

Ten Years of Energy Labelling of Domestic Appliances 1995–2005

ER 2006:18

Books and reports published by the Swedish
Energy Agency can be ordered from
Energimyndighetens förlag.
Order fax: +46 (0)16544 22 59
E-mail: forlaget@stem.se

© Statens energimyndighet
Number of copies: 150

ER 2006:18

ISSN 1403-1892

Preface

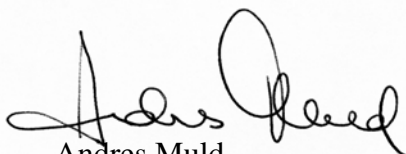
The aim of the European Energy Label is to help consumers choose energy-saving white goods. At the same time the manufacturers are given an incentive to develop energy-efficient models. The Swedish Consumer Agency has in its capacity as supervisory authority inspected the energy labelling in white goods retail outlets in co-operation with the local (municipal) consumer advisors. The labelling has been inspected nine times in all in this manner. Without the co-operation with the local consumer advisors it would not have been possible to carry out inspections to this extent and with the geographic distribution that has been the case. The main instrument at the disposal of the Swedish Consumer Agency in order to improve the labelling is information, education and recurrent inspections. If this is not sufficient, legal means such as notice of compliance and direction of conditional fine may be employed.

Part of the work with the energy labelling consists of tests of domestic appliances in order to control the information that the manufacturers state on the energy label. Consumers do not have the possibility to check whether the information is correct themselves. Deviations can only be discovered by competitors or by independent laboratory tests.

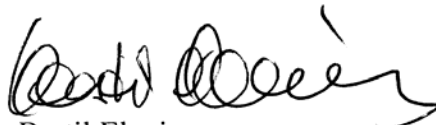
It is important to spread knowledge about the energy labelling to consumers as well as to trade and industry, manufacturers and retailers. One way of spreading information has taken place in connection with the publishing of test results in the magazine Råd & Rön (Advice and Results) and via the website of the Swedish Consumer Agency. Training of retailers and contacts with the nation-wide chains have been other ways to spread knowledge.

This report contains ten years' of collated experience from the work with compulsory energy labelling. The Swedish Energy Agency takes over from the Swedish Consumer Agency and assumes the responsibility for supervision and tests from 2006.

March 2006



Andres Muld
Head of Department
The Department for Sustainable
Energy Management
The Swedish Energy Agency



Bertil Elenius
Head of Department
The Consumer Facts Department
The Swedish Consumer Agency

Contents

1	Outline	7
2	Introduction	11
2.1	About the energy labelling.....	11
3	The Results from the Shop Inspections in 2005	13
3.1	The most extensive inspection to date.....	13
3.2	Results.....	13
3.3	Results per chain store.....	13
3.4	Why is the Energy Label absent?.....	15
3.5	How the inspection was carried out.....	16
3.6	Comparisons with the results in 2004.....	17
4	Ten Years of Energy Labelling	19
4.1	Background in the EU.....	19
4.2	Experiences from nine shop inspections 1995–2005.....	20
4.3	Common explanations for insufficient labelling.....	22
4.4	Legal tools such as notices of compliance and information orders.....	23
5	Increased Need of Knowledge	25
5.1	Channels for spreading the information.....	25
6	The Importance of Energy Labelling for the Development of Domestic Appliances	29
6.1	Refrigerators and freezers are more efficient but smaller.....	29
6.2	Ovens lack information on function.....	30
6.3	Dishwashers – find out what the normal programme is.....	30
6.4	Test results for washing machines.....	31
6.5	Test results for tumble dryers 1997–2005.....	33
6.6	Request for technical documentation.....	34
6.7	Method development for the future.....	34
7	The Choice and the Sale of Energy-saving Models are Increasing	35
7.1	Köpguiden gives advice.....	35
7.2	Sales statistics according to energy class.....	35
8	Nordic Network	39
9	Discussion	41
	Appendix 1. Colour background label and data strip	44
	Appendix 2. Energy labelling inspections – overview map	45
	Appendix 3. Test results of refrigerators and freezers	46

Appendix 4. Test results of ovens	49
Appendix 5. Test results dishwashers	50
Appendix 6. Test results washing machines	52
Appendix 7. Test results tumble dryers	57

1 Outline

This report presents the results from the 2005 inspection of the energy labelling in shops and the experiences of the Swedish Consumer Agency as supervisory authority for the compulsory energy labelling over a period of ten years.

The 2005 inspection of the energy labelling in 246 shops is the most extensive to date. 80 per cent of the refrigerators and freezers and 70 per cent of the ovens were labelled. 75 shops were issued a notice of compliance regarding insufficient energy labelling and another few cases have been handed to the legal department of the Swedish Consumer Agency for further assessment. In those cases it is a matter of shops that have not improved their labelling in spite of a previous notice of compliance. A comparison between 12 chain stores shows that Ikea, Onoff and Power have the highest proportion of energy labelled appliances in their shops, whereas Elspar has the lowest proportion of labelled appliances in this investigation. However, three of the shops from Elspar are in municipalities where the labelling has not been inspected before and in such cases the labelling is often worse. The chain stores Elon and Hemma can also do more concerning energy labelling in their shops. Coop Forum has unsatisfactory labelling on their ovens. At Elgiganten there were some labels in black and white rather than the colour labels prescribed by the regulations.

The energy labelling scheme has had the intended effect both when it comes to the available choice and the sales of more energy-saving household appliances. The fact that there still is a large variation between the inspected shops shows that a large degree of the responsibility for the energy labelling is found with the shop managers and their staff. Just as at the first inspection in 1995 there are still shops that totally lack labelling, whereas other shops have labelled everything. The routine to label an appliance the same instant it is unpacked is something the shops where the labelling works well have in common. These places order labelling material regularly and some of the staff have particular responsibility to make sure that everything is labelled.

The retailers have problems getting labelling material and this is a sign of the weakest link in the energy labelling work: The labelling is delivered to the shops in two parts. This makes it easy for the retailers and manufacturers to blame each other when the labelling does not work. The colour background label is sometimes perceived as ugly and too large for washing machines and ovens. The glue sometimes leaves marks that are hard to get rid of. If the data strip is not with the machine when it is unpacked or if it disappears, the shop sometimes has to wait a long time for a new one. Other common explanations are negligence or lack of time. The Swedish Consumer Agency has issued 323 notices of compliance in total regarding insufficient labelling, primarily to shops, but also 14 to oven manufacturers.

There are demands on what type of energy information should be included in the manufacturers' product brochures. Surveys in 1995 and 1997 show that not a single one met the demands. From now on follow-up of the Internet information will be also be demanded. The Swedish Consumer Agency has worked with small resources when it comes to producing and spreading information regarding compulsory energy labelling. At the beginning printed information such as brochures were distributed via shops, trade associations and the Swedish Energy Agency. In recent years the printed information has been replaced more and more by the web site of the Swedish Consumer Agency, primarily via the application Köpguiden (The Purchase Guide). It shows the available range of energy labelled domestic appliances and that the models may be classified according to energy class. Köpguiden had more than a million visitors during 2005.

The Swedish Consumer Agency has made a special information effort in the form of a course directed to retailers. The training sessions have taken place at the premises of the retailers in question, often before or after opening hours. 46 shops and 141 people in total have participated in the course. In addition to that the Swedish Consumer Agency has, on seven occasions taken part in training meetings for staff from Coop Forum. The aim has been to increase the understanding of the importance of the energy labelling and thus improve the energy labelling in these shops. At the end of the day it is a question of making sure that the consumers get information based on energy consumption facts before they purchase a new domestic appliance.

The magazine Råd & Rön, has in connection with the test results for energy labelled domestic appliances, published 45 articles during 1995–2005. To carry out tests to inspect the manufacturers' specifications on the Energy Label is necessary in order to maintain the confidence in the energy labelling system and to prevent the development of domestic appliances moving in the wrong direction. The biggest difference between what the manufacturers stated on the Energy Label and Testlab's test results date from when the energy labelling had recently been introduced. As the years have gone by the manufacturers have got better at keeping within the allowed tolerances. The volume of the refrigerators and freezers have decreased as a result of increased insulation, whereas washing machines and tumble dryers hold more and more laundry, according to the manufacturers' own information, which means that the energy consumption goes down per kilo of laundry. This development moves in a directly contrary direction to the fact that there is an increasing number of one and two people households. Furthermore, there is information lacking on the Energy Label that is important to the consumers of today, for example how well ovens bake and heat up or the rinsing performance of washing machines. This information is absent from the Energy Label because there are no common test methods for obtaining these details. In order to influence the development of new test methods, Testlab participates in the European and international standardisation work.

The sales statistics for the energy labelled domestic appliances show that most appliances are sold in energy class A, with the exception of tumble dryers where energy class C is still the most common. The proportion of refrigerators and freezers in energy class A+ is lower in Sweden than in the other EU states we have chosen to compare with.

The energy labelling will be extended to more product groups, such as, for example, water heaters and taps. This will require new follow-up activities in the form of shop inspections, tests and information directed to consumers and trade and industry.

2 Introduction

All use of energy affects both one's wallet and the environment. The largest effects on the environment from domestic appliances, such as for example refrigerators and washing machines, derive from the electricity they use during their lifetime. The appliances that the consumers buy may be used for ten or fifteen years and for this reason the choices consumers make today are of large importance for the future.

The energy labelling of domestic appliances is compulsory and common to all EU states. The objective is to help the consumers choose more energy-saving domestic appliances and to spur on product development in the direction towards manufacturing and selling more energy-saving models. The Swedish Consumer Agency has been the supervisory authority and has had responsibility for the work that is described here. Since 1 January 2005 the Swedish Energy Agency is the supervisory authority in Sweden and will be checking that regulations are conformed to.

When asked whether one has received information about energy labelling when buying a new piece of white goods, almost two thirds, 65 per cent, answered that they had received information on what the energy labelling is. According to an investigation in 2003 the corresponding figure was 52 per cent and in 2000 only 45 per cent.¹

This report contains the results from the most recent shop inspection of energy labelling and the experiences of the Swedish Consumer Agency after ten years of work with this labelling. The work includes inspections of the figures the manufacturers have stated on the Energy Label as well as legal measures such as notices of compliance to retailers and manufacturers regarding insufficient labelling. In addition to that, the Swedish Consumer Agency made a survey of the information found in product brochures and produced and distributed information about the energy labelling to consumers as well as retailers and manufacturers.

2.1 About the energy labelling

The Swedish Consumer Agency has inspected the energy labelling in shops almost every year since the autumn of 1995. The only exceptions being the year 2000, when the Swedish Consumer Agency compiled and assessed its experiences after five years with energy labelling and in 2003. The inspections have been unannounced and have taken place in close collaboration with the local (municipal) consumer advisors. Without this collaboration it would not have been

¹ Telephone interviews with 1 000 households carried out on behalf of the Swedish Consumer Agency by Ipsos-Eureka and Sifo.

possible for the Swedish Consumer Agency to carry out inspections to the extent that has been the case.

