publication “Energy Statistics 2000” from Statistics Norway. This publication is published in the series “Official Statistics of Norway” and is, in addition to a paper version, available at the Internet address [http://www.ssb.no/english/subjects/10/08/10/nos\\_energy/](http://www.ssb.no/english/subjects/10/08/10/nos_energy/)

From the preface of “Energy Statistics 2000”:

*Energy Statistics 2000 contains data on total energy consumption, electricity, crude oil, natural gas, petroleum products, coal and coke, prices and price changes for different energy bearers. The publication contains a selection of energy statistics. Many of the figures have been presented in other publications issued by Statistics Norway (e.g. NOS Oil and Gas Activity, NOS Electricity Statistics, and NOS External Trade). In addition, some of the figures have been published on Statistics Norway's website on the Internet. Without this particular publication, however, it would have been rather difficult to obtain a general overview of the energy sector.*

Abstract from chapter 2 in “Energy Statistics 2000”:

*Energy balance sheets have been prepared to provide an overview of the supply and consumption of energy. Such balance sheets can be set up in a variety of ways. The best layout will depend on the specific objective in mind. However, as different principles and definitions are applied to the different constellations, we advise caution when comparing figures from different layouts.*

Two kinds of energy balance sheet are presented in this publication:

1. Energy accounts
2. Energy balances

*Figures from the energy sources balance sheet are reported to international organizations such as the OECD and the UN. The energy balance sheet will therefore usually be comparable with international energy statistics.*

The energy balances are used when producing the statistics for the branches 2 to 5 in this report.

#### 3.2. Project: Measurement of energy use in 26 buildings

For the branches 1 and 6 the statistics for the use of energy were based on the survey described in chapter 2. For the branches 2 to 5 we used figures from a project (In Norwegian called “Modellbyggprosjektet”) carried out by Enovas operator for energy saving in buildings. The report from this project is only available in Norwegian; Report no. 1-02 from Enovas operator for energy saving in buildings. Contact person is Ole-Gunnar Søgne; e-mail [osoegnen@online.no](mailto:osoegnen@online.no). Except for the figures gained in the survey described in chapter 2 and the figures from the project described in this chapter – not much statistics for the consumption of energy divided between different uses in Norway are available.

During the project extensive measurements of 26 buildings were made for one year. The measuring period was from the autumn in 2000 to the autumn 2001 (September/October). Big resources were used to install instruments and produce these figures. “Norwegian Standard 3032 - Buildings energy and effect budget” was used when measuring the use of energy. The 26 buildings were divided between five types of buildings from most of the country. The buildings participating in the project were seven primary schools, four nursing homes, three Universities/academies, four grocery shops and eight offices.

**Table 3.1. Energy consumption. kWh/m<sup>2</sup>.**

	Number of buildings	Heating	Ventilation	Hot water	Fan/pumps	Light	Various	Cooling	Total
Primary schools	7	98,1	35,4	9,3	12,3	19,0	16,8	0,0	190,9
Nursing homes	4	69,7	91,5	27,2	25,7	67,2	27,6	0,4	309,2
Grocery shops	3	34,3	64,6	5,2	46,7	69,3	298,3	9,6	528,0
Offices	8	62,2	36,8	4,8	38,0	26,7	28,9	7,3	204,7
Universities/academies	4	44,8	27,4	8,6	42,6	34,8	21,3	7,9	187,3

**Table 3.2. Percentual division of energy consumption. Per cent.**

	Number of buildings	Heating	Ventilation	Hot water	Fan/pumps	Light	Various	Cooling	Total
Primary schools	7	51,4	18,5	4,9	6,4	10,0	8,8	0,0	100
Nursing homes	4	22,5	29,6	8,8	8,3	21,7	8,9	0,1	100
Grocery shops	3	6,5	12,2	1,0	8,9	13,1	56,5	1,8	100
Offices	8	30,4	18,0	2,3	18,6	13,0	14,1	3,6	100
Universities/academies	4	23,9	14,6	4,6	22,7	18,6	11,4	4,2	100

### 3.3 The buildings network

The buildings network is a network driven by Enovas operator for energy saving in buildings. The network consists, among others, of owners of buildings that have volunteered to report use of energy and data about the building. The aim of the network is to reduce the use of energy in buildings. Some of the buildings probably have less specific use of energy than normal because of this focus on reducing use of energy. But still others may join this network because they have high use of energy and therefore a big potential for energy saving. Each year Enovas operator for energy saving in buildings produce a report. One of the tables in the report for 2000 is shown in Appendix C. The production of this statistics is a co-operation between Enovas operator for energy saving in buildings and Statistics Norway, based on data from this network of buildings.

### 3.4 Statistics production

#### 3.4.1 Specific energy use

A disadvantage of using these figures described in chapter 3.2 is that the number of buildings is very low. Therefore the statistics based on these figures are uncertain. When estimating the specific use of energy (kWh/m<sup>2</sup>) for different uses (see the results in tables 4.4-4.6) the figures in table 3.2 (divided by 100) were multiplied with the specific use of energy from the same type of building in the table shown in Appendix C. This is a table showing statistics for specific energy use in the buildings network, described in chapter 3.3.

The measuring unit for both the project described in chapter 3.2 and the statistics from the buildings network described in chapter 3.3 was buildings, and not enterprises as in the one-time survey for Commerce, hotels and restaurants. The relatively low number of buildings, the fact that the measuring unit is buildings, and the fact that not all types of buildings are represented makes the statistics for the specific use of energy in tables 4.4-4.6 uncertain.

Except for NACE 80 and 85 the specific energy use for the other NACE types in branches 2-5 was calculated from the figures from offices in table 3.2 and office building (code 31) in Appendix C.

For NACE 80 a weighted average of the figures for school buildings in table 3.2 and in Appendix C has been used. The number of pupils and students from The Education statistics from Statistics Norway was used to weigh these figures. In the autumn of 2000 it was 590 471 pupils in the primary school, 163 748 students at college and 191 505 students at Universities and academies.

For NACE 85 an unweighted average of the figures for offices and nursing homes in tables 3.2 and C.1 (in Appendix C) are used.

The figures for total consumption of energy for each of the industries were used to weigh together aggregated figures for specific use of energy for branches and total.

#### 3.4.2 Total energy use

To produce the total use of energy divided between the different types of energy commodities the figures from the Energy balances was used. The percentual dividing between the different types of uses (heat, light and so on) was made from an average of all the figures from the survey of energy use in Commerce, hotels and restaurants.

## 4. Tables

In this chapter the final result is presented, with tables for use of energy in the services sector. The figures in the tables for consumption for space heating and hot water are given in TJ, as used in the Eurostat Report "Energy consumption in the services sector, 2002 Edition".

### 4.1. Branches 1 and 6

The production of the tables in this chapter is explained in chapter 2.

In 2000 the total use of energy, when transport is excluded, was 13 341 TJ for the branches 1 and 6. See table 4.1. As much as 87 per cent of this was use of electric energy. This percentage is much higher than it is in most of the other European countries. 500 TJ of the energy consumption was district heating. This is less than 4 per cent of total energy consumption. The topography of Norway (with mountains and waterfalls used to produce hydro electricity) and the fact that it is relatively scattered settling in this country explains some of the high percentages for electricity and low for district heating.

The energy consumption for space heating and hot water per m<sup>2</sup> (kWh/m<sup>2</sup>) for hotels, branch 1, is 28 per cent higher than for commerce, branch 6. For hotels the total energy consumption per m<sup>2</sup> for all types of uses was higher than commerce. In addition, a higher percentage of the energy was used for space heating and hot water.

Table 4.2 shows that specific energy consumption of energy used for air-conditioning and ventilation is much higher in hotels than in commerce. The figures were 71.8 and 34.2 kWh/m<sup>2</sup> respectively. A higher percentage of the energy in the hotels compared with commerce was used for air-conditioning and ventilation. In Norway the climate makes the use of air-condition relatively low.

While the average specific energy consumption of energy used for air-conditioning and ventilation for hotels and commerce was 40.8 kWh/m<sup>2</sup>, table 4.3 shows that the average energy consumption for lighting was 77.7 kWh/m<sup>2</sup>.

Table 4.3 also shows that 3 213 GWh electric energy was used for heating/hot water in branches 1 and 6. This is 41 per cent of the total use of electricity. The total use of electricity for the branches was 7 818 GWh in 2000.

**Table 4.1. Consumption for space heating and hot water. 2000. Branches 1 and 6. TJ**

	Energy consumption per m <sup>2</sup> (kWh/m <sup>2</sup> )	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (1+6)</b>	<b>162.5</b>	<b>1 256</b>	<b>11 566</b>	<b>500</b>	<b>3</b>	<b>12</b>	<b>4</b>	<b>13 341</b>
<b>Branches</b>								
<b>1</b>	<b>201.6</b>	<b>118</b>	<b>2 483</b>	<b>105</b>	<b>0</b>	<b>6</b>	<b>3</b>	<b>2 715</b>
<b>6</b>	<b>157.2</b>	<b>1 138</b>	<b>9 083</b>	<b>396</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>10 626</b>
<b>NACE</b>								
<b>50 Sale, maintenance and repair of motor vehicles, motorcycles; retail sale of automotive</b>	<b>202.7</b>	<b>435</b>	<b>1 457</b>	<b>69</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>1 962</b>
50.1 Sale of motor vehicles	161.9	112	423	56	0	-	-	591
50.2 Maintenance and repair of motor vehicles	183.4	186	603	-	-	-	-	789
50.3 Sale of motor vehicles parts and accessories	177.5	27	112	14	1	-	-	153
50.4 Sale, maintenance and repair of motorcycles and related parts and	106.7	-	16	0	-	-	-	16
50.5 Retail sale of automotive fuel	284.7	109	304	-	-	1	-	414
<b>51 Wholesale trade and commission trade, except of motor vehicles and motorcycles</b>	<b>176.8</b>	<b>409</b>	<b>3 190</b>	<b>265</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>3 867</b>
51.1 Wholesale on a fee or contract basis	206.0	1	75	-	-	-	-	76
51.2 Wholesale of agricultural raw materials and live animals	294.9	148	179	0	-	-	-	328
51.3 Wholesale of food, beverages and tobacco	151.7	30	266	40	-	-	-	335
51.4 Wholesale of household goods	141.3	45	411	36	-	-	-	493
51.5 Wholesale of non-agricultural intermediate products, waste and scrap	199.2	92	1 429	146	-	3	-	1 670
51.6 Wholesale of machinery, equipment and supplies	170.0	69	785	43	-	-	-	896
51.7 Other wholesale	150.8	23	46	-	-	-	-	69
<b>52 Retail trade, except of motor vehicles and motorcycles; repair of personal and</b>	<b>122.7</b>	<b>294</b>	<b>4 436</b>	<b>62</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>4 797</b>
52.1 Retail sale in non-specialized stores	147.4	174	2 806	45	1	2	0	3 028
52.2 Retail sale of food, beverages and tobacco in specialized stores	181.9	3	108	-	-	0	-	111
52.3 Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	114.4	1	59	-	-	-	-	60
52.4 Other retail sale of new goods in specialized stores	135.8	114	1 400	17	1	0	0	1 533
52.5 Retail sale of second-hand goods in stores	86.6	0	7	-	0	-	-	7
52.6 Retail sale not in stores	89.5	-	39	-	-	-	-	39
52.7 Repair of personal and household goods	106.4	2	18	-	-	-	-	20
<b>55 Hotels and restaurants</b>	<b>201.6</b>	<b>118</b>	<b>2 483</b>	<b>105</b>	<b>0</b>	<b>6</b>	<b>3</b>	<b>2 715</b>
55.1 Hotels	146.1	83	1 325	94	-	2	2	1 506
55.3 Restaurants	229.2	22	952	8	0	4	1	987
55.5 Canteens and catering	218.6	13	206	3	-	1	-	222

**Table 4.2. Consumption for air-conditioning and ventilation. 2000. Branches 1 and 6. GWh**

	Energy consumption per m2 (kWh/m2)	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (1+6)</b>	<b>40.8</b>	<b>5</b>	<b>868</b>	<b>15</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>887</b>
<b>Branches</b>								
<b>1</b>	<b>71.8</b>	<b>2</b>	<b>254</b>	<b>5</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>261</b>
<b>6</b>	<b>34.2</b>	<b>3</b>	<b>613</b>	<b>10</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>626</b>
<b>NACE</b>								
<b>50 Sale, maintenance and repair of motor vehicles, motorcycles; retail sale of automotive</b>	<b>45.3</b>	<b>-</b>	<b>102</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>103</b>
50.1 Sale of motor vehicles	39.2	-	33	1	-	-	-	34
50.2 Maintenance and repair of motor vehicles	38.2	-	37	-	-	-	-	37
50.3 Sale of motor vehicles parts and accessories	34.5	-	7	0	-	-	-	7
50.4 Sale, maintenance and repair of motorcycles and related parts and	30.8	-	1	-	-	-	-	1
50.5 Retail sale of automotive fuel	67.1	-	24	-	-	-	-	24
<b>51 Wholesale trade and commission trade, except of motor vehicles and motorcycles</b>	<b>29.9</b>	<b>3</b>	<b>163</b>	<b>8</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>175</b>
51.1 Wholesale on a fee or contract basis	15.0	-	1	-	-	-	-	1
51.2 Wholesale of agricultural raw materials and live animals	24.6	-	5	-	-	-	-	5
51.3 Wholesale of food, beverages and tobacco	25.8	-	14	-	-	-	-	14
51.4 Wholesale of household goods	24.2	1	21	3	-	-	-	25
51.5 Wholesale of non-agricultural intermediate products, waste and scrap	35.9	2	76	3	-	-	-	81
51.6 Wholesale of machinery, equipment and supplies	33.2	-	45	2	-	-	-	47
51.7 Other wholesale	6.6	-	1	-	-	-	-	1
<b>52 Retail trade, except of motor vehicles and motorcycles; repair of personal and</b>	<b>33.0</b>	<b>-</b>	<b>348,2</b>	<b>0,1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>348,3</b>
52.1 Retail sale in non-specialized stores	49.7	-	277	-	-	-	-	277
52.2 Retail sale of food, beverages and tobacco in specialized stores	28.4	-	5	-	-	-	-	5
52.3 Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	23.7	-	3	-	-	-	-	3
52.4 Other retail sale of new goods in specialized stores	20.1	-	60	0	-	-	-	60
52.5 Retail sale of second-hand goods in stores	6.4	-	0	-	-	-	-	0
52.6 Retail sale not in stores	19.3	-	2	-	-	-	-	2
52.7 Repair of personal and household goods	16.0	-	1	-	-	-	-	1
<b>55 Hotels and restaurants</b>	<b>71.8</b>	<b>2</b>	<b>254</b>	<b>5</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>261</b>
55.1 Hotels	43.0	2	114	4	-	-	0	120
55.3 Restaurants	103.3	-	119	0	-	-	-	119
55.5 Canteens and catering	77.8	-	21	-	-	-	-	21