Domestic appliances that should be labelled:

- fridges and freezers
- ovens and the oven part of cookers
- dishwashers
- washing machines
- tumble dryers
- combined washing machines and tumble dryers

In addition to these appliances, lamps and air-conditioning appliances, among those certain heat pumps, are included in the energy labelling requirement.

2.1.1 Comparative labelling

The energy labelling includes all appliances and should show both good and bad alternatives. In order for comparative labelling to have the desired effect it must be compulsory, otherwise there is a risk that only the energy-saving models would be labelled.

2.1.2 From green to red

The level of energy efficiency of a model is shown on a scale from A, green colour and low consumption, to G, red colour and high consumption. For fridges and freezers there are also energy classes A⁺ and A⁺⁺, where A⁺⁺ consumes the least energy. For washing machines, tumble dryers and dishwashers it is also indicated how well the machines wash, dry and clean on a scale from A to G, where A indicates the best performance.

2.1.3 The two parts of the energy label

The data strip contains information specific to each model and is placed on all appliances of the same model. It is applicable in all EU states and should come with the appliance from the factory. The colour background labels should be in the national language of the state where the product is sold and their task is to explain the information given on the data strip. There is one colour background label per group of appliances, in total six different labels.

For the labelling to be complete, both the data strip and the colour background label must be attached on the outside of the front or top of the appliance and be clearly visible. The data strip should be attached to the colour background label. Regarding ovens, it is specified that the label should be on the oven door. If the whole or parts of the label is missing the appliance is considered unlabelled since the labelling is then rendered incomprehensible for the consumer (see appendix 1).

3 The Results from the Shop Inspections in 2005

Here follows a compilation of the results from the shop inspections in 2005. The inspection includes the energy labelling of fridges, freezers and ovens. We have also tried to find out why the label is missing when it is and made comparisons with the results from 2004.

3.1 The most extensive inspection to date

This is the largest inspection of the energy labelling so far and includes 246 shops in 43 municipalities, from 1 to 16 shops per municipality. In total there were 6 373 fridges and freezers and 4 097 ovens in the inspected shops. The shops differ a lot in their labelling, there are shops that label everything and others where the products totally lack labels.

3.2 Results

According to the results of the inspection in 2005 80 per cent of the fridges and freezers and 70 per cent of the ovens were energy labelled. Even if it is difficult to directly compare the results, there seems to be a somewhat declining tendency concerning the proportion of labelled fridges and freezers compared to the two most recent inspections, where 87 and 84 per cent respectively were labelled. The energy labels on ovens were inspected for the first time in 2004. At that time only 34 per cent were labelled. In as good as all municipalities the labelling of ovens has undergone a pronounced improvement. Based on this the Swedish Consumer Agency draws the conclusion that the 14 notices of compliance regarding insufficient energy labelling have had the intended effect. However, several retailers call attention to the fact that the Energy Label is too large to fit on the oven door. There are shops that put the label on the wall above the cooker. This should be a relatively small problem, as long as it is very clear which label goes with which cooker. Another way this has been dealt with is to put the label on the side of the cooker. However, using this solution it is paramount that the cookers are placed openly and with plenty of room in-between so that the label is clearly visible. The labelling is not approved if the label is obscured from view causing the consumer to have to look for it.

3.3 Results per chain store

In connection with the inspection of 2004 the Swedish Consumer Agency compiled the results per chain store for the first time. The comparison was on this occasion limited to fridges and freezers since the labelling on ovens was generally very unsatisfactory. Judging from these results the Swedish Consumer Agency could establish the fact that the labelling worked best in the chain stores. This year

there are 12 chains in the investigation where we have assessed that the number of shops has been sufficient to compile the results. The number of shops per chain varies from four Ikea stores to 24 shops from Elon.

The four Ikea stores are at the top when it comes to energy labelling, closely followed by Onoff and Power. Ikea displays their white goods in a kitchen environment. Onoff and Power were among the best concerning energy labelling in 2004 year's inspection too. The chain where the labelling is least successful is at the specialised retail chain Elspar, which is represented by nine shops. Unfortunately, this was also the case in 2004. The three shops that contribute to the low results are all, however, in places where the energy labelling has been checked for the first time. This shows how important it is with shop inspections with a good geographical distribution.

If you look at the specialised retail trade chains, Electrolux Home, Elon, Elkedjan, Elspar and Hemma, it is the 14 shops that belong to Electrolux Home that do best with 92 per cent of the refrigerators and 77 per cent of the ovens being labelled. Electrolux Home also displays parts of their range placed in a kitchen environment. At the previous inspection 78 per cent of the refrigerators and freezers at Electrolux Home were labelled. In 2004, it was Elon that was the best chain at energy labelling amongst the specialised retailers, this year 73 per cent of the refrigerators and freezers and 70 per cent of the ovens were labelled in the Elon shops. For the chain Hemma there is also some work remaining in order to make the labelling work, with 79 per cent of the refrigerators and 70 per cent of the ovens labelled.

At Rusta 88 per cent of the refrigerators and freezers and 89 per cent of the ovens had a complete energy label. Five of the eight shops have all their exhibited appliances labelled. The results for the 16 shops from Coop Forum is unacceptably low, with only 57 per cent of the ovens labelled in 2005. In table 1 there is a compilation of the number of inspected shops and the proportion of labelled refrigerators, freezers and ovens per chain store.

Table 1. Proportion of labelled refrigerators, freezers and ovens in per cent per chain stores.

Chain store	Shop	Proportion of labelled refrigerators and freezers (%)	Proportion of labelled ovens (%)
Coop Forum	16	89	57
Electrolux Home	14	92	77
Elgiganten	23	77	66
Elkedjan	22	84	78
Elon	24	73	70
Elspar	9	64	52
Hemma	20	79	70
Ikea	4	100	98
Onoff	15	94	92
Power	8	95	90

Rusta	8	88	89
Siba	11	91	86

3.4 Why is the Energy Label absent?

This year's inspection shows that there is a problem with the colourful background labels. Some retailers believe that they are not necessary and confine themselves to attaching the data strip, whereas others say that they do not get enough colour background labels from their suppliers.

3.4.1 Negligence and lack of time

Common explanations for insufficient labelling is negligence, lack of time, or that a delivery of products recently came in. Previous experience in connection with this shows that the labelling work functions best when the retailers have learnt to label the appliances the very moment they are unpacked. In the shops where this is done, there are also routines for ordering labelling material from the manufacturers. There are often certain members of the staff who have particular responsibility for ensuring that everything is labelled.

3.4.2 Stainless steel and aluminium still unlabelled

The manufacturers must shoulder their responsibility and produce labels that function on the appliances that are of stainless steel, aluminium and other similar materials. The glue on the colour background label leaves ugly marks, in those cases the appliance in question can not be sold. It is becoming increasingly popular with refrigerators, freezers and ovens to have these surface materials and the Swedish Consumer Agency can not accept that the retailers are forced to label these products on the inside due to bad colour background labels. In order for the label to have the intended effect it must be placed clearly visible on the outside. The regulations concerning the energy labelling are very clear in this respect.

3.4.3 Labels in black and white

Elgiganten is a chain store where the retailers print out their own labelling material, which has unfortunately resulted in black white labels being used in several of their shops. The labels have to be in colour in order to be noticed. There are clear rules regarding the appearance of the labels. The Swedish Consumer Agency has issued a notice of compliance regarding insufficient energy labelling with a request for a statement from the main office of Elgiganten in Sweden. Elgiganten states in their comment that the problem has been caused by changes in the computerised sales programme, and has been notified. In order to improve the labelling one person has been designated to have particular responsibility for supporting the staff in the continued work with labelling. Elgiganten intends, according to their statement, to follow the regulations and will work continuously with these issues.

3.5 How the inspection was carried out.

The local consumer advisor has a protocol per shop and shows it to the shop manager or other person in charge and asks for a signature as soon as the inspection is finished. The protocol starts with questions about the shop, if it belongs to a chain, organisation number and address. After that there is information about the inspection, what day it has taken place, the time of day and the name of the person or persons that have carried out the inspection. The consumer advisor notes the number of exhibited refrigerators, freezers and ovens and the number that lack labels. If the colour background label and/or the data strip is missing, the appliance is considered unlabelled. The same applies if the label is obscured, for example placed on the inside. There are seven alternatives available in response to the question why labels are missing and it is possible to tick more than one answer in the same protocol.

- Negligence
- They do not know about energy labelling
- They have not had time
- Second-hand
- They have run out of the colour background labels
- The data strip was missing at the delivery
- Other

For ovens there is also the alternative:

1 Manufactured before 4/6 2002.

Ovens that are manufactured before 4 June 2002 should not be energy labelled. Even if this indicates that an oven is more than three years old, the Swedish Consumer Agency chose to keep this answer alternative since earlier inspections has shown that it can take a long time to phase out old models from the shops.

From the 1999 inspection and onwards, the retailers have had the possibility to read through the protocol before the local consumer advisor has left the shop. The retailer has been encouraged to sign the protocol to show that they have taken part of the content. They also have the opportunity to write down possible objections to the result shown in the protocol. This has worked very well.

In connection with the shop visits the local consumer advisor has also distributed information about the energy labelling to the shop manager or other personnel in charge in the shop.

3.5.1 Notices of compliance regarding insufficient labelling to shops

If the inspection shows that the retailer does not confirm to the regulations concerning labelling, the shop will get a notice of compliance regarding insufficient energy labelling. This is in the form of a letter where the Swedish

Consumer Agency draws the shop manager's attention to the insufficiencies and encourages the shop to improve. The notices of compliance have often given very good results and the proportion of labelled appliances has increased during the following years after a notice of compliance.

In 2005, 75 shops received a notice of compliance regarding insufficient energy labelling. All kinds of shops are represented in this group, specialised retail as well as large department stores and independent shops. It is gratifying that several retailers have contacted the Swedish Consumer Agency after having received the remark to say that they have now labelled all the appliances in the shop.

After the 2004 inspection 37 shops were given remarks concerning insufficient energy labelling. 33 of the shops are also in this year's inspection and ten of those now have all their refrigerators, freezers and ovens labelled. Six shops have improved considerably and only lack labels on isolated appliances and their result was approved.

3.6 Comparisons with the results in 2004

In a majority of the participating municipalities the energy labelling was inspected in 2004 too. It is, however, not always the same shops that are visited, most often due to natural reasons, such as shops closing and others going into business. At the last inspection the protocols made it apparent that many retailers had misunderstood the information and thought that the oven in cookers was not included in the energy labelling requirement demand. They only labelled separate ovens. At the inspection in 2005 the labelling of cookers worked much better. On the other hand, cookers with two ovens often lacked a label on one of them. Several retailers claim to be unaware of the fact that these should have two labels.

4 Ten Years of Energy Labelling

Here follows a summary of the experiences of the Swedish Consumer Agency as supervisory authority for the compulsory energy labelling since 1995. The shop inspections have been carried out in collaboration with the local consumer advisors and Testlab has tested refrigerators, freezers, dishwashers, ovens, washing machines and tumble dryers in order to control that the information details that the manufacturers have stated on the energy labels are correct. In addition to that, Testlab has participated in the European and international standardisation work which is the basis for the labelling. In the preventive work it has been important to establish and maintain contacts with representatives from the trade associations for manufacturers and retailers as well as with the nationwide chain stores. Furthermore it is important to reach consumers, who are on the point of buying a new domestic appliance, retailers and manufacturers with information about the energy labelling.

4.1 Background in the EU

The first attempt to introduce energy labelling of domestic appliances in the EU states started as early as at the end of the 1970's. Unlike today's energy labelling it was voluntary and in practice it ended up only covering ovens. The interest for the voluntary labelling was low and for this reason it was unable to influence the choice of energy-saving models on the market². Instead, national energy labelling started to appear, for example in France, Holland and Denmark. The different labelling systems were potentially confusing and misleading for the consumers and at the same time they threatened the free movement of domestic appliances within the internal market of the EU.

4.1.1 The framework directive

The framework directive, which is the basis for the compulsory energy labelling of today, is from 22 September 1992. The framework directive, 92/75/EEG, gives a broad outline of the importance of consumers receiving information concerning the energy consumption when they are going to buy a new domestic appliance. For each group of appliances there is an implementing directive which describes the regulations in more detail and what information should be given. In the framework directive two purposes of the energy labelling are described. The first one is to raise the consumers' awareness of the importance of saving energy. The second purpose is to make sure that the measures needed to increase consumer

² Winward, Schiellerup, Boardman *Cool Labels, The first three years of the European Energy Label*, Energy and Environmental Programme, Environmental Change Unit, University of Oxford, Great Britain .

awareness do not become an obstacle for the free movement of goods within the EU.

The responsibility for the energy labelling is shared by three participants:

- The member states of the EU
- The manufacturers
- The retailers

4.1.2 The member states are required to control compliance with the regulations

Sweden, as a member state of the EU, is required to incorporate the regulations concerning energy labelling with its national legislation. The member states are also responsible for the training and information activities and for controlling the compliance.

4.1.3 The manufacturers are required to provide the shops with labelling material

The manufactures are required to provide the shops with labelling material free of charge and should make sure that there is an information sheet in all product brochures or other documents that come with the appliance. It is also the manufacturers' responsibility to make sure that the information about the model is correct. They are required to supply technical documentation to make it possible for the supervisory authority to control the correctness of the declared information. The documentation should be available for a period of five years after the last machine of a certain model has been manufactured".

4.1.4 The retailers are required to label everything

The retailers have the responsibility to make sure that all appliances exhibited for sale or rent are energy labelled. They are required to place the label clearly visible on the outside of the front or top of the appliance and should make sure that the correct data strip and colour background label is placed on the appliance. The retailers should regularly order labelling material from the manufacturers.

4.2 Experiences from nine shop inspections 1995–2005

The first inspection of the energy labelling was carried out in the autumn of 1995 and comprised of 99 shops in 21 municipalities. At the time only refrigerators and freezers manufactured from and including 1 January the same year were included by the regulations. The result showed that 72 per cent were labelled, which the Swedish Consumer Agency thought was acceptable at the time given the fact that the labelling programme was new. Subsequently new groups of appliances were added such as washing machines and dishwashers, and due to this the inspections increased in extent. The shop inspections during 1999, 2001 and 2002 included most groups of appliances, as the energy labels on refrigerators, freezers, washing

machines, tumble dryers and combined washing machines and tumble dryers along with dishwashers were inspected, see table 2.

Table 2. Proportion of labelled appliances per product group and year.

Year	Refrigerators and freezers (%)	Washing machines (%)	Tumble dryers (%)	Dishwashers (%)	Ovens (%)
1995	72				
1996	73	40	30		
1997	66	59	55		
1998	92	88	85		
1999	81	77	76	31	
2000					
2001	78	74	78	72	
2002	87	86	89	86	
2003					
2004	84				34
2005	80				70

No shop inspections were carried out in 2000 and 2003..

The last two inspections have been limited to cold appliances and ovens. The highest number of shops included in an inspection is 246 and the smallest number 60. The trend during the 2000's shows an increasing number shops being inspected.

4.2.1 Courses and follow-up meetings for local consumer advisors

In 1999 the Swedish Consumer Agency arranged, for the first time, a follow-up meeting for local consumer advisors that had taken part in the inspection. This was much appreciated and for this reason an introduction as well as a follow-up meeting has, since then, been offered. There has been no requirement, however, of participation to be able to participate in the inspection. However, after the introduction of these meetings, it has become clear to the Swedish Consumer Agency that the quality of the inspections has increased, which is reflected in the protocols. The primary purpose of the follow-up meetings is to give the participating local consumer advisors feedback on the results.

4.2.2 The highest number of inspections

There is only one municipality where the local consumer advice centre has participated nine times. After that come two municipalities with eight and seven inspections, respectively. In five municipalities the energy labelling has been inspected on six different occasions. In as many as 21 municipalities the local consumer advice centres have inspected the shops four or five times. Even if a municipality has had frequent inspections the shops included in the inspection may have varied from year to year. The most common case, however, is that the shops in a municipality have been inspected on one occasion (see appendix 2).

4.2.3 Unsatisfactory labelling the first time

The results from the first inspection of refrigerators and freezers was characterised by the Swedish Consumer Agency as a "successful start for the new energy labelling" in the press release that was issued. Subsequently the results have been considerably worse, when the labelling of a new group of appliances has been inspected. Manufacturers and retailers do not, just because they have learnt to label for example washing machines, automatically transfer these routines to dishwashers. At the first inspection of washing machines and tumble dryers, only 40 and 30 per cent respectively were labelled. The same applies for dishwashers and ovens where 31 per cent of the dishwashers were labelled in 1999 and 34 per cent of the ovens in 2004.

4.3 Common explanations for insufficient labelling

At the very first inspection of the energy labelling it became apparent that retailers had trouble getting labelling material from the manufacturers, which this is something the retailers have called attention to at each subsequent inspection. The shared responsibility has made it possible for the manufacturers and the retailers to blame each other when the labelling does not work. This is an area where further efforts may be needed in the future in order to put pressure on the manufacturers to improve their routines regarding supplying the shops with labelling material.

Other common explanations for unsatisfactory energy labelling have been negligence or lack of time. This can possibly be interpreted as an indication that everybody has not understood the compulsory nature of the labelling. The labelling works best in shops where the retailers have the routine to label the appliance when unpacking it.

4.3.1 Problems with the colour background labels

The problems with the colour background labels can be summed up by saying that the shops find it difficult to get hold of a sufficient number of colour background labels, that they are perceived as large and ugly and that the glue may leave traces on, for example, stainless steel surfaces, and if that happens those appliances cannot be sold. In 2001, the trade association, the Swedish Association of Suppliers of Electrical Domestic Appliances (Elektriska Hushållsapparater Leverantörers förening, EHL), ran out of colour background labels for refrigerators and freezers for a period of time. The EHL co-ordinates the printing for their member companies. This can not be allowed to happen as the labelling is compulsory.

4.3.2 A long wait for new data strips

The shop inspections of the Swedish Consumer Agency have revealed that if the data strip was missing when the retailer unpacked the appliance or if it is misplaced, it can take a long time for the retailers to get a new data strip. Sometimes the retailers have to order them from a different country and in those

cases it can take several weeks before the new one arrives. The best thing would be if the retailers were able to print out a new strip or if they received one with returning mail. When data strips have been missing, the retailers have sometimes written down the details by hand straight onto the colour background label. This is not a good solution to the problem since there may be disputes between retailers and manufacturers if the information should turn out to be incorrect.

4.3.3 Questionnaire inquiry among manufacturers

Since the shop inspections showed that the deliveries of labelling material was not working optimally, the Swedish Consumer Agency put together a questionnaire that was sent to 22 manufacturers on the Swedish market. 19 of these answered the questionnaire. The purpose was to get a picture of how the manufacturers supply the shops with labelling material. It is evident from the questionnaire answers that the routines for sending a data strip with the appliance is a part of the quality control at the factories. Usually the data strip is bipped with the manual before the appliance leaves the factory. However, it was not possible to tell from the questionnaire answers whether the manufacturers have extra data strips in stock or whether these have to be ordered specially if they are missing or disappear.

The questionnaire showed that there are manufacturers that lacked routines in order to ensure that the shops receive colour background labels. The manufacturer may not visit the shop very often and in those cases it is up to the retailer to make sure that the shop has sufficient labelling material.

4.4 Legal tools such as notices of compliance and information orders

Repeated inspections and information efforts are not always enough to increase the proportion of labelled appliances in the shops. For this reason the Swedish Consumer Agency has sent notices of compliance concerning insufficient labelling to the shops which have not labelled their exhibited appliances. A notice of compliance is a letter where the Swedish Consumer Agency calls the shop manager's attention to the insufficiencies that the inspection has revealed and requests compliance. If a follow-up inspection does not show improvement, the shop receives an information order combined with a default fine. The fines have been 100 000 or 200 000 SEK, 11 000 or 22 000 EUR. No fine, however, has had to be imposed. An information order means the shop manager must undertake to comply with the energy labelling regulations and if the follow-up inspection does not show any improvement the Swedish Consumer Agency have had the possibility to go to court and get the fine imposed.

4.4.1 Notices of compliance regarding insufficient labelling

The Swedish Consumer Agency has issued altogether 323 notices of compliance regarding insufficient energy labelling, to shops for the most part but also to 14 oven manufacturers between 1997 and 2005. The notices of compliance have,

with a few exceptions, yielded good results and contributed to a great extent to an improvement in labelling.

After the 1999 inspection the Swedish Consumer Agency requested that the retailers that had failed to improve in spite of a previous notice of compliance, should submit a so-called statement, where they were expected to account for their lack of improvement. It was, however, very time-consuming to make sure that these statements came in. Now the retailers sign the protocol instead and they also have the opportunity to write down possible objections to what is presented in the protocol.

4.4.2 Inspection of product brochures

In regulations concerning energy labelling there are also requirements that product brochures should contain certain energy information. The EU directives regulate contents, the terms that should be used and in what order they should be presented in a table. This is supposed to offer the consumer the opportunity to compare the information in different manufacturers' brochures at his or her leisure. The information that should be given in the brochures is supposed to give more detailed information than what the Energy Label provides. If the manufacturer does not have a product brochure, there must be a separate information sheet with the appliance in the shop.

When the Swedish Consumer Agency, in 1995 and 1997, reviewed 66 brochures in total for refrigerators, freezers, washing machines and tumble dryers it became evident that not a single brochure conformed to the energy information requirements. In almost all brochures the compulsory energy information was mixed with other information, such as what colour the model had. Other common mistakes were that they did not use the prescribed terms, noise was for example expressed as sound level. The energy consumption for refrigerators and freezers should be stated per year. For washing machines and tumble dryers the manufacturers are required to state the energy consumption per wash or drying cycle. In certain brochures the energy consumption of refrigerators and freezers per day and per kilo was given, which gave the incorrect impression that the machines used less energy.

The Swedish Consumer Agency wrote a letter to all the manufacturers calling attention to the insufficiencies and urged them to improve matters. An information meeting was also arranged on the theme "The Compulsory Energy Information in Brochures". Of more than 20 manufacturers, only three came to the meeting. On this occasion the Swedish Consumer Agency handed out a suggestion as to how the energy information can look when it is presented in accordance with the regulations. This shows that it is hard to invite competing businesses to one joint meeting. It is often better to meet them one at a time.