**Table 4.3. Consumption for specific uses of electricity, 2000. Branches 1 and 6. GWh**

	<u>Lighting</u>		Heating/hot water	Cooling and freezing	Ventilation and air-condition	Electrical appliances	Other	Total
	kWh/m2	Total consumption						
<b>Total (1+6)</b>	<b>77.7</b>	<b>1 893</b>	<b>3 213</b>	<b>1 005</b>	<b>868</b>	<b>557</b>	<b>351</b>	<b>7 887</b>
<b>Branches</b>								
<b>1</b>	<b>69.3</b>	<b>291</b>	<b>690</b>	<b>213</b>	<b>254</b>	<b>124</b>	<b>146</b>	<b>1 718</b>
<b>6</b>	<b>79.1</b>	<b>1 602</b>	<b>2 524</b>	<b>792</b>	<b>613</b>	<b>433</b>	<b>205</b>	<b>6 169</b>
<b>NACE</b>								
<b>50 Sale, maintenance and repair of motor vehicles, motorcycles; retail sale of automotive</b>	<b>69.0</b>	<b>199</b>	<b>405</b>	<b>63</b>	<b>102</b>	<b>73</b>	<b>77</b>	<b>919</b>
50.1 Sale of motor vehicles	44.7	59	117	6	33	23	21	258
50.2 Maintenance and repair of motor vehicles	43.0	63	167	13	37	26	16	323
50.3 Sale of motor vehicles parts and accessories	53.2	16	31	0	7	5	4	63
50.4 Sale, maintenance and repair of motorcycles and related parts and	64.8	3	4	0	1	0	0	9
50.5 Retail sale of automotive fuel	131.7	58	84	43	24	20	36	265
<b>51 Wholesale trade and commission trade, except of motor vehicles and motorcycles</b>	<b>43.1</b>	<b>364</b>	<b>887</b>	<b>86</b>	<b>163</b>	<b>193</b>	<b>71</b>	<b>1 765</b>
51.1 Wholesale on a fee or contract basis	43.0	7	21	1	1	4	1	36
51.2 Wholesale of agricultural raw materials and live animals	56.8	26	50	8	5	6	0	95
51.3 Wholesale of food, beverages and tobacco	43.7	45	74	61	14	16	7	218
51.4 Wholesale of household goods	44.1	51	114	3	21	26	7	222
51.5 Wholesale of non-agricultural intermediate products, waste and scrap	43.6	149	397	5	76	87	41	755
51.6 Wholesale of machinery, equipment and supplies	37.7	80	218	8	45	50	14	416
51.7 Other wholesale	51.3	6	13	0	1	3	-	23
<b>52 Retail trade, except of motor vehicles and motorcycles; repair of personal and</b>	<b>99.9</b>	<b>1 039</b>	<b>1 232</b>	<b>643</b>	<b>348</b>	<b>166</b>	<b>57</b>	<b>3 485</b>
52.1 Retail sale in non-specialized stores	108.4	641	779	608	277	107	38	2 450
52.2 Retail sale of food, beverages and tobacco in specialized stores	118.8	22	30	18	5	4	5	83
52.3 Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	101.3	15	16	0	3	2	0	37
52.4 Other retail sale of new goods in specialized stores	94.6	350	389	16	60	46	12	873
52.5 Retail sale of second-hand goods in stores	37.5	1	2	0	0	0	0	4
52.6 Retail sale not in stores	38.5	6	11	1	2	2	1	22
52.7 Repair of personal and household goods	57.4	4	5	-	1	4	1	16
<b>55 Hotels and restaurants</b>	<b>69.3</b>	<b>291</b>	<b>690</b>	<b>213</b>	<b>254</b>	<b>124</b>	<b>146</b>	<b>1 718</b>
55.1 Hotels	57.9	176	368	61	114	43	33	795
55.3 Restaurants	73.3	91	264	116	119	67	95	753
55.5 Canteens and catering	65.4	24	57	36	21	14	18	170

## 4.2. Branches 2-5

As explained in chapter 3 the Energy balance was used when producing the statistics for the branches 2-5. Only the NACE-codes are shown in these tables. See Appendix D listing the NACE-codes for the different industries mentioned in this report.

"Other" energy in the tables in this chapter includes natural gas, other gas and garbage.

In table 4.5 we can see that the specific energy use for space heating and hot water for branch 3, education, is higher than for the other branches. This is because a high percentage of the energy in primary schools was used for space heating and hot water (see table 3.2).

Offices and administration, branch 5, used almost half of the total energy that branches 2-5 used for space heating and hot water. While the total consumption for space heating and hot water for branches 2-5 was 39 489 TJ, table 4.6 shows that the total consumption for ventilation for these branches was 6 279 GWh, or 22 604 TJ.

**Table 4.4. Consumption for space heating and hot water. 2000. Branches 2-5. TJ**

	Energy consumption per m2 (kWh/m2)	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (2 -5)</b>	<b>77.6</b>	<b>10 092</b>	<b>26 086</b>	<b>3 087</b>	<b>38</b>	<b>-</b>	<b>186</b>	<b>39 489</b>
<b>Branches</b>								
2	79.2	1 502	3 719	27	19	-	26	5 293
3	99.2	847	4 393	645	5	-	-	5 890
4	69.9	1 219	6 868	595	8	-	141	8 831
5	69.9	6 524	11 107	1 819	6	-	19	19 476
<b>Nace</b>								
60	69.9	57	986	-	-	-	16	1 059
61	69.9	5 101	14	-	-	-	-	5 115
62	69.9	-	115	-	-	-	-	115
63	69.9	223	877	82	1	-	-	1 183
64	69.9	49	948	-	-	-	-	997
65-67	69.9	221	1 219	348	2	-	-	1 790
70	69.9	46	463	132	-	-	-	640
71	69.9	20	153	44	-	-	-	216
72	69.9	-	-	-	-	-	-	-
73	69.9	30	-	0	-	-	-	30
74	69.9	92	1 230	351	2	-	-	1 674
75	69.9	685	5 103	864	0	-	3	6 655
80	99.2	847	4 393	645	5	-	-	5 890
85	79.2	1 502	3 719	27	19	-	26	5 293
90	69.9	1	13	40	-	-	141	195
91	69.9	248	1 853	-	0	-	-	2 101
92	69.9	161	3 082	286	4	-	-	3 533
93	69.9	809	1 920	269	3	-	-	3 002

**Table 4.5. Consumption for ventilation. 2000. Branches 2-5. GWh**

	Consumption per m2 (kWh/m2)	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (2 -5)</b>	<b>40.5</b>	<b>215</b>	<b>5 686</b>	<b>369</b>	-	-	<b>7</b>	<b>6 279</b>
<b>Branches</b>								
2	50.8	32	811	3	-	-	1	847
3	37.9	18	957	77	-	-	-	1 053
4	38.4	26	1 497	71	-	-	6	1 600
5	38.4	139	2 421	218	-	-	1	2 779
<b>Nace</b>								
60	38.4	1	215	-	-	-	1	217
61	38.4	109	3	-	-	-	-	112
62	38.4	-	25	-	-	-	-	25
63	38.4	5	191	10	-	-	-	206
64	38.4	1	207	-	-	-	-	208
65-67	38.4	5	266	42	-	-	-	312
70	38.4	1	101	16	-	-	-	118
71	38.4	0	33	5	-	-	-	39
72	38.4	-	-	-	-	-	-	-
73	38.4	1	-	0	-	-	-	1
74	38.4	2	268	42	-	-	-	312
75	38.4	15	1 112	103	-	-	0	1 230
80	37.9	18	957	77	-	-	-	1 053
85	50.8	32	811	3	-	-	1	847
90	38.4	0	3	5	-	-	6	13
91	38.4	5	404	-	-	-	-	409
92	38.4	3	672	34	-	-	-	709
93	38.4	17	419	32	-	-	-	468

**Table 4.6. Consumption for specific uses of electricity. 2000. Branches 2-5.  
GWh**

	<u>Lighting</u>		Heating/hot water	Cooling and freezing	Ventilation and air-condition	Electrical appliances	Other	Total
	kWh/m2	Total consumption						
<b>Total (2 -5)</b>	<b>56.3</b>	<b>4 315</b>	<b>7 257</b>	<b>1 237</b>	<b>1 582</b>	<b>1 322</b>	<b>759</b>	<b>16 472</b>
<b>Branches</b>								
2	64.6	615	1 035	176	226	188	108	2 348
3	51.1	727	1 222	208	266	223	128	2 774
4	55.8	1 136	1 911	326	417	348	200	4 337
5	55.8	1 837	3 090	527	674	563	323	7 013
<b>Nace</b>								
60	55.8	163	274	47	60	50	29	622
61	55.8	2	4	1	1	1	0	9
62	55.8	19	32	5	7	6	3	73
63	55.8	145	244	42	53	44	26	553
64	55.8	157	264	45	57	48	28	599
65-67	55.8	202	339	58	74	62	35	770
70	55.8	77	129	22	28	23	13	292
71	55.8	25	43	7	9	8	4	97
72	55.8	-	-	-	-	-	-	-
73	55.8	-	-	-	-	-	-	-
74	55.8	203	342	58	75	62	36	777
75	55.8	844	1 420	242	309	259	148	3 222
80	51.1	727	1 222	208	266	223	128	2 774
85	64.6	615	1 035	176	226	188	108	2 348
90	55.8	2	4	1	1	1	0	8
91	55.8	307	516	88	112	94	54	1 170
92	55.8	510	857	146	187	156	90	1 946
93	55.8	318	534	91	116	97	56	1 213

### 4.3. Aggregated figures. Branches 1-6

This chapter includes tables with aggregated figures for all the branches 1-6. Most of the figures are found in the previous tables, or as totals of these tables, but the total average specific use of energy for all the branches are only found in tables 4.8-4.10. The aggregation of branches vs. NACE is described in chapter 1. NACE-codes vs industries are listed in Appendix D.

**Table 4.7. Total consumption. 2000. TJ**

	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (1 -6)</b>	<b>6 795</b>	<b>87 878</b>	<b>4 144</b>	<b>58</b>	<b>141</b>	<b>297</b>	<b>99 312</b>
<b>Branch 1</b>	<b>129</b>	<b>6 183</b>	<b>122</b>	<b>0</b>	<b>93</b>	<b>5</b>	<b>6 534</b>
<b>Branch 2</b>	<b>1 632</b>	<b>8 480</b>	<b>31</b>	<b>27</b>	<b>-</b>	<b>40</b>	<b>10 209</b>
<b>Branch 3</b>	<b>921</b>	<b>10 017</b>	<b>737</b>	<b>7</b>	<b>-</b>	<b>-</b>	<b>11 682</b>
<b>Branch 4</b>	<b>1 325</b>	<b>15 662</b>	<b>680</b>	<b>11</b>	<b>-</b>	<b>214</b>	<b>17 891</b>
<b>Branch 5</b>	<b>1 546</b>	<b>25 328</b>	<b>2 080</b>	<b>9</b>	<b>-</b>	<b>29</b>	<b>28 992</b>
<b>Branch 6</b>	<b>1 242</b>	<b>22 209</b>	<b>492</b>	<b>4</b>	<b>47</b>	<b>10</b>	<b>24 004</b>
<b>Nace</b>							
<b>50</b>	<b>508</b>	<b>3 308</b>	<b>127</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>3 946</b>
50.1	138	928	59	0	0	0	1 125
50.2	227	1 163	52	0	0	0	1 442
50.3	28	227	15	1	1	0	272
50.4	0	34	0	0	0	0	34
50.5	116	955	1	0	2	0	1 073
<b>51</b>	<b>431</b>	<b>6 354</b>	<b>298</b>	<b>0</b>	<b>32</b>	<b>5</b>	<b>7 120</b>
51.1	7	129	3	0	0	0	139
51.2	148	342	0	0	13	0	503
51.3	30	783	40	0	2	4	859
51.4	48	801	48	0	0	0	897
51.5	106	2 719	157	0	16	0	2 999
51.6	69	1 498	50	0	1	0	1 617
51.7	23	82	0	0	0	0	105
<b>52</b>	<b>303</b>	<b>12 548</b>	<b>68</b>	<b>2</b>	<b>12</b>	<b>5</b>	<b>12 938</b>
52.1	174	8 820	45	1	11	0	9 050
52.2	3	301	1	0	0	0	305
52.3	1	135	1	0	0	0	137
52.4	120	3 142	20	1	1	0	3 285
52.5	0	13	0	0	0	4	18
52.6	2	81	1	0	0	0	84
52.7	2	57	0	0	0	0	59
<b>55</b>	<b>129</b>	<b>6 183</b>	<b>122</b>	<b>0</b>	<b>93</b>	<b>5</b>	<b>6 534</b>
55.1	92	2 862	110	0	17	4	3 085
55.3	22	2 710	9	0	75	2	2 818
55.5	15	611	3	0	2	0	631
60	62	2 248	-	-	-	24	2 334
61	-	32	-	-	-	-	32
62	-	263	-	-	-	-	263
63	243	1 999	94	2	-	-	2 337
64	53	2 162	-	-	-	-	2 215
65-67	240	2 780	397	3	-	-	3 421
70	50	1 055	151	-	-	-	1 256
71	21	349	50	-	-	-	420
72	-	-	-	-	-	-	-
73	32	-	0	-	-	-	32
74	100	2 804	401	3	-	-	3 308
75	745	11 636	988	1	-	5	13 373
80	921	10 017	737	7	-	-	11 682
85	1 632	8 480	31	27	-	40	10 209
90	1	30	46	-	-	214	290
91	269	4 226	-	0	-	-	4 495
92	175	7 027	327	6	-	-	7 536
93	879	4 379	308	4	-	-	5 570