5 Increased Need of Knowledge

The attention to the risks of the greenhouse effect has increased the need for information on what each and everyone can do concretely in their everyday life to reduce the effects on the environment and the energy costs. The printed material has during the 2000's been more and more replaced by information via the web site of the Swedish Consumer Agency. Other important information channels are the magazine Råd & Rön, courses for retailers and visits to the headquarters of nation-wide chains of stores that sell white goods.

5.1 Channels for spreading the information

The Swedish Consumer Agency has produced information material about the energy labelling that has been aimed at consumers, retailers and manufacturers. The Swedish Consumer Agency has not had the resources to increase the awareness and knowledge about the energy labelling on a national level. The information has been spread in co-operation with trade associations, the Swedish Energy Agency and the Swedish Environmental Protection Agency (Naturvårdverket). The printed material has during the 2000's been more and more replaced by information via the web site of the Swedish Consumer Agency, primarily the application Köpguiden, which is a market survey of the products that are covered by the energy labelling, with the exception of separate ovens. The models can, amongst other things, be classified according to energy efficiency class. There is also help in interpreting the information on the energy label. Köpguiden had more than a million visitors during 2005.

5.1.1 The magazine Råd & Rön

The magazine Råd & Rön was published by the Swedish Consumer Agency until May 2006 with 10 issues per year to 112 000 subscribers. Every issue is read by an average of 475 000 people. The web version of the magazine has 175 000 visitors per month. The articles are also often referred to in other media. The magazine is commercially independent and contains no advertisements. Råd & Rön has, in connection with publishing test results for refrigerators, freezers, washing machines, tumble dryers, dishwashers, lamps and ovens, written about the importance of saving energy and the energy labelling. Between 1995 and 2005, 45 articles with test results for energy labelled domestic appliances were published.

Råd & Rön is now published by the Swedish Consumers' Association, Sveriges Konsumentråd, an independent, non-partisan cooperative organisation consisting of 27 member organisations.

5.1.2 Energy labelling training for retailers

At the end of 2000 the Swedish Consumer Agency started a pilot project in order to give white goods retailers training on how to give advice to households concerning saving energy and energy labelling. The objective was to increase the number of energy labelled appliances. The courses started on a small scale in some shops in Stockholm and since then retailers from another 8 municipalities have been offered to participate in the training, see table 3. All shops in the municipality that were part of the previous shop inspection have received the offer and most of them have accepted.

Training in a shop environment

The Swedish Consumer Agency has visited and trained retailers in 46 shops, and 141 people in total have participated. In order to reach the target group, one shop was visited at a time, in the retailers' own environment and at a time that was suitable for them, which in practice meant before or after opening hours. Every course has been free of charge and has taken about an hour and half, sometimes longer if there were many questions. The conclusion that the Swedish Consumer Agency draws from the conversations with the retailers directly after the training session, is that the effort has been much appreciated. In addition to that the Swedish Consumer Agency has, on seven occasions, participated at training sessions that the retailer chain Coop Forum has organised for their staff. Around 140 people in total from different parts of the country took part in these meetings where the Swedish Consumer Agency was one of several lecturers.

The training binder

Since the training has taken place in a shop environment and over a long period of time, the Swedish Consumer Agency chose to put the information material together in a binder, where the pages can easily be exchanged when it is time for updates. The training includes, apart from the regulations concerning energy labelling and tips on what the retailers can do to improve their energy labelling, amongst other things, the consequences of our behaviour and habits on energy consumption and comparisons between old and new appliances.

Borås from the worst result to a better one

At the 2001 inspection of the energy labelling the retailers in the four shops in Borås had the poorest compliance record of the inspection, with barely 30 per cent of the freezers and the washing machines labelled. A follow-up inspection a year after the training showed that between 85 and 92 per cent of the appliances were energy labelled. The training effort attracted attention from the local radio station and the local newspaper. When the most recent inspection was carried out in 2005, eight shops from Borås were included. The results show that 70 per cent of refrigerators and freezers and 64 per cent of the ovens were labelled, which means that they are below the average according to the 2005 inspection.

The retailers of Gotland continue to be good at labelling

Four years after the training and Gotland still has a high proportion of energy labelled appliances. In spite of the fact that most of the retailers have had to concentrate on selling digital TV boxes during 2005, they have managed to maintain a good level of labelling with 95 per cent of refrigerators and freezers and 87 per cent of ovens being energy labelled. Before the training, 50 to 78 per cent of all appliances were labelled. The training effort on Gotland took place in close collaboration with the consumer advice centre and had a good impact in local media, which has contributed to the good result.

The training in Jönköping/Huskvarna

In Jönköping/Huskvarna the proportion of labelled appliances varied between 72 and 81 per cent in 2002. The retailers participated in the training during 2003, the follow-up inspection the following year included three shops and the results show that 93 per cent of refrigerators and freezers and all ovens were labelled. The shops in Jönköping were in 2004 almost the only ones to label all their ovens. Two years after the training the shop inspections show that the degree of labelling on refrigerators and freezers is still at 93 per cent whereas the proportion of labelled ovens has gone down to 76 per cent. However, that is better than the 2005 inspection average.

Improvement in Karlshamn after two years

In Karlshamn barely half the exhibited appliances were energy labelled in 2002. However, results show that two years after the training of the retailers the proportion of labelled refrigerators and freezers had increased to 94 per cent. The 2004 inspection covered, apart from refrigerators and freezers, also ovens of which 33 per cent were labelled according to the results. Ovens were not included in the energy labelling regulations when the training was carried out.

Table 3. Municipalities where the retailers have taken part in training and number of shops and participants during 2000–2004.

Municipality	Year	Number of shops	Number of participants
Borås	2001	4	10
Gotland	2002	11	30
Hagfors/Munkfors	2002	4	10
Jönköping/ Huskvarna	2003	6	22
Karlshamn	2002	4	8
Luleå	2001	8	22
Stockholm	2000	5	24
Uppsala	2004	4	15

Poorer labelling in Luleå four years after the training

The retailers in Luleå were among the first that the Swedish Consumer Agency offered energy labelling training to. Over a duration of two and half days the retailers of eight shops in total were visited. In 2001, 75 per cent of the refrigerators and freezers, 68 and 69 per cent of the washing machines and tumble dryers respectively and 65 per cent of the dishwashers were energy labelled. One year after the training the proportion of labelled appliances varied from 75 per cent for the dishwashers to 90 per cent for the tumble dryers. Three years later the proportion of labelled appliances in Luleå has gone down again, to 44 per cent for refrigerators and freezers and 35 per cent for ovens. Two of the shops in Luleå that contribute to the poor results declined the offer to take part in the training and one of those has subsequently signed an information order concerning insufficient labelling.

The retailers in Uppsala among the best at energy labelling

In January 2004, the Swedish Consumer Agency visited four shops in Uppsala in co-operation with the local consumer advice centre. Shortly thereafter a follow-up inspection was carried out that showed that the proportion of labelled refrigerators and freezers had increased from 69 per cent in 2002 to 83 per cent in 2004. The proportion of labelled ovens was 55 per cent. The inspection included more shops than those that took part in the Swedish Consumer Agency training. In 2005 94 per cent of the refrigerators and freezers and 96 per cent of the ovens were labelled.

... and in these places there has been no follow-up

In the five shops in Stockholm as well as in the shops in Hagfors/Munkfors there has been no follow-up inspection after the training effort.

5.1.3 Visits to the management of the nation-wide chain stores.

In the course of the preventive work the Swedish Consumer Agency has visited and informed the management of 10 of the nation-wide chain stores on energy labelling regulations. It is important that the insight that it is important to energy label all appliances, permeates the chain stores from top management all the way to the individual retailers. This may be a path towards increasing the proportion of labelled appliances on a more long-term basis since shop managers and personnel sometimes leave and new people join. It has become apparent that several of the chains have environment or quality systems of which the energy labelling is already or should be a central part. These contacts are important for the continued development of the energy labelling in Sweden and one proposal is to extend this contact network and it would also be desirable to be able to visit representatives for the chains regularly.

6 The Importance of Energy Labelling for the Development of Domestic Appliances

The specifications given on the Energy Label concerning energy consumption, washing, drying or dishwashing efficiency is based on the manufacturers' own tests and the manufacturers are responsible for the correctness of the information. Consumers have no possibility of controlling the information themselves. Deviation can only be spotted by independent test laboratories and competing manufacturers. To test domestic appliances in order to control the specifications that are stated on the Energy Label is, for this reason, necessary in order to maintain the credibility of the energy labelling.

Thanks to the energy labelling a larger number of energy-saving domestic appliances are manufactured and sold. Sometimes, however, the focus on energy consumption has become so strong that other properties have been pushed into the background. The Swedish Consumer Agency's laboratory Testlab has tested washing machines, tumble dryers, dishwashers, cookers and ovens. Refrigerators and freezers have been tested at a different laboratory. The tests include everything from how well the machines wash, dry and do the dishwashing, to the energy consumption and manageability, which shows if the appliance is easy to use. The results are based on the tests of one single machine. Since 1 January 2006, the Swedish Energy Agency is responsible for tests at Testlab.

6.1 Refrigerators and freezers are more efficient but smaller

Refrigerators and freezers consume less energy, the compressors have become more efficient and the insulation has been improved. The volume has, however, decreased somewhat due to the thicker insulation. In total, Testlab has tested 101 models of refrigerators and freezers during 1996–2005. The energy consumption of refrigerators and freezers may deviate with a maximum of 15 per cent. For 15 of the 101 tested refrigerators and freezers the deviation went beyond that. The largest deviation for a fridge was 30 per cent. The most common thing is that the test results reveal a higher consumption than the one declared by the manufacturer. However, in four cases Testlab has found the consumption lower than declared. In the most recent tests the manufacturers have kept within the permitted tolerance for deviation (see appendix 3).

6.1.1 Combined refrigerators and freezers deviate more often in volume

The European standard method for measuring the energy consumption of refrigerators and freezers states that the volume may deviate with a maximum of

three per cent from what the manufacturer has declared. The test results show that it is more common that combined refrigerators and freezers have a smaller volume than the manufacturer has specified, whereas the volume for separate refrigerators and freezers is often correct. On one occasion a deviation in freezer volume was gauged to 27 per cent. Out of five combined refrigerators and freezers of so-called American model, approx. 90 cm wide and with a larger refrigerator than freezer, the freezer volume of all the freezers deviated more than what is allowed.

6.2 Ovens lack information on function

Ovens is the most recent group of appliances that is included in the energy labelling regulations. However, Testlab has a long experience of testing cookers and ovens. Since the energy labelling came into force for ovens in 2003, Testlab has tested 19 ovens, of which three were labelled with energy class C and ten with energy class A. The C-labelled ovens were very hot on the surface, which makes it uncomfortable to work in front of the cooker and in addition to that, it is easy to scold oneself (see appendix 4).

The energy consumption used to be measured per hour in an empty oven. When the energy labelling was introduced, the ovens started to be tested according to a new method with a specially developed stone, designed to correspond to the cooking of a meat-steak. For ovens, only the energy consumption per cooking session is stated, and not the energy consumption per year as in the case of washing machines and dishwashers. The ovens are classified according to three different sizes. The ovens classed as large have a capacity of 65 litres or more and those of a capacity between 35 and 65 litres constitute the medium-sized group.

The Energy Label does not include a specification regarding the performance of the oven, i.e. how evenly they bake and the heat distribution. Testlab considers this a shortcoming and is working for such an addition to the energy label. Testlab is part of an international work group within standardisation where a test method has been developed that will hopefully be internationally recognised. The performance of the ovens is assessed by means of a baking test that measures how evenly they bake.

6.3 Dishwashers – find out what the normal programme is

The energy labelling on dishwashers started in 1999. During 1999–2005, Testlab tested 28 dishwashers, of which 22 were integrated dishwashers and 6 table-top ones. The energy consumption of a dishwasher is allowed to deviate by 15 per cent at the most. The largest deviation found among the tested models was 25 per cent for table-top dishwashers, whereas integrated ones were within the 15 per cent limit.

The specifications given by the manufacturer on the Energy Label refers to the so-called normal programme of the dishwasher. Which programme this is may vary

from model to model. It is important that consumers find out which programme the manufacturer considers to be the normal programme if they want to have the same energy consumption and dishwashing result as on the energy label.

6.3.1 Standardised dirt

The dishwashing performance of the machines is also stated on the energy label. In order to measure this, china, crockery, cutlery and glass is soiled with minced meat, egg yolk, oatmeal porridge, spinach, milk, margarine and tea. The food scraps are then allowed to dry up in 180°C heat. After the washing-up programme is complete, the amount of food residue is assessed and the washing-up efficiency class is calculated based on this assessment.

6.3.2 The programme durations have become longer

More and more models are A-classed both in the energy consumption and the dishwashing and drying efficiency classifications. In this context it is useful to know that the Swedish Consumer Agency top note, which is five, approximately corresponds to the dishwashing efficiency class B. In order to get the best dishwashing and drying results the programme times of the machines have been prolonged. When the energy labelling was new for dishwashers, Testlab found models where the drying efficiency sometimes deviated by 30–40 per cent and in separate cases even more. This has, however, improved. In the last measurements the manufacturers have kept within the allowed tolerances. Formerly it was common that the machines had a programme duration of about one and a half hours and today there are certain models that take three hours to complete. This can be experienced as unpractical by the consumers.

6.3.3 More covers

The number of dishes the machine holds is expressed in number of covers. One way for the manufacturers to reduce the energy consumption per dishwasher cycle, is to increase the number of covers. This can result in a shortage of space in the machine and then there is a risk that the dishes do not come out as clean as they would normally. The most common number of covers on the Swedish market is 12, but there are models where the manufacturer states that the machine holds as many as 15 covers per dishwasher cycle (see appendix 5).

6.4 Test results for washing machines

The specification that the manufacturers state on the Energy Label for washing machines refers to the programme 60 °C cotton. Apart from the energy consumption, the wash and spin performance is declared on a scale from A to G, where A is the best and G is the worst. Besides this there is also information on how much water the machines consume in litres per wash.

During 1997–2005 the Swedish Consumer Agency tested 48 washing machines. For 20 of these the results deviated from what the manufacturer declared on the energy label. The energy and water consumption may deviate by 15 per cent from

the declared values. As regards the washing efficiency classes, the maximum deviation allowed is three per cent.

For three of the models, where the manufacturers had declared the energy efficiency class A, Testlab found the models belonging to energy class C instead. On four occasions the test results revealed that the model in question belonged to one energy class inferior to the one declared by the manufacturer. In all these cases the manufacturer had declared the energy efficiency class A, and the test results revealed results corresponding to a class B.

When it comes to the washing efficiency class, there has, at the most, been a difference of four classes between the manufacture's own information and the Testlab results. The manufacturer had declared the washing efficiency class B and the test results showed class G. In addition to that, there were three models that diverged three classes on the scale for washing efficiency. The largest deviations were revealed at tests that were conducted when the labelling was new (see appendix 6).

6.4.1 More than clean

The Swedish Consumer Agency has for a long time graded the functioning of washing machines on a scale divided into five grades, where the highest grade is five and signifies very clean laundry. The washing efficiency class A has higher demands than grade five. The question is whether this is in demand on the part of the consumers. In order to achieve the top washing efficiency class, the laundry has to be processed more, which leads to more wear. The spin speed is also accounted for on the Energy Label and the number of revolutions have been optimised to achieve a lower remaining moisture content, which means that there is less water left in the clothes. This is of special importance if the clothes have to be dried in a tumble dryer or a drying cabinet that otherwise use an unnecessary amount of electricity.

6.4.2 Rinsing missing on the energy label

The focus on the energy consumption of washing machines has contributed to less water consumption. Unfortunately this has led to negative consequences for the rinsing. The rinsing efficiency is not stated on the Energy Label as there is no standardized method for measuring this. Testlab is working towards making rinsing efficiency a compulsory piece of information on the Energy Label and has developed its own test method which hopefully will be internationally recognised.

6.4.3 Larger capacity and longer laundry time

Another development is that the capacity of washing machines has increased. This means that more laundry is needed in order to fill a machine. Before the energy labelling was introduced, the most common capacity was three and a half kilos and today there are several models that, according to the manufacturers, hold seven or eight kilos per cycle. This development moves in a directly contrary direction to many people's habits and behaviour. Weighing laundry at Testlab has

shown that on average two and half kilos is washed per cycle. Furthermore, most households in Sweden are one or two people households.

In order to reach the best washing efficiency class the manufacturers have increased the laundry time for the 60 °C cotton programme with about 40 per cent. Today it is not uncommon that it takes more than two hours for a cycle to complete. This is unpractical for many consumers that want to be able to put a few loads through after coming home from work. Many manufactures have put energy into improving their short programmes. Tests show that these programmes on average achieve the second best Swedish Consumer Agency grade, a four, for the wash result.

6.5 Test results for tumble dryers 1997–2005

A somewhat simplified way of putting it would be to say that three times as much energy is consumed drying the laundry in a tumble dryer compared to washing it. It is, however, practical to get the laundry dried quickly. In the Swedish climate it is often an invaluable help for a family with children. Testlab has tested 14 tumble dryers in total, 11 of these are condenser tumble dryers and three are air vented tumble dryers. One of the models had a higher energy consumption than what the manufacturer had stated, according to Testlab's measurement (see appendix 7).

6.5.1 Tumble dryers are getting larger

Just as in the case of washing machines, the trend is larger and larger machines. Consequently it takes more clothes to fill the tumble dryer and this is a way for the manufacturers to lower the energy consumption per kilo of laundry. The programme durations of the machines have increased since it is taking longer to get the laundry dry. As a consequence the clothes come out more creased and it takes time to iron them in order to get them smooth again.

The criteria for the energy class A are very strict, which means that the manufacturers have, in fact, been obliged to develop new technology in order to bring out very energy-saving models. The small number of models found in the best energy class are condenser dryers with a heat pump and they are almost twice as expensive as most other models on the market.

6.5.2 Drying cabinets and dehumidifiers

Drying cabinets are not included in the energy labelling regulations. The reason is simply that it is not that common with drying cabinets in the rest of Europe. Many people that have a drying cabinet also choose to hang in the laundry without switching the heat on. This reduces the electricity consumption but on the other hand it takes longer to get the laundry dry.

Another possible alternative is a dehumidifier for those who have room to hang up their laundry in for example the utility room or the cellar. A comparative test between dehumidifiers and tumble dryers reveals that a dehumidifier has 30 per

cent lower energy consumption than a tumble dryer. However, it takes five times longer to dry the laundry with a dehumidifier.

6.6 Request for technical documentation

In the cases where Testlab has found deviations larger than what is allowed, the Swedish Consumer Agency has contacted the manufacturer and requested the technical documentation that the Energy Label specifications is based on. This has often been very time-consuming and the quality of the documentation has sometimes been of poor quality. The manufacturers' routines for providing the supervisory authority with relevant documentation must be improved. The Swedish Consumer Agency has in separate cases brought in three machines of the same model for further tests in the cases where the manufacturer has not been able to authenticate their claims on the energy label.

On several occasions the manufacturer has informed the agency that the model is no longer in production, but in these cases they are obliged to save the technical documentation for five years. The Swedish Consumer Agency has requested information on how many machines of the model are still in the shops, and demanded that they are relabelled. In some cases the follow-up of this has been rendered more difficult due to the fact that the manufacturer has kept the same model name for the newer model too.

6.7 Method development for the future

In order to spread the experiences of the Swedish Consumer Agency and to influence the development of domestic appliances, Testlab participates in the European and international standardisation work with the objective to develop common test methods. What looks like a small change of a standard, may actually lead to a positive development on the whole European or global market. Within this area Testlab has been particularly involved in the development work towards establishing methods in order to have specification of rinsing performance on the Energy Label of washing machines, as well as in the work to bring about a performance test for ovens.

7 The Choice and the Sale of Energy-saving Models are Increasing

The Swedish Consumer Agency has a long tradition of compiling information about the domestic appliances available on the Swedish market. The information is collected via manufacturers and is found in Köpguiden on the Swedish Consumer Agency web site, www.konsumentverket.se. All product groups that are included by energy labelling regulations are found here, with the exception of separate ovens. By means of these market surveys the Swedish Consumer Agency is able to follow the changes on the market.

7.1 Köpguiden gives advice

On the basis of the web application Köpguiden, the Swedish Consumer Agency can now say that both the number of models on the market and the proportion of A-labelled products have increased considerably since the energy labelling was introduced. There were for example no upright freezers in energy class A in 1995 and today the proportion is 61 per cent. The largest increase in the proportion of models of energy class A did not take place until the efficiency requirement for refrigerators and freezers was introduced in 1999, which meant that models that were in a lower category than energy class C were banned from sale. There is an exception for chest freezers where models down to and including class E are allowed to still remain on the market.

7.2 Sales statistics according to energy class

The Swedish Consumer Agency has bought sales statistics from the market research company GfK Marketing Services on the domestic appliances that are included in the compulsory energy labelling. Their surveys cover areas such as home electronics, white goods and IT and are based on a selection of shops.

The statistics cover the period from the year 2000 until September 2005. Apart from Sweden, figures from Denmark, Italy and Holland were included. The sales of energy-saving models have increased year after year. The proportion of refrigerators and freezers of energy Class A⁺ is smaller in Sweden than in the other countries.

7.2.1 More and more energy-saving refrigerators and freezers

In 2000, 15 per cent of the freezers that were sold in Sweden belonged to energy class A. In 2005 the proportion had increased to 78 per cent and in addition to that 8 per cent were found in energy class A⁺. This can be compared to Sweden's neighbouring country Denmark, where as much as 24 per cent of the freezers sold

belonged to energy class A⁺. As early as in 2000, more than half of the freezers that were sold in Holland belonged to energy class A and five years later the proportion is 71 per cent and in addition to that, 19 per cent are found in energy class A⁺, see table 4. In Holland efforts to boost the sales of energy-saving models have been carried out by means of subsidising the price.