**Table 4.8. Consumption for space heating and hot water. 2000. Branches 1-6. TJ**

	Energy consumption per m2 (kWh/m2)	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (1-6)</b>	<b>98.4</b>	<b>11 348</b>	<b>37 652</b>	<b>3 587</b>	<b>42</b>	<b>12</b>	<b>189</b>	<b>52 830</b>
<b>Branches</b>								
<b>1</b>	201.6	118	2 483	105	0	6	3	2 715
<b>2</b>	79.2	1 502	3 719	27	19	-	26	5 293
<b>3</b>	99.2	847	4 393	645	5	-	-	5 890
<b>4</b>	69.9	1 219	6 868	595	8	-	141	8 831
<b>5</b>	69.9	6 524	11 107	1 819	6	-	19	19 476
<b>6</b>	157.2	1 138	9 083	396	3	6	0	10 626

**Table 4.9. Consumption for air-conditioning and ventilation. 2000. Branches 1-6. GWh**

	Consumption per m2 (kWh/m2)	Heating oil	Electricity	District heating	Paraffin	Fluid propane and butane	Other	Total
<b>Total (1-6)</b>	<b>40,6</b>	<b>220</b>	<b>6 554</b>	<b>384</b>	<b>-</b>	<b>-</b>	<b>7</b>	<b>7 166</b>
<b>Branches</b>								
<b>1</b>	71.8	2	254	5	-	-	0	261
<b>2</b>	50.8	32	811	3	-	-	1	847
<b>3</b>	37.9	18	957	77	-	-	-	1 053
<b>4</b>	38.4	26	1 497	71	-	-	6	1 600
<b>5</b>	38.4	139	2 421	218	-	-	1	2 779
<b>6</b>	34.2	3	613	10	-	-	-	626

**Table 4.10. Consumption for specific uses of electricity. 2000. Branches 1-6. GWh**

	<u>Lighting</u> kWh/m2	Total consumption	Heating/ hot water	Cooling and freezing	Ventilation and air-condition	Electrical appliances	Other	Total
<b>Total (1-6)</b>	<b>62,8</b>	<b>6 208</b>	<b>10 471</b>	<b>2 242</b>	<b>2 450</b>	<b>1 879</b>	<b>1 110</b>	<b>24 359</b>
<b>Branches</b>								
<b>1</b>	69,3	291	690	213	254	124	146	1 718
<b>2</b>	64,6	615	1 035	176	226	188	108	2 348
<b>3</b>	51,1	727	1 222	208	266	223	128	2 774
<b>4</b>	55,8	1 136	1 911	326	417	348	200	4 337
<b>5</b>	55,8	1 837	3 090	527	674	563	323	7 013
<b>6</b>	79,1	1 602	2 524	792	613	433	205	6 169

# Appendices

## Appendix A. Questionnaire for commerce, hotel and restaurants



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Statistics Norway

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Phone: 21 09 00 00 Fax: 21 09 49 96

**Professional secrecy  
Filing requirement**

### Energy consumption in the service sector 2000

Commerce, hotel and restaurants

#### 1. Use of energy (not included in rent/common expenses)

	Quantity		Value excl. VAT (1 000 kr)
1.1 Electricity (grid rent included) .....	<input type="text"/>	1 000 kWh	<input type="text"/>
1.2 District heating .....	<input type="text"/>	1 000 kWh	<input type="text"/>
1.3 Paraffin .....	<input type="text"/>	Litre	<input type="text"/>
1.4 Gasolin .....	<input type="text"/>	Litre	<input type="text"/>
1.5 Auto diesel, tax bound .....	<input type="text"/>	Litre	<input type="text"/>
1.6 Auto diesel, tax free .....	<input type="text"/>	Litre	<input type="text"/>
1.7 Heat oil .....	<input type="text"/>	Litre	<input type="text"/>
1.8 Fluid propane and butane .....	<input type="text"/>	Litre	<input type="text"/>
1.9 Other fuel (specify) 1.9.1 .....	<input type="text"/>	Unit: .....	<input type="text"/>
1.9.2 .....	<input type="text"/>	Unit: .....	<input type="text"/>
1.9.3 .....	<input type="text"/>	Unit: .....	<input type="text"/>
<b>Total</b>			<input type="text"/>

#### 2. Area

How large heated gross area (used more than 6 months) used the enterprise in the year 2000? (Incl. cooling-/freeze store, excl. unheated store, garage and so on).  
See guidance

Square metres

#### 3. Energy expenses included in rent/common expenses

Are the energy expenses for premises totally or partially included in rent/common expenses?

- Yes → Estimate the energy expenses paid for in the rent/common expenses 2000.....
- No

1000 kr.  
(Excl. VAT)

#### 4. Ventilation installation

Do the enterprise have ventilation installation/air-condition in one or more of the premises?

- No
- Yes → How large area do the installation cover? .....

Square metres

### 5. Distribution of energy by use (quantity)

Distribute the energy by use (ref. Part 1). The total of each row must be 100 per cent for energy goods the enterprised used in the year year 2000. Estimations can be used. Give the figures without decimals.

	2.1 Heating/ hot water	2.2 Lighting	2.3 Cool and freeze	2.4 Ventilation installation /air- condition	2.5 Electronic equipment	2.6 Other stationary energy use	2.7 Vehicle/ transport	Total
5.1 Electricity	%	%	%	%	%	%	%	100 %
5.2 District heating	%	%	%	%	%	%	%	100 %
5.3 Paraffin	%	%	%	%	%	%	%	100 %
5.4 Gasolin	%	%	%	%	%	%	%	100 %
5.5 Auto diesel, tax bound	%	%	%	%	%	%	%	100 %
5.6 Auto diesel, tax free	%	%	%	%	%	%	%	100 %
5.7 Heat oil	%	%	%	%	%	%	%	100 %
5.8 Fluid propane and butane	%	%	%	%	%	%	%	100 %
5.9 Other fuel (specify)								
5.9.1	%	%	%	%	%	%	%	100 %
5.9.2	%	%	%	%	%	%	%	100 %
5.9.3	%	%	%	%	%	%	%	100 %

### Other information and messages to Statistics Norway

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.....

.....

.....

.....

### Applications from You to Statistics Norway can be made to

Guro Henriksen (phone 21 09 47 65), Randi Brakalsvålet (21 09 47 73), Live Tanum Pasnin (21 09 49 19) or Randi Brakalsvålet (21 09 47 73)

### Applications from Statistics Norway can be made to

Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Place/date: \_\_\_\_\_ Signature: \_\_\_\_\_

## **Appendix B. Documentation of sampling plan and estimation**

Anne Sofie Abrahamsen

Division for Statistical Methods and Standards

28 June 2002

# **Energy consumption in the service sector**

## **Documentation of sampling plan and estimation**

### **Introduction**

Energy statistics for the service industry comprises domestic trade, sector 50 – 52 and hotels and restaurants – sector 55 excluding bars/pubs (55.4) and camping sites (55.2) Population is defined by

nace1	-	50.110 - 52.740 and 55.110, 55.120, 55.301, 55.302, 55.510, 55.520
reg. type	-	01, 02 and 04
status	-	B

It is assumed that energy statistics sample for the service sector is selected from the structural statistics sample for these sectors.

### **Structural statistics**

The sample drawn for the structural statistics comprises 5068 enterprises (sector 50 – 52) and 958 enterprises within hotels and restaurants (sector 55.1, 55.3 and 55,5). A small overview of the correlation between variables for enterprises in the structural sample is shown in the appendix, chapter 4.

- turnover and number of employees by 2-digit sector in appendix 4.2
- inclusion probability versus employment for enterprises randomly selected in appendix 4.3

The sample plan for structural statistics is based on Leiv Solheim's system, described in notes: Iso 13. March 2001 – "Structural statistics 2000 – proposal for co-ordination of sample plan". Inclusion probability for the structural statistics was calculated on the basis of the enterprise's industry, size, age and complexity and rounded off within strata.

## **Sampling plan for energy statistics – service industries**

### **Sampling plan**

The sample is preferably to be limited to about 3 000 enterprises, and is to be drawn from enterprises in the structural statistics sample. We have chosen to let the probability for an enterprise in the structural sample being selected into the sample for energy statistics, depend upon the inclusion probability that was calculated for the sampling plan for the structural statistics. The correlation between the inclusion probability in the energy sample and structural sample is shown in Table 1.

**Table 1. Inclusion probability – structural statistics and energy statistics**

Inclusion probabilities

Sample enterprises for structural statistics, inclusion probability	1,0	0,3 - 0,85	< 0,3	0
Inclusion probability for units in the structural statistics sample for the energy statistics	1,0	0,5	0,25	0

The structural sample is stratified by sector(5 – digit nace) and inclusion probability in the structural sample. The selection to the energy sample is done by systematic selection (sorted by employment) with inclusion probability as given in table 1.

### Verification of the sample

The gross sample comprises 2 854 enterprises. The sample is verified with the population and the structural sample with regard to reasonable coverage within each industry, both for the number of enterprises and employment/turnover.

In total, 84% of employment and 87% of turnover in the structural sample are covered by the energy sample. Proportionate to the population, the energy sample covers 37% of employment and 55% of turnover respectively. The coverage is described in the 2 - digit sector level in Table 2. whereas the relation between the sample for the energy statistics and the sample for the structural statistics is described by the 5 - digit sector in appendix 4.4.

**Table 2. Sample for the energy statistics – with relation to the structural statistics sample and the reference population**

Sector	Number of enterprises			Energy sample – proportion of structural samples		Energy sample – proportion of the populations	
	Population	Structural-samples	Energy-sample	Employment.	Turnover	Employment.	turnover
Total	73 453	6 026	2 894	0,84	0,87	0,37	0,55
50	9 467	653	252	0,66	0,79	0,20	0,43
51	20 417	1 634	830	0,86	0,89	0,43	0,64
52	34 840	2 781	1 218	0,83	0,87	0,33	0,45
50 - 52	64 724	5 068	2 300	0,82	0,87	0,34	0,55
55	8 729	958	594	0,90	0,92	0,47	0,56

# Estimation

## Population and sample

Updated population by March 2002 with preliminary values for energy and turnover from the structural statistics was retrieved from divisions 440 and 460. The populations, the correlation between the sample population and the statistical population in total and by 2 - digit sector, are shown in Figure 1.

**Figure 1. Population development from selection to estimation**

		< Population/sample basis - 73 453 enterprises >			
Total		11 596 enterprises		61 857 enterprises	7 328 enterprises
By sector:					
50	1 147	+ 2	8 319		844
51	3 255	+ 19	17 252		1 789
52	5 955	+ 17	28 750		3 451
55	1 199	+ 2	7 536		1 244
			< Population for estimation - 69 185 enterprises >		

Figures marked with "+" under population/sample basis are enterprises that are in the net sample but not in the population files from divisions 440 and 460.

The sample is shown in figure 2, the development of the gross sample to the net sample, in proportion to the population distribution from figure 1, in total, by gross/net sample and by 2 - digit sector.

**Figure 2. Gross sample and net sample**

		< gross sample - 73 453 enterprises >		
Total	117	40		2 737 enterprises
Gross – Net				
Only in the gross sample	117			566 foretak
Net sample		40		2 171 enterprises
By sector:				Net sample(only in the gross sample)
50		2		207 (40)
51		19		612 (164)
52		17		921 (216)
55		2		431 (146)
			< Net sample - 2 171 enterprises >	

The 40 enterprises that are in the net sample but not in the population files from the specific divisions (440 and 460) are excluded from the basis of data in estimation of energy consumption for enterprises outside the sample. The net sample in estimating total figures therefore comprises 2 171 enterprises.

## Energy goods

Total figures are estimated for energy consumption, both value and amount, for each of the energy goods.

Energy goods	Variable	
	value	Amount
Electric power	V2_110	V1_110
Distant heating	V2_120	V1_120
Paraffin	V2_130	V1_130
Petrol	V2_140	V1_140
Auto diesel, liable to duty	V2_150	V1_150
Auto diesel, duty free	V2_160	V1_160
Fuel oils	V2_170	V1_170
Liquid propane and butane	V2_180	V1_180
Other fuel	V2_190	
Energy costs incl. in rent	V2_300	

Other fuel may be composed of different energy goods and does not have an unambiguous quantitative unit. This also applies to energy cost included in rent.

## Value – energy consumption

### Model

Energy consumption from the trading statement, turnover and employment, are the auxiliary variables used in estimation. None of these three variables cover all enterprises outside the population however, we have values for at least one of them. Where we have more than one variable, energy consumption from the trading statement is prioritised, thereafter turnover and last, employment.

Every energy variable – electric power, district heating, paraffin, petrol, auto diesel (liable to duty), auto diesel (duty free), fuel oils, liquid propane and butane and other fuel – is estimated from one of the energy auxiliary variables from the trading statement or turnover or employment according to the model:

$$(1) \quad Y_i = \beta X_i + \varepsilon_i, \quad \varepsilon_i \text{ is a random variable with: } E(\varepsilon_i) = 0 \\ \text{Var}(\varepsilon_i) = \sigma^2 * X_i$$

Where  $Y_i$  denotes energy variable and  $X_i$  is the auxiliary variable for enterprise  $i$ .

Verification of the model can be found in appendix 4.5.

The same model is used to estimate energy costs included in rent (V2\_300). The auxiliary variable is other energy consumption. Verification of the Model can be found in appendix 4.7.

### Outlier control

Large enterprises in the sample were excluded from the basis of data for estimating energy consumption in enterprises outside the sample. This applies to enterprises with:

- More than 1000 employees
- Total energy consumption above NOK 10 000

This applies to 25 observations that are excluded from the basis of data in estimating but are nonetheless included in the total.

Furthermore, an automatic outlier control was carried out on total energy consumption in relation to the energy consumption auxiliary variable in the trading statement, turnover and employment. The control is carried out by sector and is based on residuals, Cook's D and Covratio from regression analysis according to the ratio model. Consequently, 311 observations were excluded from certain models but not necessarily for all auxiliary variables. Automatic outlier control is described in more detail in appendix 4.6

Distribution of the 311 outliers by model is illustrated in Table 3. Many outliers are common for several models, however the criteria are prioritised such that observations selected by a single criterion are not marked for others even if there was reason to do so.

**Table 3. Number of outliers by auxiliary variable, total and distributed by criterion**

Model/auxiliary variable	Total	Criterion for outlier definition		
		Residual	Cook's D	Covratio
Energy trading statem.	130	95	20	15
Turnover	109	72	13	24
Employment	110	94	12	4
Energy incl. in rent	118	81	8	29

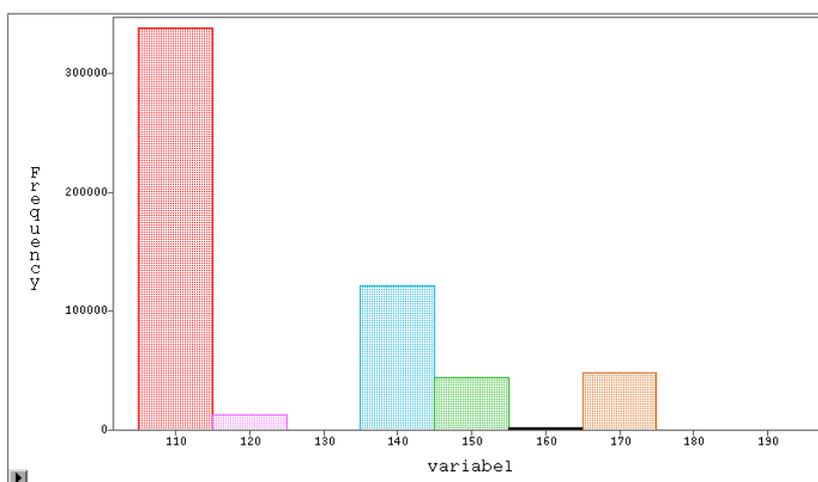
Most of the outliers, 219 out of 311, only apply to one model/auxiliary variable. 38 outliers apply to 2 models, 37 apply to 3 models and only 17 are outliers in all the models.

### Estimated energy consumption

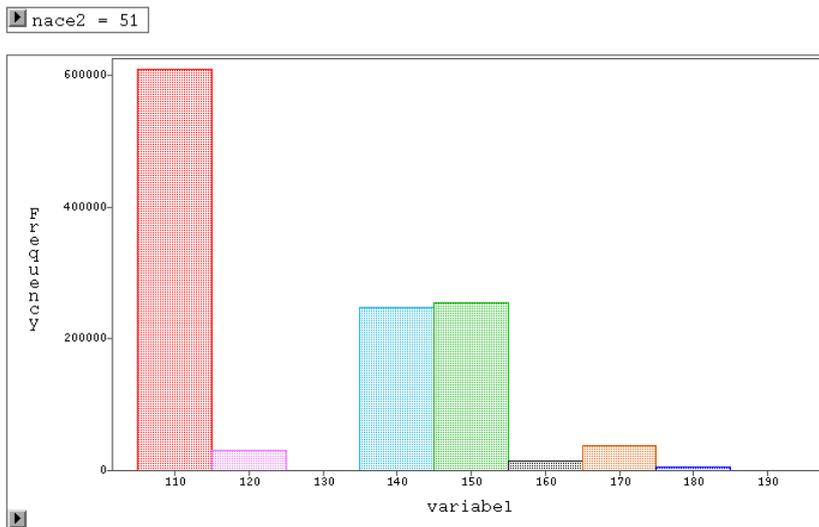
Electric power is the domineering energy goods for all sectors whereas use of other energy goods varies among the sectors. The distribution of energy goods, value by 2-digit sector is graphically illustrated in Figures 3 - 6. For the connection between energy goods and variable numbers used in the graphs, see paragraph 3.2.

**Figure 3. Energy good in trade with maintenance and repair of motor vehicles**

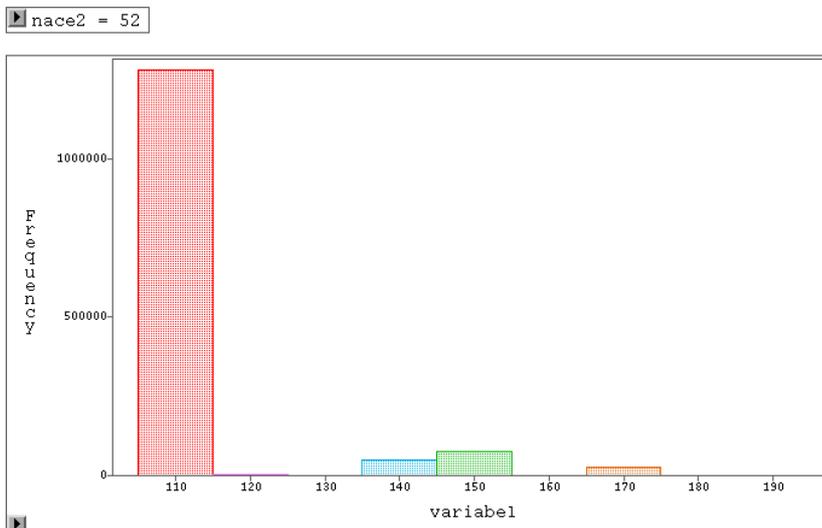
nace2 = 50



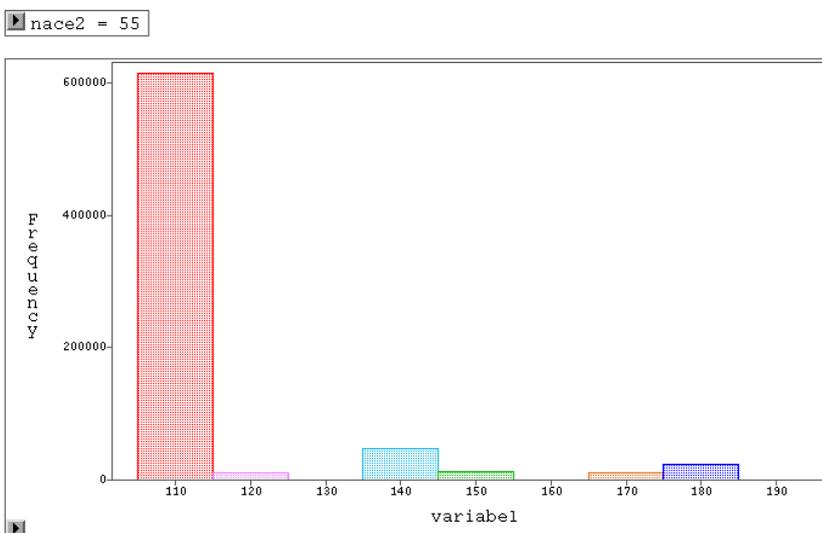
**Figure 4. Energy good in commercial- and wholesale trade excluding motor vehicles**



**Figure 5. Energy good in wholesale trading excluding motor vehicles**



**Figure 6. Energy good in hotels and restaurants**



## Amount – energy consumption

The amount of energy is estimated/calculated for units outside the sample and units in the sample where quantitative figures for energy are missing.

### Model

The quantitative figures are calculated from estimated or observed values:

$$Amount = \frac{Value}{Prize}$$

### Prices

Price is calculated for every source of energy as the median of observed prices for all enterprises in the sample, irrespective of sector. The median is used because it is less sensitive to extreme values than the average.

Price for energy good  $j$  in enterprise  $i$  is calculated thus:

$$Price_{enterprise\ i} = \frac{Value_{enterprise\ i}}{Amount_{enterprise\ i}}$$

Calculated prices for every energy variable is given in Table 3. In addition to the median price used in estimating (bold type) minimum prices, maximum prices and average prices are shown as well as the number of enterprises that are included in the price basis for each of the energy goods.

**Table 3. Prices calculated from the sample. The median is used in estimating quantitative figures**

Energy goods	El. power V - 110	District- heating V - 120	Paraffin V - 130	Petrol V - 140	Auto diesel liable to duty. V - 150	Auto diesel duty free V - 160	Fuel oils V - 170	Liquid propane and butane V - 180
no. of obs.	1569	63	15	548	513	102	268	104
average price	0.39568	0.39952	0.00481	0.00896	0.00815	0.00507	0.00367	0.00861
price-median	<b>0.38323</b>	<b>0.40000</b>	<b>0.00402</b>	<b>0.00901</b>	<b>0.00800</b>	<b>0.00442</b>	<b>0.00352</b>	<b>0.00712</b>
Min. - price	0.16000	0.22632	0.00250	0.00098	0.00349	0.00250	0.00113	0.00199
Max -price	1.00000	0.68750	0.01111	0.01273	0.01695	0.01156	0.00833	0.03667

More detailed distribution of prices per enterprise in the sample is illustrated in appendix 4.8 for the energy goods electric power and petrol.

## Files used for sample drawing and estimation

### Sample selection

Population/basis for structural sample: \$DSB/sbbofsit/wk6/sit0201b

Structural sample:     \$\$S440LES/struktur/wk1/utvakg\_440.sas7bdat  
                          \$\$S460LES/wk1/aen/store\_boa\_endelig.sas7bdat  
                          \$\$S460LES/wk1/aen/store\_ft\_endelig.sas7bdat  
                          \$\$S460LES/wk1/aen/store\_vh\_endelig.sas7bdat

Sample:                 \$ENERGI/tjeneste/2000/wk24/utvalg\_tj.sa7bdat

### Estimation

Populations:     \$\$S440LES/wk1/AEN/forebels55.sas7bdat  
                  \$\$S460LES/wk1/aen/forebels5052.sas7bdat

Sample:            \$INDUSTR/energi/tjeneste/2000/wk24/energi\_tj2000.sas7bdat

Estimated:        \$ENERGI/tjeneste/2000/wk24/estimert.sas7bdat

- file with estimated figures aggregated on sector.

\$ENERGI/tjeneste/2000/wk24/estmengde.sas7bdat

- file with detailed predicated figures pr enterprise.

\$ENERGI/tjeneste/2000/wk24/utligger.sas7bdat

- file with enterprises partly excluded from data before predication.

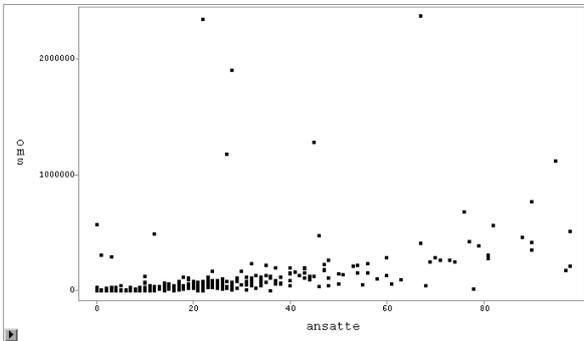
\$ENERGI/tjeneste/2000/wk24/ utengorpop.sas7bdat

- file with enterprises that was not included in the population file.