Table 4. Proportion of sold refrigerators in energy class A/A⁺ distributed per year and country.

Year	Sweden (%)	Denmark (%)	Italy (%)	Holland (%)
2000	15		15	54
2001	32	45	25	70
2002	48	60	37	71
2003	A61/A+2	A67/A+2	A43/A+2	A67/A+21
2004	A72/A+4	A67/A+16	A49/A+4	A68/A+19
2005	A77/A+8	A65/A+24	A54/A+8	A71/A+19

Of the freezers that were sold in Sweden in 2000, there were barely four per cent that belonged to energy class A, compared to 42 per cent five years later. Furthermore, 17 per cent are found in energy class A⁺. In Italy the proportion of freezers in energy class A and A⁺ is as large 25 per cent in each class, see table 5.

Table 5. Proportion of sold freezers in energy class A/A⁺ distributed per year and country.

Year	Sweden (%)	Denmark (%)	Italy (%)	Holland (%)
2000	4		10	59
2001	3		15	69
2002	6		21	73
2003	A21/A+3		A22/A+9	A61/A+22
2004	A38/A+8		A23/A+18	A57/A+22
2005	A42/A+17		A25/A+25	A57/A+20

7.2.2 Many energy-saving ovens are already sold

In 2002, when the energy labelling for ovens was introduced, 19 per cent of the models that were on the market in Sweden belonged to energy class A and 27 per cent were found in class B. In 2005 the proportion of sold A-ovens was 48 per cent. In Denmark more than half of the ovens that were sold belonged to energy class A. In Italy and Holland, on the other hand, just over 20 per cent of the ovens belonged to energy class A and this may be connected to the fact that gas ovens are more common in these countries and are not included in the energy labelling regulations, see table 6.

Table 6. Proportion of sold ovens in energy class A, distributed per year and country.

Year	Sweden (%)	Denmark (%)	Italy (%)	Holland (%)
2002	19	10	4	3
2003	31	33	6	9
2004	38	51	12	18

2005	48	56	24	23
------	----	----	----	----

7.2.3 Dishwashers – the highest proportion of class A machines in Holland

The energy labelling on dishwashers started in 1999 and in 2000 most dishwashers, 40 per cent, were in energy class C. Only 18 per cent of the sold models belonged to the best energy class. In 2005 the proportion of sold dishwashers in energy class A is 77 per cent. In Italy the proportion of dishwashers in class A, was only 10 per cent in 2000, but in 2005 the proportion had increased to 86 per cent. The country with the highest proportion of A-labelled dishwashers is Holland, with 89 per cent, see table 7.

Table 7. Proportion of sold dishwashers in energy class A, distributed per year and country.

Year	Sweden (%)	Denmark (%)	Italy (%)	Holland (%)
2000	18		10	52
2001	30	48	21	74
2002	47	62	44	88
2003	61	73	58	91
2004	69	85	74	86
2005	77	88	86	89

7.2.4 Washing machines

In 2000 just over 30 per cent of the washing machines that were sold in Swedish shops belonged to energy class A, in spite of the fact that the energy labelling had existed for four years. In 2005 the proportion had increased to 91 per cent. The highest proportion of A-labelled washing machines are sold in Holland with 97 per cent and the lowest proportion in Italy with 82 per cent, see table 8.

Table 8. Proportion of sold washing machines in energy class A, distributed per year and country.

Year	Sweden (%)	Denmark (%)	Italy (%)	Holland (%)
2000	34		18	71
2001	55	68	34	88
2002	70	77	49	95
2003	84	87	63	96
2004	88	93	75	96
2005	91	94	82	97

7.2.5 Tough demands for tumble dryers – most tumble dryers found in class C

The fact that the tumble dryer requirements to qualify for energy class A are strict, is also reflected in the sales statistics. Most tumble dryers are found in energy class C. In this respect the differences are not that large between different countries. 98 per cent of the tumble dryers that are sold on the Swedish market are in energy class C, the same proportion applies in Denmark.

8 Nordic Network

In 2000 the Swedish Consumer Agency took the initiative to start a network for the Nordic organisations that work with the compulsory energy labelling. Three work groups have been formed, one for shop inspections, one for the testing of products and one for information, in order to benefit from each other's experiences. What is unique for Sweden is that the competence to carry out tests, the legal work and the responsibility for spreading information about the energy labelling is all found within one authority. In the rest of the Nordic countries the work is distributed over several authorities and organisations.

9 Discussion

Evidence shows that repeated inspections, with a few exceptions, is a method that functions well and the labelling improves in shops which have been inspected several times. This is an area where the co-operation with the local consumer advisors has worked well and their local trade and industry and mass media contacts have been important for the improvement of the labelling. The retailers have often started to label their appliances with the local consumer advisor still on the premises. To point out the insufficiencies is often an effective way of increasing the proportion of labelled appliances in the shops. If a retailer still does not improve, there is the possibility of issuing an information order with a default fine. Targeted training efforts is one method that has been used to increase the knowledge about the energy labelling amongst retailers that do not conform to the labelling demands.

The preventive work with information directed to consumers, manufacturers and retailers is important. In the future the contacts with the central chain stores should be intensified since the importance of energy labelling must permeate the companies from top management down to shop personnel. This way the energy labelling can improve on a long-term basis.

The weakest link in the energy labelling work is that the label itself is delivered in two separate parts. The system is constructed in such a way that it is easy for the retailers and manufacturers to blame each other when the labelling is not working. The manufacturers must become more generous when it comes to sending colour background labels to the shops and it is unacceptable that it sometimes takes a long time to supply new data strips. Both the manufacturers and the retailers must review their routines concerning supplying and ordering labelling material. In the continued energy labelling development work at EU level, some kind of compensation that the retailers can get if the manufacturer forgets to include labelling material, should be taken into consideration. However, this is something that the manufacturers and the retailers must solve between themselves, for example via their trade associations.

Another important area to follow up on in the future is the information that is given when products are sold over the internet. This is a way of selling things that can be expected to increase in the future. When the energy labelling regulations were developed, nobody could foresee the development of information via the internet. However, nowadays the national prescriptions concerning energy labelling have been complemented with regulations on what information about the appliances should be present when they are marketed via the internet.

To carry out tests to check that the information the manufacturers have declared on the Energy Label is necessary to be able to maintain the confidence in the

energy labelling. This in turn is important in order to prevent domestic appliances on the market developing in the wrong direction. It is for example, no use with energy-saving washing machines that do not make the laundry clean. In the future the energy labelling needs to be complemented with the rinsing performance of washing machines and how well ovens bake and heat up. In order to achieve this, continued commitment to developing new test methods is required within the European and international standardisation work.

Most refrigerators, freezers, washing machines and dishwashers that are sold today belong to energy class A. This reflects the fact that the energy labelling has increased both the choice and the demand for energy-saving models. Two years after the energy labelling had been introduced on ovens almost half of the ovens are found in energy class A, whereas the most common energy class for tumble dryers is still C. This can either be interpreted along the lines that the energy labelling has had a rapid positive influence on the choice of energy-saving ovens, or that the requirements for energy class A for a tumble dryer are considerably stricter than for an oven. This is probably partly connected to the fact that the market for cookers and ovens is larger than the tumble dryer one. Most households have a cooker, but not all have a tumble dryer.

The energy labelling does not just include domestic appliances but also lamps, light bulbs, low-energy lamps and air conditioning appliances. The lamp labelling differs from the white goods labelling in that it is international and printed straight on the packaging. In this area there is a need for inspections in the future in order to check that the regulations are adhered to. The advantage when it comes to lamps, however, is that the lamps can be controlled in a few places since it can be assumed that if the label is found on the packaging in a shop, it will also be found on the corresponding packaging in other shops in the country.

Air conditioning appliances are not important consumer products in Sweden. They are mostly used in public buildings such as hotels and offices. However, some heat pumps can be used indoors for cold air too and consequently they are included in the energy labelling regulations. There are many single-family house owners that have or are considering getting a heat pump. The Swedish Consumer Agency has not, however, checked whether the heat pump companies conform to the energy labelling regulations. A heat pump is a product that is sold via catalogue or directly from an installation engineer, for this reason it is important to control the information that is given in the product brochures or provided by the installation engineer in connection with a purchase.

The energy labelling will in the future be extended with more products such as water heaters. There is no doubt that experiences from the energy labelling of domestic appliances can be applied to these new areas. This will mean new demands on extended contacts with manufacturers, retailers and trade associations. More inspections will be required to check if the regulations are followed in practice and new information efforts will be required in order to

facilitate the consumers purchase decisions based on relevant, understandable and brand neutral information.

Appendix 1. Colour background label and data strip

Energi

Leverantör
Modell

Låg förbrukning

A

B

C

D

E

F

G

Hög förbrukning


Energiförbrukning (kWh/år)
(Baserad på resultat från standardiserade provningar under 24 timmar.)
Verklig förbrukning beror på hur apparaten används och var den är placerad.

Volym kyl (liter)
Volym frys (liter)

Buller dB(A)

Produktbroschyrerna innehåller ytterligare information.

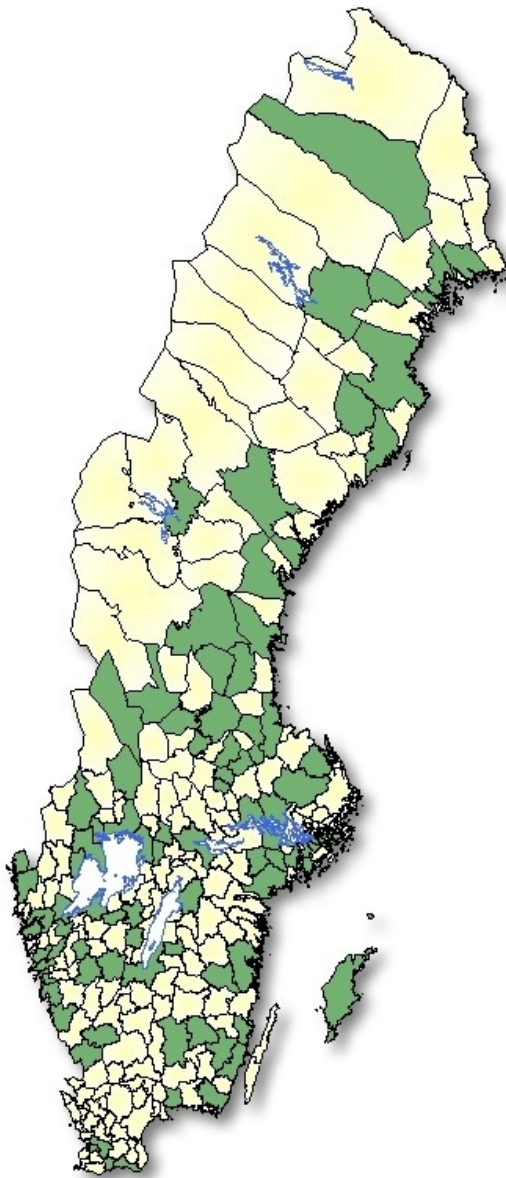
Standard EN 153 maj 1990
Direktiv om märkning av kyl/frys 94/2/EG och 2003/86/EG.