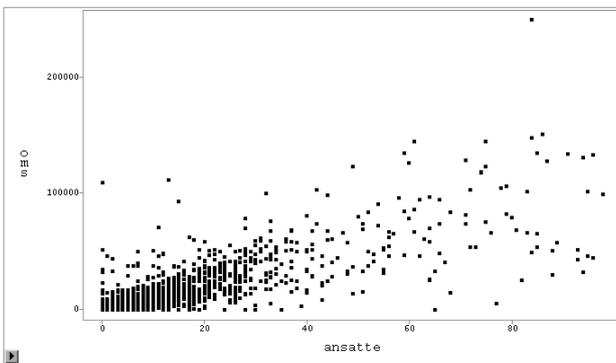
## Structural sample, turnover and number of employees

Relation between turnover and employment for enterprises in the structural sample (from the sample file)

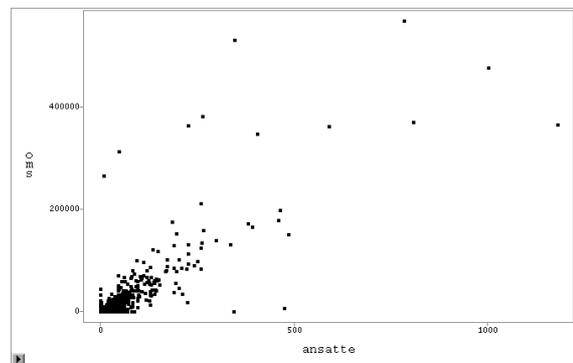
nace2 = 50



nace2 = 52



Nace2 = 55

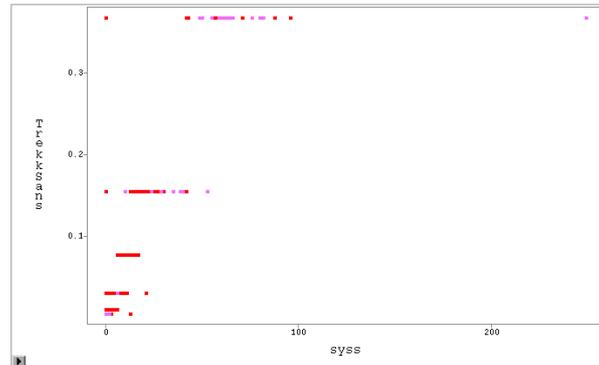
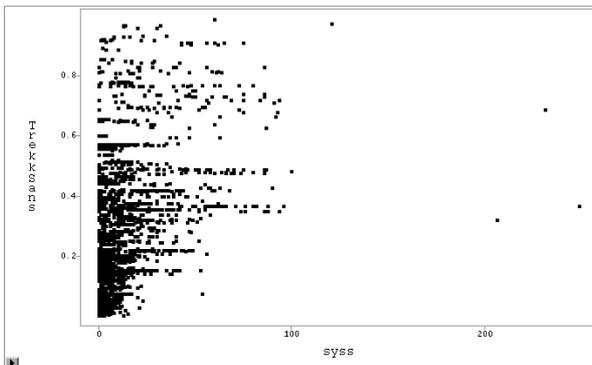


## Inclusion probabilities for enterprises outside total counts

The inclusion probability of the structural sample is constant within strata and is calculated as powers of  $\frac{1}{2}$  but rounded off for the number of units in the strata. In practice, this results in many different inclusion probabilities. On the other hand, when one takes a detailed look at an individual 5-digit sector, one can detect a clear pattern of inclusion probabilities.

### Distributive trades - sectors 50 - 52

### Sector 52.110



## Sample proportion for energy statistics, services sector

Ratio of the energy statistics sample and the structural statistics sample.

NACE1	number Serv.	number str.sam.	proportion empl.	proportion turnover
50.101	16	30	0.85	0.90
50.102	68	170	0.65	0.67
50.200	55	172	0.63	0.71
50.301	14	28	0.75	0.78
50.302	15	39	0.81	0.84
50.401	10	13	0.99	1.00
50.402	8	19	0.62	0.68
50.403	9	13	0.82	0.88
50.500	57	169	0.56	0.70
51.110	7	12	0.80	0.90
51.120	8	14	0.89	0.95
51.130	11	17	0.74	0.88
51.140	9	20	0.60	0.76
51.150	11	25	0.68	0.74
51.160	11	23	0.75	0.88
51.170	12	22	0.73	0.82
51.180	14	36	0.83	0.97
51.190	7	17	0.59	0.66
51.210	14	26	0.97	0.98
51.220	10	17	0.93	0.95
51.230	7	9	0.87	0.97
51.240	8	10	0.99	0.93
51.310	11	23	0.86	0.86
51.320	11	21	0.93	0.91
51.330	14	14	1.00	1.00
51.341	12	19	0.96	0.96
51.349	15	20	0.99	0.96
51.350	10	10	1.00	1.00
51.360	14	21	0.94	0.92
51.370	8	16	0.69	0.77
51.381	12	29	0.78	0.85
51.389	10	25	0.68	0.70
51.390	20	34	0.92	0.94
51.410	11	25	0.80	0.85
51.421	14	36	0.83	0.89
51.422	9	16	0.66	0.94
51.431	16	28	0.76	0.91
51.432	10	18	0.82	0.87
51.433	9	15	0.89	0.93
51.434	11	19	0.84	0.81
51.441	11	22	0.45	0.79
51.442	12	19	0.80	0.81
51.450	11	20	0.78	0.91
51.460	20	38	0.88	0.93
51.471	10	18	0.95	0.99
51.472	13	25	0.83	0.93
51.473	13	21	0.87	0.95
51.474	13	15	1.00	1.00
51.475	13	22	0.85	0.87
51.476	10	17	0.86	0.59
51.477	13	36	0.77	0.74
51.479	12	29	0.69	0.58
51.510	13	24	0.97	0.99

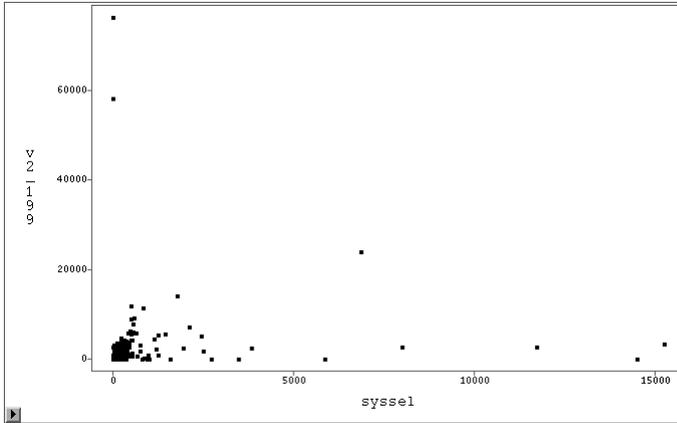
NACE1	number Serv.	number str.sam.	proportion empl.	proportion turnover
51.520	15	23	0.91	0.89
51.531	13	17	1.00	1.00
51.532	15	31	0.76	0.52
51.533	12	22	0.84	0.87
51.539	15	36	0.84	0.94
51.540	15	33	0.81	0.88
51.550	13	24	0.85	0.88
51.561	11	20	0.93	0.85
51.569	10	14	0.94	0.96
51.570	12	23	0.77	0.91
51.610	12	27	0.69	0.66
51.620	16	35	0.83	0.90
51.630	12	19	0.79	0.63
51.640	45	110	0.84	0.79
51.651	15	27	0.80	0.89
51.652	12	25	0.80	0.84
51.653	22	47	0.79	0.52
51.654	20	62	0.66	0.51
51.660	13	32	0.61	0.78
51.700	22	64	0.76	0.80
52.110	110	273	0.90	0.91
52.120	28	70	0.83	0.84
52.210	13	27	0.42	0.54
52.220	11	19	0.81	0.78
52.230	10	23	0.75	0.73
52.241	13	24	0.81	0.79
52.242	30	30	1.00	1.00
52.251	1	1	1.00	1.00
52.252	10	23	0.67	0.59
52.260	15	15	1.00	1.00
52.271	11	25	0.82	0.85
52.272	11	18	0.77	0.86
52.279	14	25	0.68	0.70
52.310	35	74	0.52	0.51
52.320	9	22	0.71	0.74
52.330	28	82	0.61	0.58
52.410	21	59	0.76	0.87
52.420	53	146	0.88	0.92
52.431	15	35	0.75	0.79
52.432	13	30	0.73	0.80
52.441	35	60	0.74	0.73
52.442	24	54	0.77	0.77
52.443	90	167	0.87	0.87
52.449	17	44	0.58	0.69
52.451	30	70	0.85	0.92
52.452	24	57	0.76	0.84
52.453	10	26	0.53	0.50
52.461	17	41	0.67	0.76
52.462	17	34	0.66	0.67
52.463	36	98	0.53	0.53
52.464	11	22	0.69	0.69
52.469	13	25	0.58	0.64
52.471	19	40	0.74	0.80
52.481	17	46	0.85	0.85
52.482	29	70	0.67	0.72
52.483	38	97	0.58	0.69
52.484	47	134	0.73	0.78

NACE1	number Serv.	number str.sam.	proportion empl.	proportion turnover
52.485	23	62	0.85	0.85
52.486	18	28	0.89	0.90
52.487	11	20	0.62	0.60
52.489	51	160	0.49	0.56
52.501	9	17	0.79	0.75
52.502	11	18	0.88	0.95
52.509	9	19	0.86	0.93
52.611	10	14	0.89	0.91
52.612	10	16	0.97	0.97
52.613	19	19	1.00	1.00
52.614	6	11	0.85	0.93
52.615	9	12	0.98	0.99
52.619	13	29	0.91	0.93
52.620	8	14	0.70	0.79
52.630	33	109	0.89	0.94
52.710	8	14	0.74	0.69
52.720	24	73	0.43	0.53
52.730	8	14	0.67	0.74
52.740	13	26	0.86	0.87
55.110	135	173	0.96	0.96
55.120	52	65	0.92	0.92
55.301	187	411	0.76	0.81
55.302	114	164	0.90	0.88
55.510	32	47	0.99	1.00
55.520	74	98	0.97	0.98

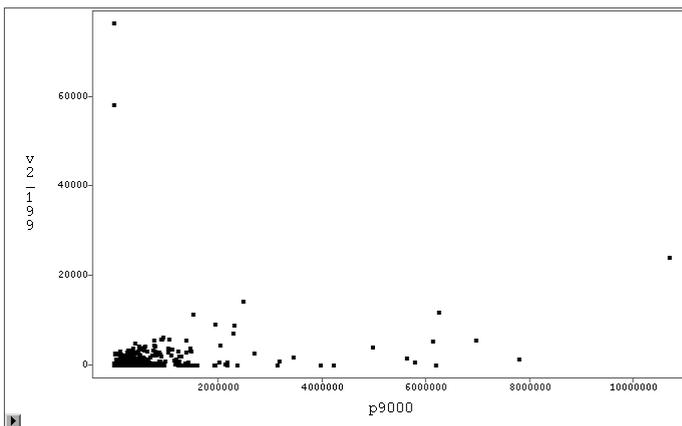
## Model verification – energy consumption in the service sector

The sum of the variable V2-199 (which was to be equal to the sum of the value of all energy variables) is plotted against employment and turnover (P9000). Since the sum does not always agree, a new sum of energy is calculated, V2\_100\_sum (equal to the sum of the value of all energy variables), for enterprises in the sample.

### Employment

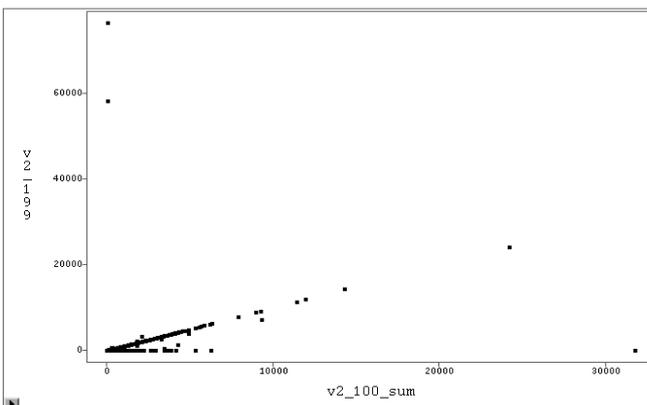


### Turnover



Two enterprises clearly distinguish themselves as outliers because of their high energy consumption with relation to employment and turnover. When the two sum variables are plotted against each other in the figure below, we see that these "outliers" are actually caused by an error in addition.

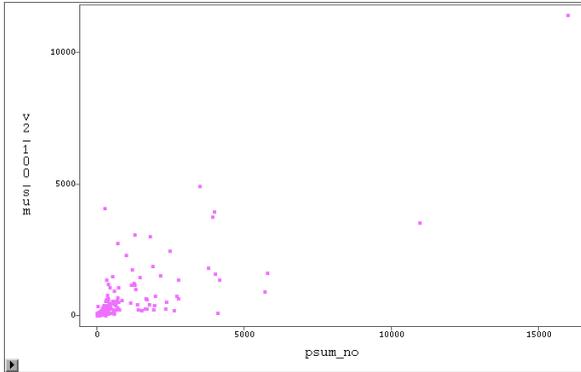
### Sum energy consumption



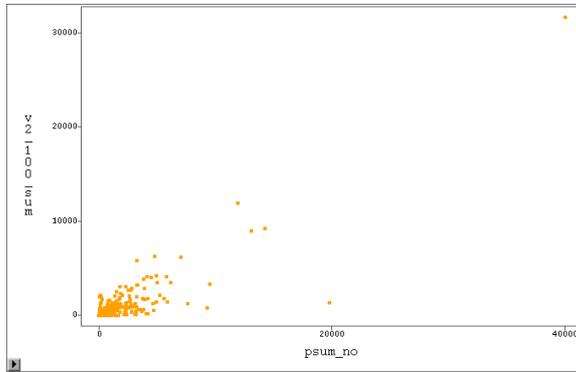
**Energy consumption from forms and energy consumption from trading statements.**

New sum variable, V2\_100\_sum is plotted against the sum of energy consumption from the trading statement, psum\_no, special plot for every 2-digit sector.