←

Fabrikat Modell
A+
194
190 90 * ** *
42

Appendix 2. Energy labelling inspections – overview map



Energimärkningskontroller	
Ale	Mönsterås
Arvika	Nacka
Arvidsjaur	Norberg
Avesta	Nyköping
Bollnäs	Nybro
Borlänge	Åmål
Borås	Nynäshamn
Botkyrka	Örust
Burlöv	Ovanåker
Degerfors	Sandviken
Enköping	Skara
Fagersta	Skellefteå
Falun	Skurup
Flen	Skövde
Gotland	Sollefteå
Gnesta	Staffanstorps
Grums	Stockholm
Gällivare	Strängnäs
Gävle	Strömstad
Göteborg	Sundsvall
Hagfors	Säffle
Halmstad	Södertälje
Hedemora	Tanum
Huddinge	Tidaholm
Hudiksvall	Tranås
Hylte	Trollhättan
Härnösand	Tyresö
Jönköping	Uddevalla
Kalmar	Uppsala
Kalix	Ulricehamn
Karlshamn	Umeå
Karlskoga	Uppvidinge
Karlskrona	Varberg
Karlstad	Vimmerby
Kristinehamn	Vindeln
Kungsbacka	Vårgårda
Kungälv	Värdö
Leksand	Vänersborg
Lidingö	Västervik
Lidköping	Västerås
Luleå	Växjö
Lund	Ystad
Ljusdal	Älvsbyn
Malung	Örebro
Mora	Östersund
Motala	Östhammar
Mölnålar	

Appendix 3. Test results of refrigerators and freezers

Results from testing of declared values on the Energy Label on refrigerators and freezers year 1996–2005

No.	Type of product	Refrigerator volume			Freezer volume			Energy consumption		
		Declared (litre)	Measured (litre)	Deviation (%)*	Declared (litre)	Measured (litre)	Deviation (%)*	Declared (kWh/year)	Measured (kWh/year)	Deviation (%) **
1	Refrigerator/chiller	354	348	-2				219	218	0
2		314	312	-1				274	253	-8
3		378	369	-2				248	218	-12
4		377	368	-2				241	274	14
5	Refrigerator	154	150	-3				219	246	12
6		158	157	-1				219	226	3
7		138	139	1				146	167	14
8		153	153	0				208	249	20
9		155	155	0				226	246	9
10		286	285	0				182	157	-14
11		266	261	-2				164	172	5
12		265	265	0				164	135	-18
13		266	258	-3				146	131	-10
14		271	268	-1				237	270	14
15		249	246	-1				263	219	-17
16	Refrigerator/chiller	178	175	-2	112	104	-7	420	398	-5
17		238	230	-3	90	94	4	350	394	13
18		193	193	0	99	97	-2	336	333	-1
19		242	193	-20	66	74	12	537	573	7
20		205	202	-1	103	98	-5	511	533	4
21		234	233	0	101	87	-14	482	533	11
22		188	182	-3	129	128	-1	529	588	11
23		236	229	-3	90	94	4	522	548	5
24		186	186	0	44	44	0	329	314	-5
25		190	183	-4	68	67	-1	402	423	5
26		272	269	-1	62	62	0	478	573	20
27		240	231	-4	87	85	-2	511	526	3
28		198	198	0	58	57	-2	544	653	20
29		177	168	-5	127	105	-17	420	453	8
30		204	204	0	120	104	-13	438	485	11
31		188	184	-2	125	122	-2	420	456	9
32		203	193	-5	100	94	-6	339	376	11
33		missing	184	-	125	117	-6	529	551	4
34		196	189	-4	175	129	-26	605	595	-2

No.	Type of product	Refrigerator volume			Freezer volume			Energy consumption		
		Declared (litre)	Measured (litre)	Deviation (%)*	Declared (litre)	Measured (litre)	Deviation (%)*	Declared (kWh/year)	Measured (kWh/year)	Deviation (%) **
35		190	188	-1	115	missing	-	620	675	9
36		160	157	-2	115	95	-17	602	679	13
37		236	235	0	93	89	-4	390	402	3
38		241	229	-5	104	76	-27	404	436	8
39		221	216	-2	93	91	-2	368	332	-10
40		218	212	-3	83	81	-2	255	253	-1
41		221	215	-3	81	77	-5	260	294	13
42		251	252	0	96	100	4	362	374	3
43		240	239	0	92	83	-10	270	267	-1
44		263	259	-2	84	83	-1	350	371	6
45		211	202	-4	118	117	-1	354	372	5
46		256	269	5	82	79	-4	350	326	-7
47		266	258	-3	95	92	-3	387	407	5
48		255	259	2	76	71	-7	380	388	2
49		261	266	2	59	57	-3	332	325	-2
50		230	222	-3	90	92	2	263	303	15
51		224	223	0	123	120	-2	412	440	7
52		227	226	0	84	82	-2	336	335	0
53		245	241	-2	92	87	-5	281	298	6
54		245	243	-1	86	87	1	318	292	-8
55		227	225	-1	84	82	-2	285	309	8
56		247	243	-2	100	97	-3	361	367	2
57		230	227	-1	95	93	-2	350	380	9
58		170	167	-2	112	110	-2	290	missing	-
59		254	256	1	87	84	-3	286	287	0
60		218	212	-3	83	81	-2	255	253	-1
61		224	223	0	123	120	-2	412	440	7
62		227	226	0	84	82	-2	336	335	0
63		245	241	-2	92	87	-5	281	298	6
64		245	243	-1	86	87	1	318	292	-8
65		227	225	-1	84	82	-2	285	309	8
66		247	243	-2	100	97	-3	361	367	2
67		230	227	-1	95	93	-2	350	380	9
68		170	167	-2	112	110	-2	259	290	12
69		218	211	-3	83	81	-2	332	305	-8
70		206	203	-1	76	68	-11	354	407	15
71		248	250	1	73	76	4	504	498	-1
72	Upright freezer				92	87	-5	339	296	-13
73					96	96	0	358	367	3
74					108	109	1	394	376	-5
75					153	154	1	219	186	-15
76					103	98	-5	208	266	28
77					287	287	0	402	409	2
78					237	235	-1	376	456	21

No.	Type of product	Refrigerator volume			Freezer volume			Energy consumption		
		Declared (litre)	Measured (litre)	Deviation (%)*	Declared (litre)	Measured (litre)	Deviation (%)*	Declared (kWh/year)	Measured (kWh/year)	Deviation (%) **
79					252	220	-13	485	504	4
80					245	222	-9	347	438	26
81					283	279	-1	657	639	-3
82					250	236	-6	402	461	15
83					282	248	-12	464	417	-10
84					290	279	-4	431	440	2
85					159	160	1	245	318	30
86					292	284	-3	431	427	-1
87					186	175	-6	343	353	3
88					255	224	-12	467	531	14
89					205	196	-4	438	500	14
90					250	238	-5	402	448	11
91					151	140	-7	292	274	-6
92	Chest freezer				282	283	0	530	558	5
93					284	287	1	339	372	10
94					217	214	-1	168	201	20
95					257	258	0	449	449	0
96					250	251	0	230	252	10
97					234	236	1	376	420	12
98					241	241	0	241	237	-2
99					316	298	-6	343	471	37
100					318	315	-1	529	639	21
101					249	248	0	493	548	11

* Maximum volume deviation allowed is 3 per cent.

** Maximum energy consumption deviation allowed is 15 per cent.

Appendix 4. Test results of ovens

Results from testing of declared values on energy labels on ovens 2003–2005

No.	Type of product	Oven volume (litre)			Energy consumption, conventional heating (kWh)			Energy consumption, forced-air (kWh)			Baking surface (cm ²)
		Declared	Measured	Deviation (%) [*]	Declared	Measured	Deviation (%) ^{**}	Declared	Measured	Deviation (%) ^{**}	
1	Oven ^{***}	61	58	-5	1,1	1,16	5	1,1	0,91	-17	1250
2	Oven ^{***}	55	54	-2	1,05	1,05	0	0,96	1,01	5	1330
3	Oven ^{***}	55	54	-2	missing	0,94	-	0,78	0,83	6	1300
4	Oven ^{***}	46	47	2	0,79	0,83	5	missing	missing	-	1500
5	Oven ^{***}	55	55	0	0,99	0,95	-4	0,99	0,88	-11	1220
6	Oven ^{***}	missing	51	-	missing	0,97	-	missing	0,92	-	1125
7	Oven ^{***}	53	52	-2	0,87	0,86	-1	0,77	0,8	4	1125
8	Built-in oven	52	54	4	0,85	0,93	9	0,83	0,93	12	1050
9	Built-in oven	49	50	2	0,93	1,05	13	1,21	1,1	-9	1440
10	Built-in oven	52	50	-4	1,1	1,03	-6	0,99	1,04	5	1150
11	Built-in oven	58	57	-2	0,85	0,92	8	0,76	0,8	5	1365
12	Oven ^{***}	54	55	2	missing	0,92	-	missing	0,9	-	missing
13	Oven ^{***}	54	55	2	missing	0,83	-	missing	0,9	-	missing
14	Oven ^{***}	54	53	-2	missing	0,87	-	missing	0,93	-	missing
15	Oven ^{***}	46	45	-2	0,99	0,94	-5	0,95	0,9	-5	1455
16	Oven ^{***}	18	17	-6	0,59	0,55	-7	missing	missing	-	800
17	Oven ^{***}	46	46	0	0,99	0,93	-6	0,94	0,9	-4	1455
18	Oven ^{***}	26	27	4	0,79	0,78	-1	missing	missing	-	1455
19	Oven ^{***}	31	31	0	-	-	-	0,68	0,79	14	1260

* Maximum volume deviation allowed is 5 per cent.