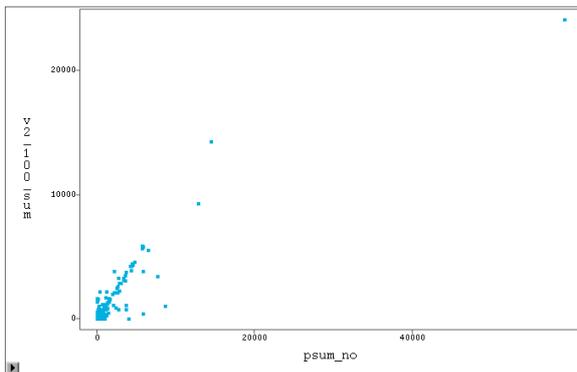
**Sector 50**



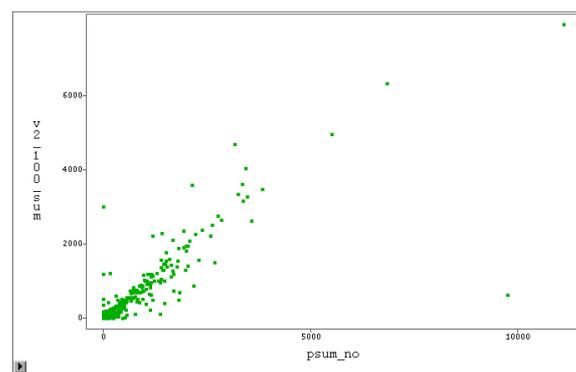
**Sector 51**



**Sector 52**



**Sector 55**



For this sector, one outlier has been left out. One outlier is clearly visible on the plot.

The plots illustrate that apart from a number of outliers, the relation between energy consumption from the energy form and energy consumption from the trading statement is quite satisfactory.

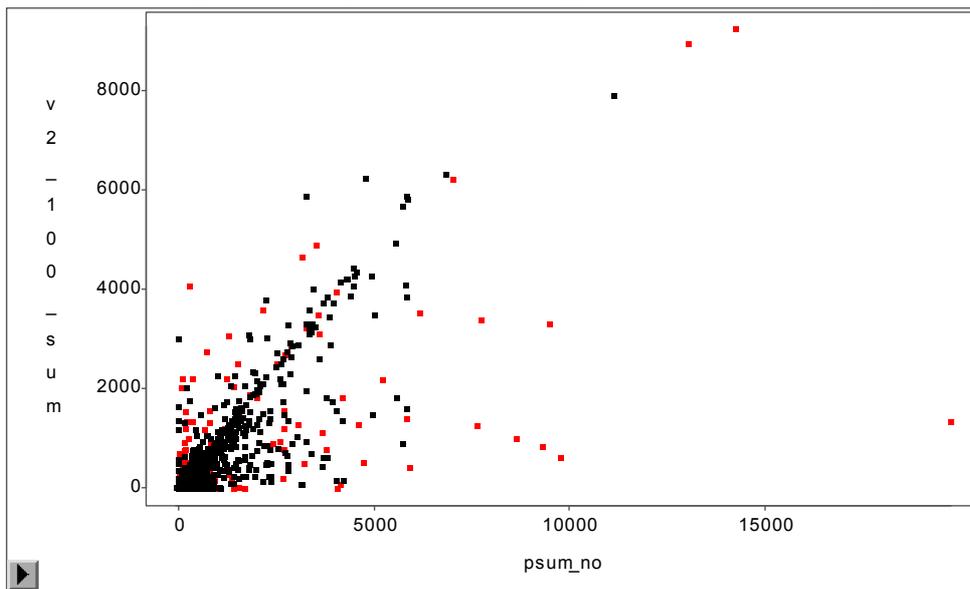
## Automatic outlier control

Automatic outlier control provides observations that are poorly suited to the model, weight =1, and otherwise excludes them from the basis of data. The models are checked for total energy consumption pr. 5-digit sector. The criteria for outliers are quite strict:

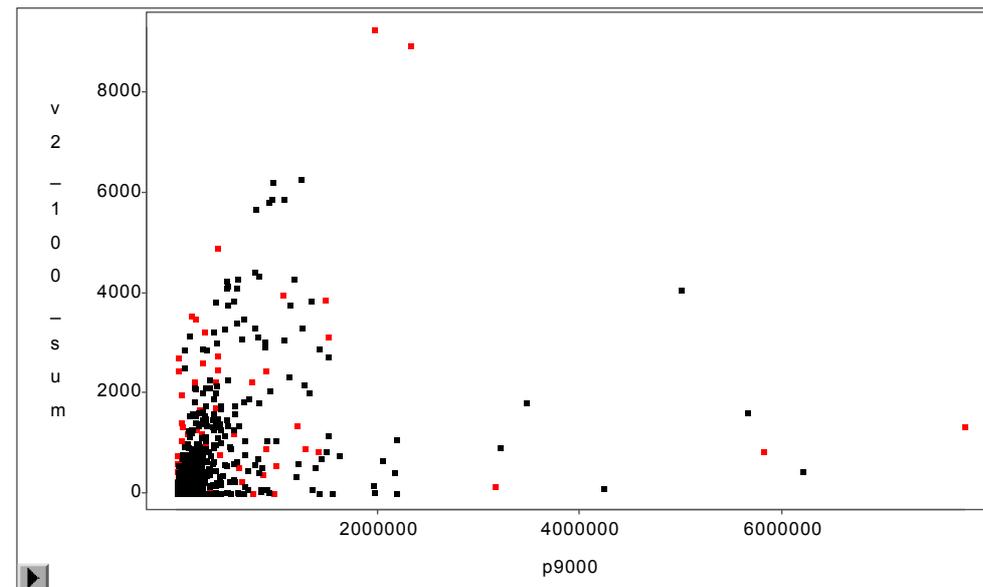
1. residual (rstudent) has a value greater than 3
2. Cooks D is greater than 2 and there are at least 6 enterprises in the sector
3. Covratio deviates from 1 by more than 10/n

The correlation between energy consumption and auxiliary variable is plotted for all sectors as a whole. Outliers are marked with ■.

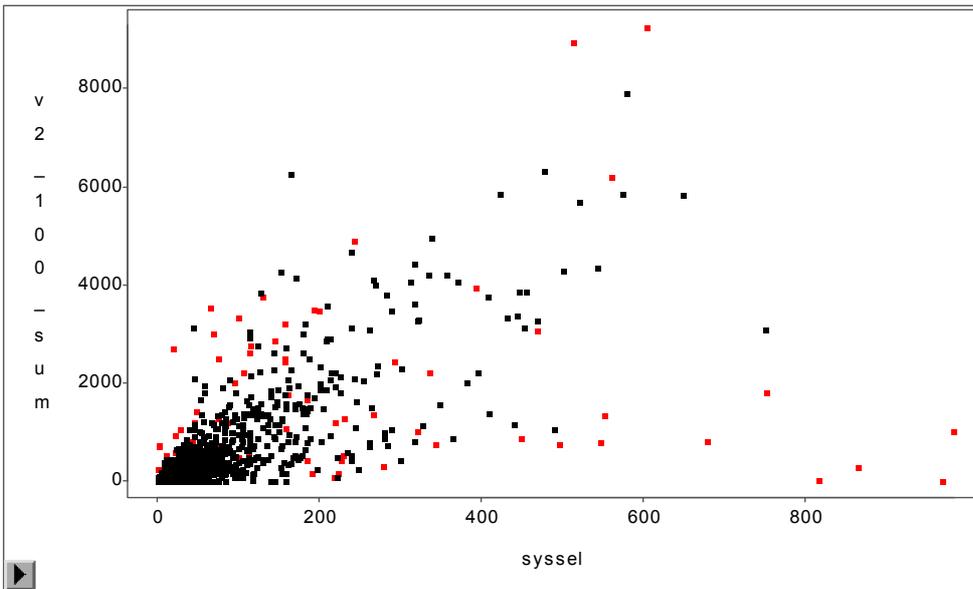
### The whole sample, auxiliary variable is energy value from the trading statement



### The whole sample, auxiliary variable is turnover (p9000)

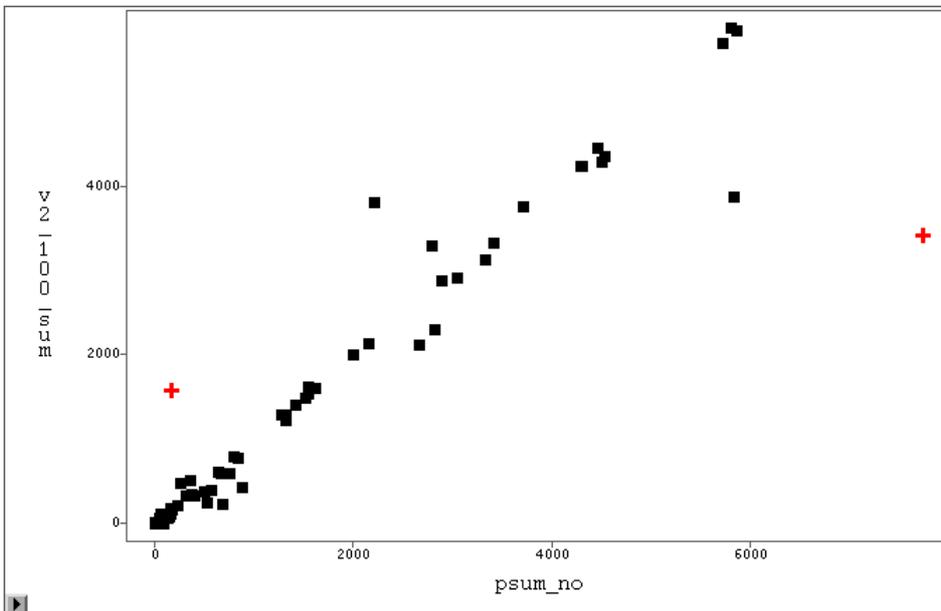


### The whole sample, auxiliary variable is employment

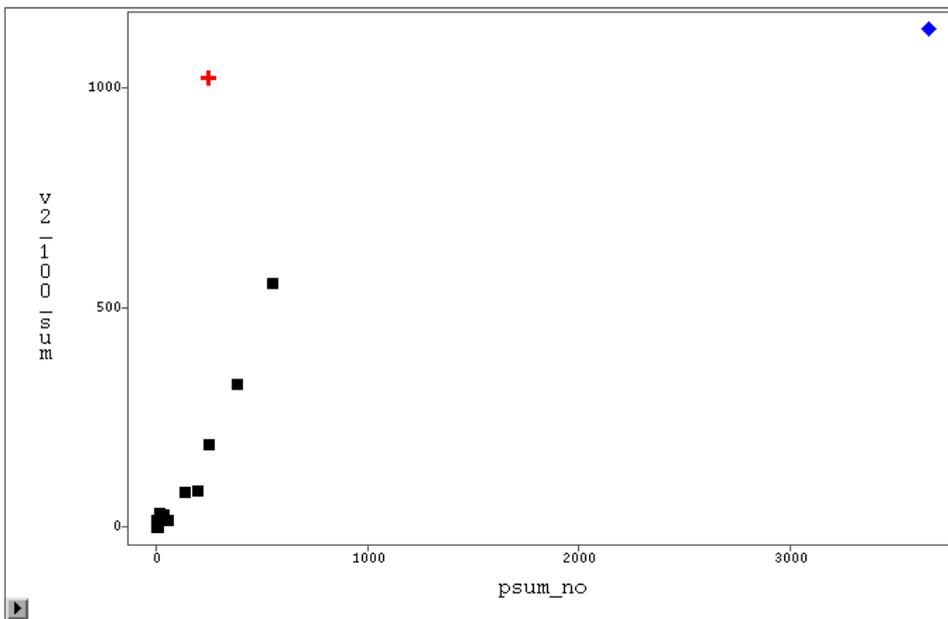


With all sectors presented here, this looks slightly chaotic. I have therefore selected some 5-digit sectors in order to show more clearly how the outlier control works. In the figures below, we find examples of outliers for three different sectors, selected on the basis of each of the three criteria.

### Outliers by the residual criterion are marked with +.

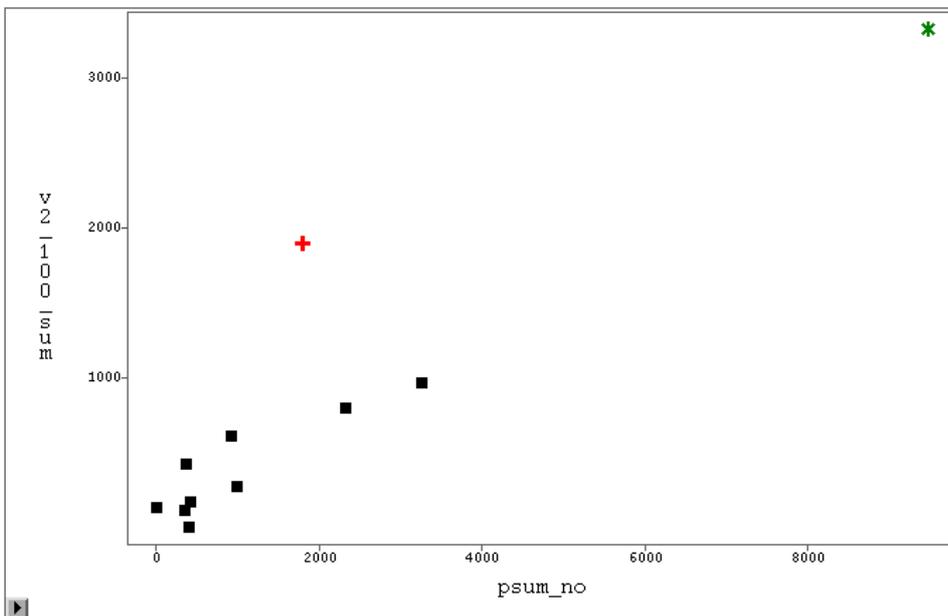


Outliers by the Cooks D criterion are marked with  $\blacklozenge$ .



(There is moreover one outlier by the residual criterion.)

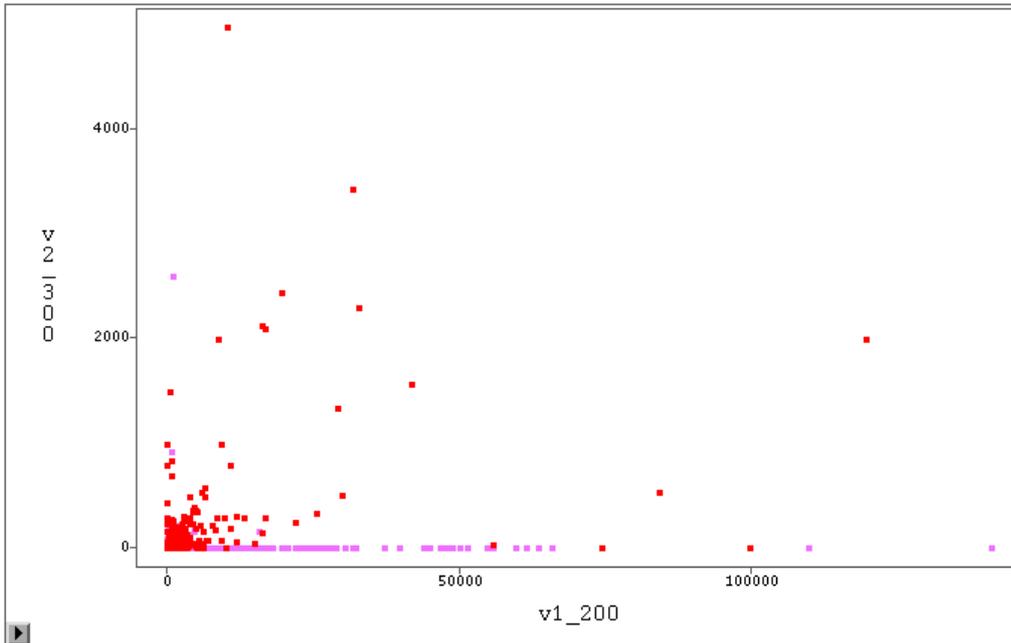
Outliers by the covratio are marked with  $\ast$ .



(There is moreover one outlier by the residual criterion.)

## Energy costs included in rent

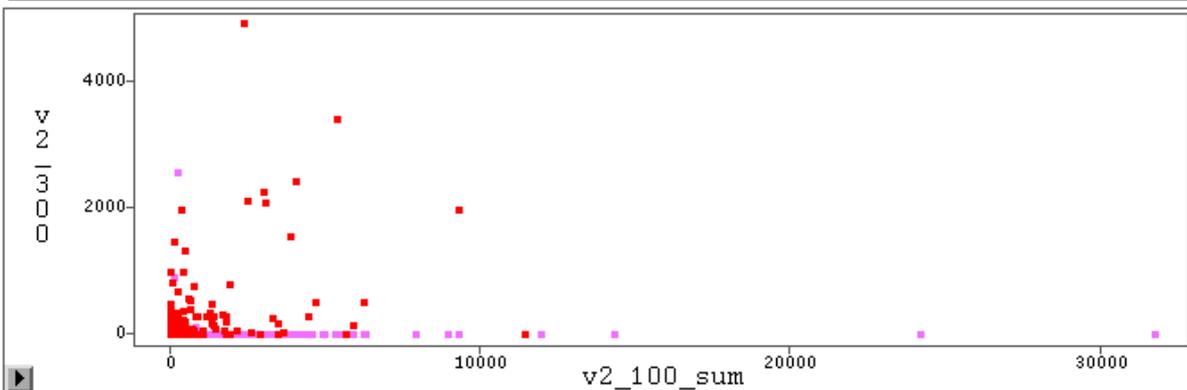
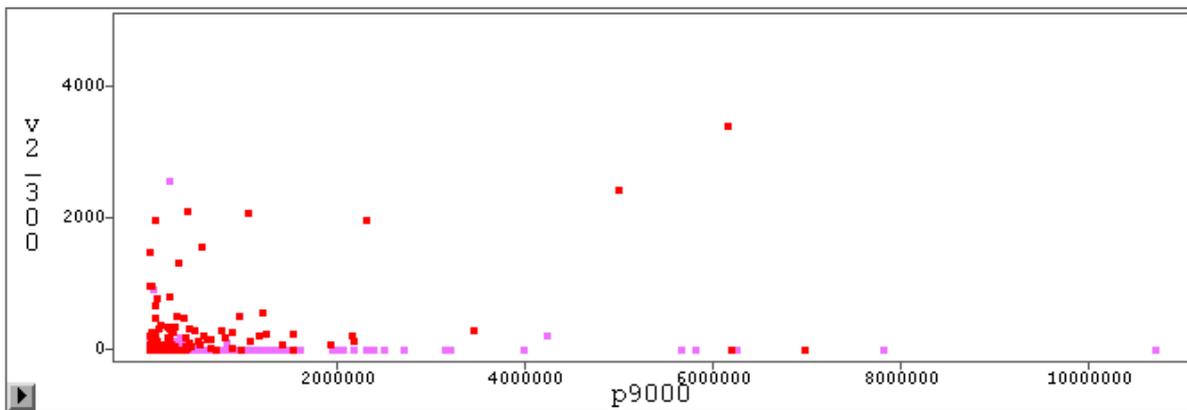
### Relation between energy costs included in rent and area



Red (dark) ■ - includes energy, Lilac (light) ■ - does not include energy.

(2 extreme outliers have been removed).

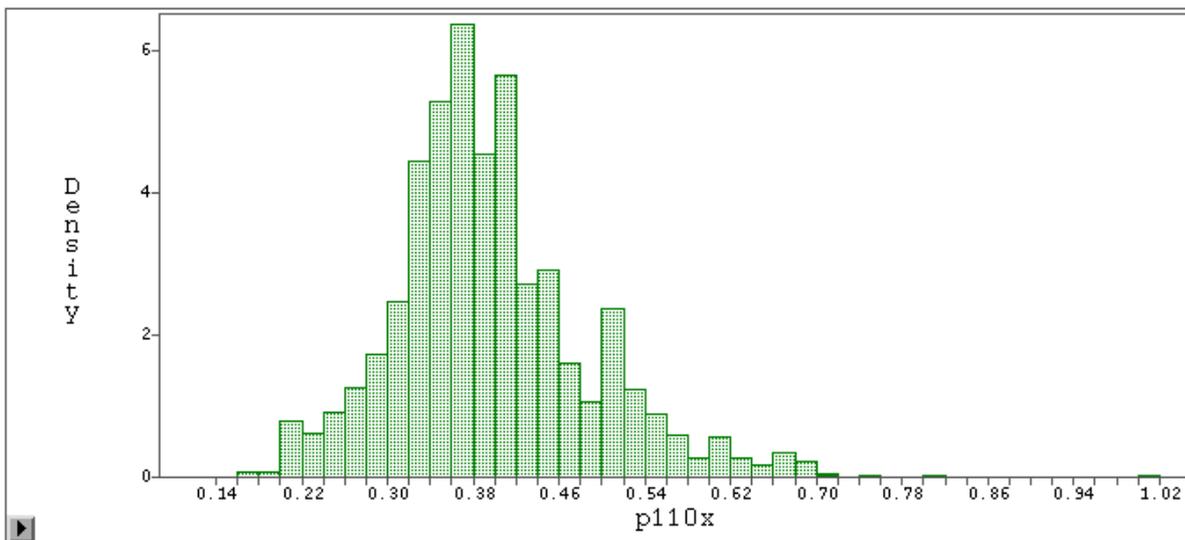
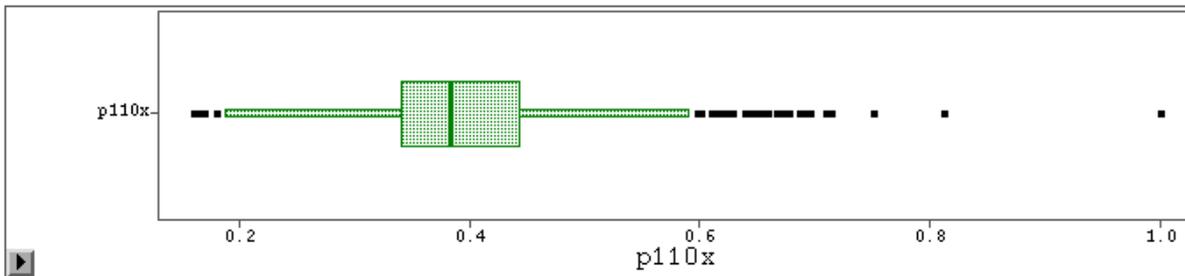
### Relation between energy included in rent and turnover (P9000) / energy consumption other (v2\_100\_sum) (marked as above.)



## Prices

Distribution for prices as regards the individual enterprise. Electric power and petrol.

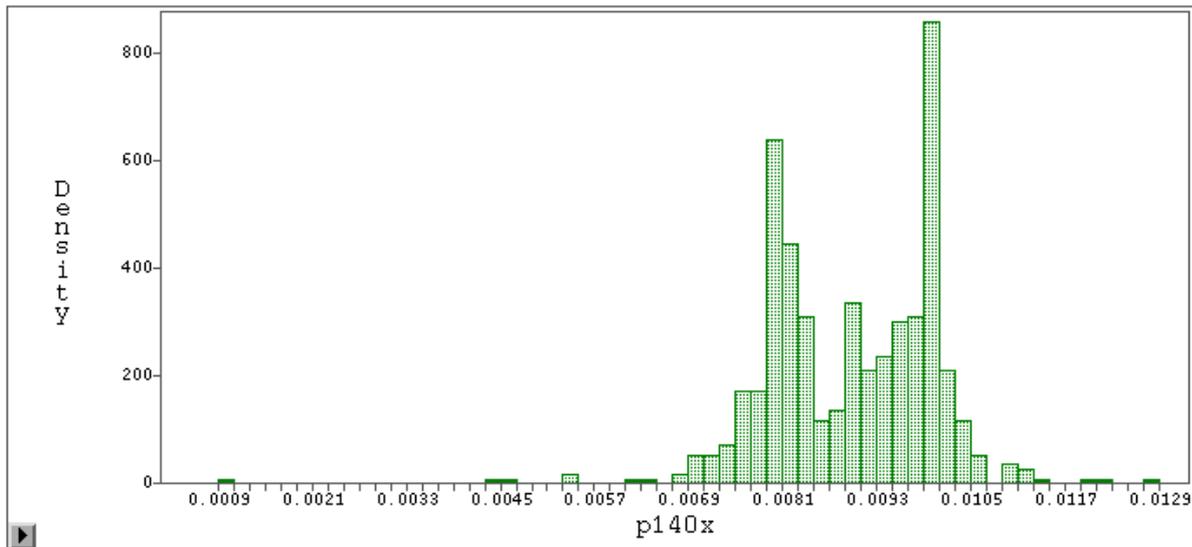
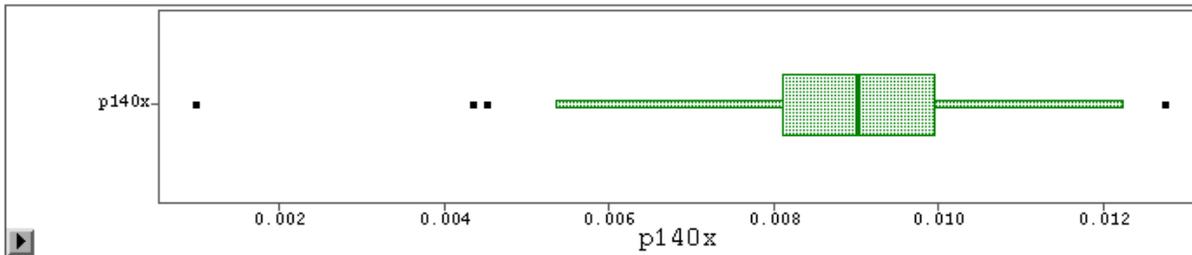
### V110 – electric power



Moments			
N	1569.0000	Sum Wgts	1569.0000
Mean	0.3957	Sum	620.8287
Std Dev	0.0921	Variance	0.0085
Skewness	0.8470	Kurtosis	2.0660
USS	258.9634	CSS	13.3112
CV	23.2856	Std Mean	0.0023

Quantiles			
100% Max	1.0000	99.0%	0.6696
75% Q3	0.4423	97.5%	0.6154
50% Med	0.3832	95.0%	0.5694
25% Q1	0.3399	90.0%	0.5128
0% Min	0.1600	10.0%	0.2915
Range	0.8400	5.0%	0.2585
Q3-Q1	0.1024	2.5%	0.2278
Mode	0.4000	1.0%	0.2096

## V140 - petrol



Moments			
N	548.0000	Sum Wgts	548.0000
Mean	0.0090	Sum	4.9121
Std Dev	0.0011	Variance	1.234E-06
Skewness	-0.9200	Kurtosis	5.0294
USS	0.0447	CSS	0.0007
CV	12.3939	Std Mean	4.746E-05

Quantiles			
100% Max	0.0127	99.0%	0.0112
75% Q3	0.0099	97.5%	0.0107
50% Med	0.0090	95.0%	0.0103
25% Q1	0.0081	90.0%	0.0101
0% Min	0.0010	10.0%	0.0078
Range	0.0118	5.0%	0.0075
Q3-Q1	0.0018	2.5%	0.0071
Mode	0.0100	1.0%	0.0061

## Appendix C. Table: Specific energy use in the buildings network

Table C.1 is from an annual report from Enovas operator for energy saving in buildings, based on data from the network of buildings described in chapter 3.3.

**Table C.1. Consumption of energy. KWh/m2 heated area. 2000.**

Code	Type of building	Number of buildings (number)	Total use of energy corrected for temperature (kWh/m2)	Total use of energy (kWh/m2)	Total use of energy divided between energy bearers				
					Electricity (%)	Fluid (%)	District heating (%)	Gas (%)	Other (%)
<b>Total</b>		<b>1 039</b>	<b>247.8</b>	<b>230.2</b>	<b>84.9</b>	<b>10.6</b>	<b>4.1</b>	<b>0.1</b>	<b>0.2</b>
<b>1 Houses</b>		<b>13</b>	<b>196.5</b>	<b>181.6</b>	<b>80.2</b>	<b>19.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
13 Row house		3	183.7	171.0	100.0	0.0	0.0	0.0	0.0
131 Row house with 3 and 4 flats		1	151.0	141.0	100.0	0.0	0.0	0.0	0.0
132 Row house with 5 flats or more		2	200.0	186.0	100.0	0.0	0.0	0.0	0.0
15 Block of flats		10	200.3	184.8	74.7	25.3	0.0	0.0	0.0
151 Block of flats with 2 floors		2	169.0	159.0	100.0	0.0	0.0	0.0	0.0
152 Block of flats with 3 and 4 floors		4	193.3	176.3	100.0	0.0	0.0	0.0	0.0
153 Block of flats with 5 or more floors		4	223.0	206.3	43.4	56.6	0.0	0.0	0.0
<b>2 Manufacturing- and storehouses</b>		<b>21</b>	<b>294.1</b>	<b>271.7</b>	<b>42.6</b>	<b>47.0</b>	<b>10.3</b>	<b>0.0</b>	<b>0.0</b>
21 Industribygning		9	346.0	321.3	46.2	33.4	20.4	0.0	0.0
212 Verkstedsbygning		8	366.5	340.5	42.9	35.5	21.6	0.0	0.0
213 Produksjonshall		1	182.0	168.0	100.0	0.0	0.0	0.0	0.0
23 Lagerbygning		12	255.3	234.5	39.0	61.0	0.0	0.0	0.0
231 Lagerhall		11	255.7	234.4	40.8	59.2	0.0	0.0	0.0
239 Annen lagerbygning		1	250.0	236.0	19.1	80.9	0.0	0.0	0.0
<b>3 Offices and commercial buildings</b>		<b>180</b>	<b>286.7</b>	<b>270.3</b>	<b>88.9</b>	<b>4.6</b>	<b>5.9</b>	<b>0.0</b>	<b>0.5</b>
31 Office building		143	229.1	213.7	84.5	6.8	7.7	0.0	0.8
311 Office and administration building, city hall		101	219.9	205.6	86.8	8.5	3.9	0.0	0.6
312 Bank building, post office		6	209.2	197.5	99.7	0.4	0.0	0.0	0.0
319 Other office building		34	259.4	240.2	75.8	3.6	19.0	0.0	1.6
32 Commercial building		37	509.4	489.1	96.3	0.9	2.8	0.0	0.0
321 Shopping centre, department store		22	551.5	527.2	99.4	0.6	0.0	0.0	0.0
322 Shop building		6	590.5	576.7	97.3	2.7	0.0	0.0	0.0
329 Other commercial buildings		9	352.4	337.4	83.3	0.0	16.7	0.0	0.0
<b>4 Communication- and transport building</b>		<b>34</b>	<b>366.9</b>	<b>337.9</b>	<b>83.4</b>	<b>14.5</b>	<b>2.1</b>	<b>0.0</b>	<b>0.0</b>
41 General office- and terminal building		24	398.4	366.6	93.3	5.1	1.5	0.0	0.0
411 General office, flight terminal, control tower		5	509.0	483.8	99.6	0.4	0.0	0.0	0.0
412 Railways		13	405.2	366.1	90.2	7.0	2.9	0.0	0.0
415 Goods terminal		1	327.0	298.0	100.0	0.0	0.0	0.0	0.0
416 Post terminal		5	284.2	264.4	91.8	8.2	0.0	0.0	0.0
43 Garage- and hangar building		6	298.3	280.7	30.8	69.2	0.0	0.0	0.0
432 Bus garage, streetcar building, locomotive building		1	120.0	106.0	65.1	34.9	0.0	0.0	0.0
433 Aircraft hangar		5	334.0	315.6	28.5	71.5	0.0	0.0	0.0
44 Road- and car supervision building		4	280.8	251.8	84.4	4.6	11.0	0.0	0.0
441 Car supervision building		3	301.7	270.0	80.6	5.7	13.7	0.0	0.0
442 Working sentral		1	218.0	197.0	100.0	0.0	0.0	0.0	0.0
<b>5 Hotel and restaurant building</b>		<b>55</b>	<b>275.7</b>	<b>266.5</b>	<b>51.7</b>	<b>46.6</b>	<b>1.6</b>	<b>0.1</b>	<b>0.0</b>
51 Hotel building		12	313.8	302.2	82.2	10.8	6.6	0.3	0.0
511 Hotel building		12	313.8	302.2	82.2	10.8	6.6	0.3	0.0
52 Building for overnight stop		35	215.4	208.3	36.9	63.1	0.0	0.0	0.0
523 Barracks		19	187.4	181.4	33.4	66.6	0.0	0.0	0.0
529 Other building for overnight stop		15	251.3	242.8	36.7	63.3	0.0	0.0	0.0

**Table C.1. Consumption of energy. KWh/m2 heated area. 2000. (continues)**

Code	Type of building	Number of buildings (number)	Total use of energy corrected for temperature (kWh/m2)	Total use of energy (kWh/m2)	Total use of energy divided between energy commodities				
					Electricity (%)	Fluid (%)	District heating (%)	Gas (%)	Other (%)
53	Restaurant building	8	482.3	467.4	50.8	49.2	0.0	0.0	0.0
531	Restaurant building, café building	1	381.0	365.0	100.3	0.0	0.0	0.0	0.0
532	Sentral kitchen, canteen building	7	496.7	482.0	45.5	54.5	0.0	0.0	0.0
	<b>6 Cultural- and research building</b>	<b>595</b>	<b>215.2</b>	<b>197.5</b>	<b>87.6</b>	<b>7.5</b>	<b>4.9</b>	<b>0.0</b>	<b>0.1</b>
61	School building	479	198.7	182.2	90.8	7.5	1.6	0.0	0.1
611	Kindergarten, playground	48	232.6	211.0	98.9	1.1	0.0	0.0	0.0
612	Primary school	292	197.5	180.7	91.6	7.4	0.9	0.0	0.0
613	College	129	187.3	173.5	86.5	9.3	4.1	0.0	0.0
619	Other school building	8	210.4	191.3	81.4	18.6	0.0	0.0	0.0
62	University and academy building	50	287.2	261.6	70.8	3.9	25.3	0.0	0.0
621	Building with integrated functions and so on	40	294.1	269.2	69.5	2.6	27.9	0.0	0.0
622	Special building	6	282.8	250.5	80.3	4.7	15.1	0.0	0.0
629	Other University and academy building	4	224.3	203.0	69.8	19.6	10.6	0.0	0.0
64	Museum- and library building	6	200.8	187.2	69.5	12.6	17.8	0.0	0.0
641	Museum, art gallery	3	217.3	203.0	62.9	4.3	32.8	0.0	0.0
642	Library	3	184.3	171.3	77.4	22.6	0.0	0.0	0.0
65	Sports building	43	317.7	295.7	82.8	12.2	5.0	0.0	0.0
651	Sports building	28	242.7	222.1	82.4	13.6	4.0	0.0	0.0
652	Ice building	1	272.0	244.0	67.6	32.4	0.0	0.0	0.0
653	Swimming hall	13	478.3	455.2	84.1	9.4	6.5	0.0	0.0
659	Other sports building	1	375.0	336.0	80.7	19.3	0.0	0.0	0.0
66	Culture house	13	226.5	210.0	90.9	3.7	5.5	0.0	0.0
661	Cinema, theatre, opera/consert hous	3	177.7	166.3	100.0	0.0	0.0	0.0	0.0
662	Community centre	6	247.5	226.8	89.1	0.0	10.9	0.0	0.0
663	Discoteque, youth club	1	398.0	389.0	100.0	0.0	0.0	0.0	0.0
669	Other cultural building	3	176.3	160.3	79.2	20.8	0.0	0.0	0.0
67	Building with religious activities	3	196.7	165.3	100.0	0.0	0.0	0.0	0.0
671	Church, chapel	3	196.7	165.3	100.0	0.0	0.0	0.0	0.0
69	Other cultural- and research building	1	94.0	87.0	96.6	3.4	0.0	0.0	0.0
	<b>7 Health buildings</b>	<b>135</b>	<b>297.3</b>	<b>278.0</b>	<b>91.8</b>	<b>6.8</b>	<b>0.3</b>	<b>0.5</b>	<b>0.6</b>
71	Hospital	15	330.9	309.1	67.7	26.3	0.0	4.1	1.8
711	Local hospital	3	316.0	295.7	76.1	23.9	0.0	0.0	0.0
712	Central hospital	6	360.8	336.2	79.5	11.0	0.0	9.5	0.0
714	Special hospital	3	351.0	331.3	66.3	25.4	0.0	0.0	8.4
719	Other hospital	3	265.7	246.0	27.6	72.4	0.0	0.0	0.0
72	Nursing home	111	300.2	281.3	95.4	3.9	0.3	0.0	0.4
721	Nursing home	82	305.6	286.9	96.5	3.1	0.3	0.0	0.0
722	Live- and treatment centre	25	286.4	267.3	93.1	6.9	0.0	0.0	0.0
729	Other nursing home	4	276.0	254.5	84.3	1.1	2.1	0.0	12.6
73	Primary health building	9	205.9	185.6	91.5	7.7	0.8	0.0	0.0
732	Health centre, maternal and child health centre	8	213.8	192.0	91.6	8.4	0.0	0.0	0.0
739	Other primary health building	1	143.0	134.0	90.3	0.0	9.7	0.0	0.0
	<b>8 Prisons, emergency buildings etc.</b>	<b>6</b>	<b>228.0</b>	<b>210.8</b>	<b>81.4</b>	<b>15.5</b>	<b>3.1</b>	<b>0.0</b>	<b>0.0</b>
82	Standby building	6	228.0	210.8	81.4	15.5	3.1	0.0	0.0
821	Police station	5	235.6	216.2	93.2	3.1	3.6	0.0	0.0
829	Other standby building	1	190.0	184.0	12.0	88.0	0.0	0.0	0.0

## Appendix D. NACE-codes

**Table D.1. NACE-codes for the services sector covered by this report.**

<b>NACE Industry</b>	
50	Sale, maintenance and repair of motor vehicles, motorcycles; retail of automotive fuel
51	Wholesale trade, commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles; Repair of personal and household goods
55	Hotels and restaurants
60	Land transport; Transport via pipelines
61	Water transport
62	Air transport
63	Supporting and auxiliary transport activities; Activities of travel agencies
64	Post and telecommunications
65	Financial intermediation, except insurance and pension funding
66	Insurance and pension funding, except compulsory social security
67	Activities auxiliary to financial intermediation
70	Real estate activities
71	Renting of machinery and equipment without operator and personal and household goods
72	Computer and related activities
73	Research and development
74	Other business activities
75	Public administration and defence. Compulsory social security
80	Education
85	Health and social work
90	Sewage and refuse disposal, sanitation and similar activities
91	Activities of membership organizations n.e.c.
92	Recreational activities, cultural and sporting activities
93	Other service activities
99	Extra-territorial organizations and bodies

## Appendix E. Links to Internet sites

### 1. Statistics from Statistics Norway

Home page:

<http://www.ssb.no/english/>

Pages with many links to different energy statistics:

- <http://www.ssb.no/english/subjects/10/08/10/> and
- <http://www.ssb.no/english/subjects/01/03/10/>

Consumption of energy in commerce, hotels and restaurants, 2000:

[http://www.ssb.no/vhrenergi\\_en/](http://www.ssb.no/vhrenergi_en/)

Annual energy statistics:

- [http://www.ssb.no/energiregn\\_en/](http://www.ssb.no/energiregn_en/) and
- [http://www.ssb.no/english/subjects/10/08/10/nos\\_energy/](http://www.ssb.no/english/subjects/10/08/10/nos_energy/)

Annual electricity statistics:

<http://www.ssb.no/english/subjects/10/08/10/electricity/>

Monthly and annual electricity statistics:

[http://www.ssb.no/elektrisitet\\_en/](http://www.ssb.no/elektrisitet_en/)

Quarterly prices of electric energy:

[http://www.ssb.no/elkraftpris\\_en/](http://www.ssb.no/elkraftpris_en/)

District heating statistics:

[http://www.ssb.no/fjernvarme\\_en/](http://www.ssb.no/fjernvarme_en/)

Water levels in the reservoirs:

[http://www.ssb.no/vannmag\\_en/](http://www.ssb.no/vannmag_en/)

Deliveries of petroleum products:

[http://www.ssb.no/petroleumsalg\\_en/](http://www.ssb.no/petroleumsalg_en/)

### 2. Other

Enova: <http://www.enova.no/>

NVE: <http://www.nve.no>

Sintef: <http://www.sintef.no>

Nord Pool: <http://www.nordpool.no/>

OED: <http://odin.dep.no/oed/>

EBL: <http://www.ebl.no/>

IFE: <http://www.ife.no/>

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- 2002/4 R. Bjørnstad, Å. Cappelen, I. Holm and T. Skjerpen: Past and Future Changes in the Structure of Wages and Skills
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