** Maximum energy consumption deviation allowed is 10 per cent + 0,04 kWh.

*** Oven in cooker

Appendix 5. Test results dishwashers

Results from testing of declared values on energy labels on dishwashers 1999–2005

No.	Capacity	Energy consumption							Dishwashing efficiency				Drying efficiency				Water consumption			Time consumption			Yearly consumption, 220 cycles, water and energy			
		Declared (kWh)	Declared (index)	Declared (class)	Measured (kWh)	Measured (index)	Measured (class)	Deviation (%)*	Declared (class)	Declared (index)	Measured (index)	Deviation (%)**	Declared (class)	Declared (index)	Measured (index)	Deviation (%)***	Declared (litre)	Measured (litre)	Deviation (%)*	Declared (min)	Measured (min)	Deviation (min)	Declared (litre)	Measured (litre)	Declared (kWh)	Measured (kWh)
1	12	1,24	0,75	B	1,39	0,84	C	12	B	1,00	1,00	0	C	0,78	0,94	21	18	19	7	93	86	-7	3960	4224	273	306
2	12	1,05	0,64	A	1,20	0,73	B	14	A	1,12	1,05	-6	A	1,08	0,99	-8	14	15	9	150	179	29	3080	3344	231	264
3	12	1,05	0,64	A	1,19	0,72	B	13	A	1,12	1,06	-5	A	1,08	1,07	-1	14	15	10	150	165	15	3080	3388	231	262
4	12	1,05	0,64	A	1,20	0,73	B	14	A	1,12	1,08	-4	B	0,93	1,00	8	14	15	9	178	179	1	3080	3344	231	264
5	12	1,05	0,64	A	1,16	0,70	B	10	B	1,00	1,01	1	C	0,78	0,67	-14	16	16	-3	120	110	-10	3520	3432	231	255
6	12	0,99	0,60	A	1,07	0,65	B	8	B	1,00	0,97	-3	B	0,93	0,47	-49	18	17	-4	100	98	-2	3850	3696	218	235
7	12	1,03	0,62	A	1,06	0,64	A	3	A	1,12	1,04	-7	B	0,93	1,03	11	16	17	9	120	127	7	3520	3828	227	233
8	12	0,99	0,60	A	1,12	0,68	B	13	B	1,00	0,97	-3	C	0,78	0,47	-40	18	17	-1	100	99	-1	3850	3806	218	246
9	12	1,05	0,64	A	1,20	0,73	B	14	A	1,12	1,05	-6	A	1,08	0,99	-8	14	16	14	150	178	28	3080	3498	231	264
10	12	1,60	0,97	D	2,00	1,21	F	25	D	0,76	0,77	1	B	0,93	0,57	-39	22	31	39	-	81	-	4840	6710	352	440
11	4	0,79	0,98	D	0,86	1,06	E	9	B	1,00	0,93	-7	C	0,78	0,49	-37	12	15	25	82	83	1	2640	3300	174	189
12	5	0,79	0,88	C	0,76	0,84	C	-4	B	1,00	0,82	-18	D	0,63	0,45	-29	12	12	0	63	60	-3	2640	2640	174	167
13	5	0,75	0,83	C	0,78	0,87	C	4	C	0,88	0,78	-11	E	0,48	0,23	-52	13	13	-2	55	57	2	2860	2816	165	172

No.	Capacity	Energy consumption							Dishwashing efficiency				Drying efficiency				Water consumption			Time consumption			Yearly consumption, 220 cycles, water and energy			
		Cover (number)	Declared (kWh)	Declared (index)	Declared (class)	Measured (kWh)	Measured (index)	Measured (class)	Deviation (%)*	Declared (class)	Declared (index)	Measured (index)	Deviation (%)**	Declared (class)	Declared (index)	Measured (index)	Deviation (%)***	Declared (litre)	Measured (litre)	Deviation (%)*	Declared (min)	Measured (min)	Deviation (min)	Declared (litre)	Measured (litre)	Declared (kWh)
14	3	0,77	1,07	E	0,68	0,94	G	-12	D	0,76	0,31	-59	G	0,33	0,30	-9	14	11	-19	-	50	-	2970	2420	169	150
15	6	0,63	0,64	A	0,70	0,71	B	11	A	1,12	1,04	-7	B	0,93	1,00	8	7	7	3	150	153	3	1540	1584	139	154
16	6	0,63	0,64	A	0,70	0,71	B	11	A	1,12	1,04	-7	B	0,93	1,00	8	7	7	3	150	153	3	1540	1584	139	154
17	12	1,05	0,64	A	1,20	0,73	B	14	A	1,12	1,14	2	A	1,08	1,03	-5	14	16	11	150	159	9	3080	3432	231	264
18	12	1,05	0,64	A	1,09	0,66	A	4	A	1,12	1,11	-1	A	1,08	1,03	-5	14	15	9	140	154	14	3080	3344	231	240
19	12	1,04	0,63	A	1,03	0,62	A	-1	A	1,12	1,03	-8	A	1,08	1,04	-4	10	10	-1	160	158	-2	2178	2156	229	227
20	12	1,05	0,64	A	1,17	0,71	B	11	A	1,12	1,04	-7	B	0,93	1,04	12	16	14	-12	165	165	0	3520	3102	231	257
21	12	1,05	0,64	A	1,12	0,68	B	7	A	1,12	1,17	4	A	1,08	1,03	-5	14	15	5	140	155	15	3080	3234	231	246
22	12	1,05	0,64	A	1,21	0,73	C	15	A	1,12	1,09	-3	A	1,08	1,06	-2	13	13	2	135	152	17	2860	2904	231	266
23	12	1,05	0,64	A	1,12	0,68	B	7	A	1,12	1,02	-9	B	0,93	0,80	-14	16	18	9	145	154	9	3520	3850	231	246
24	12	1,04	0,63	A	1,11	0,67	B	7	A	1,12	1,09	-3	A	1,08	1,00	-7	10	10	-3	160	159	-1	2178	2112	229	244
25	12	1,05	0,64	A	1,14	0,69	B	9	A	1,12	1,05	-6	B	0,93	0,90	-3	16	15	-9	150	160	10	3520	3190	231	251
26	12	1,24	0,75	A	1,31	0,79	C	6	B	1,00	0,82	-18	C	0,78	0,74	-5	16	16	0	110	112	2	3520	3520	273	288
27	12	1,05	0,64	A	1,12	0,68	B	7	A	1,12	1,11	-1	A	1,08	1,01	-6	13	15	14	178	180	2	2860	3256	231	246
28	12	1,05	0,64	A	1,04	0,63	A	-1	A	1,12	1,02	-9	A	1,08	0,90	-17	14	15	6	140	148	8	3080	3278	231	229

* Energy and water consumption is allowed to deviate by a maximum of 15 per cent.

** Dishwashing efficiency is allowed to deviate by a maximum of 6 per cent.

*** Drying efficiency is allowed to deviate by a maximum of 15 per cent.

Appendix 6. Test results washing machines

Results from testing of declared values on the energy labels on washing machines 1997–2005.

No.	Tested in (year)	Programme	Capacity (kg)	Energy consumption per wash Declared (kWh)	Energy consumption Declared (class)	Yearly energy consumption Declared (kWh)	Energy consumption per wash Measured (kWh)	Energy consumption Measured (class)	Yearly energy consumption Declared (kWh)	Deviation (%)*	Washing efficiency Declared (class)	Washing efficiency Measured (index)	Washing efficiency Measured (class)	Number of revolutions Spinning Declared (rpm)	Number of revolutions Spinning Measured (rpm)	Deviation (rpm)**	Remaining moisture content Declared (class)	Remaining moisture content Measured (%)	Water consumption Declared (litre)	Water consumption Measured (litre)	Deviation (%) ***
1	1997-99		5	1,00	B	200	1,10	B	220	10	B	1,02	B	1000	1010	10	C	55	59	65	10
2	1997-99		5	1,10	B	220	1,10	B	220	0	B	0,99	C	1300	1280	-20	B	50	62	75	21
3	1997-99		5	1,00	B	200	1,08	C	216	8	B	1,03	A	1000	910	-90	C	56	59	64	8
4	1997-99		5	1,10	B	220	1,20	C	240	9	A	1,01	B	1000	970	-30	C	58	56	53	-5
5	1997-99		5	1,20	C	240	1,17	C	234	-3	B	0,97	C	1000	960	-40	C	55	72	71	-1
6	1997-99		3	1,05	E	210	0,99	E	198	-6	C	0,98	C	900	880	-20	D	63	55	54	-2
7	1997-99		5	1,00	B	200	0,95	B	190	-5	C	0,85	G	1000	1010	10	C	64	65	63	-3
8	1997-99		4	0,95	B	190	1,02	D	204	7	B	1,06	A	1200	1190	-10	C	53	60	65	8
9	1997-99		5	1,15	B	230	1,10	B	220	-4	C	0,96	D	1000	930	-70	C	66	70	75	7
10	1997-99		5	missing	B	missing	1,10	B	220	-	B	0,93	E	1200	1170	-30	C	62	55	62	13

No.	Tested in (year)	Programme	Capacity (kg)	Energy consumption per wash Declared (kWh)	Energy consumption Declared (class)	Yearly energy consumption Declared (kWh)	Energy consumption per wash Measured (kWh)	Energy consumption Measured (class)	Yearly energy consumption Declared (kWh)	Deviation (%)*	Washing efficiency Declared (class)	Washing efficiency Measured (index)	Washing efficiency Measured (class)	Number of revolutions Spinning Declared (rpm)	Number of revolutions Spinning Measured (rpm)	Deviation (rpm)**	Remaining moisture content Declared (class)	Remaining moisture content Measured (%)	Water consumption Declared (litre)	Water consumption Measured (litre)	Deviation (%) ***
11	1997-99		5	1,05	B	210	1,15	B	230	10	A	1,03	A	1000	1010	10	C	60	55	59	7
12	1997-99		5	1,00	B	200	0,99	B	198	-1	B	0,92	E	1000	1050	50	C	57	65	65	0
13	1997-99		5	1,15	C	230	1,08	C	216	-6	C	0,99	C	1100	1060	-40	B	54	59	55	-7
14	1997-99		5	1,20	C	240	1,26	C	252	5	B	1,02	B	1100	1240	140	C	53	60	54	-10
15	1999-00		5	0,85	A	170	1,08	B	216	27	A	1,02	B	1200	1240	40	B	51	49	49	0
16	1999-00		5	0,94	A	188	1,04	A	208	11	A	1,01	B	1200	1140	-60	B	55	49	55	12
17	1999-00		5	1,10	B	220	1,25	B	250	14	A	1,02	B	1200	1180	-20	B	55	59	72	22
18	1999-00		5	1,10	B	220	1,14	B	228	4	C	0,97	C	1300	1320	20	B	55	67	65	-3
19	1999-00		5	0,95	A	190	1,10	C	220	16	A	1,01	B	1200	missing	-	B	55	44	53	20
20	1999-00		5	0,92	A	184	1,09	C	218	18	B	0,99	C	1200	1280	80	C	52	49	67	37
21	1999-00		5	1,15	B	230	1,12	B	224	-3	A	0,99	C	1300	1220	-80	B	59	55	56	2
22	1999-00		5	0,95	A	190	1,02	A	204	7	A	1,04	A	1300	1320	20	B	52	52	55	6
23	1999-00		5	0,95	A	190	1,05	A	210	11	A	0,96	D	1200	1230	30	B	56	52	62	19
24	1999-00		5	1,03	B	206	0,96	B	192	-7	B	0,94	D	1200	1230	30	B	56	52	52	0

No.	Tested in (year)	Programme	Capacity (kg)	Energy consumption per wash Declared (kWh)	Energy consumption Declared (class)	Yearly energy consumption Declared (kWh)	Energy consumption per wash Measured (kWh)	Energy consumption Measured (class)	Yearly energy consumption Declared (kWh)	Deviation (%)*	Washing efficiency Declared (class)	Washing efficiency Measured (index)	Washing efficiency Measured (class)	Number of revolutions Spinning Declared (rpm)	Number of revolutions Spinning Measured (rpm)	Deviation (rpm)**	Remaining moisture content Declared (class)	Remaining moisture content Measured (%)	Water consumption Declared (litre)	Water consumption Measured (litre)	Deviation (%) ***
25	2000-01		5	0,95	A	190	1,09	B	218	15	A	1,04	A	1200	1150	-50	B	54	54	58	7
26	2000-01		5	0,95	A	190	1,06	B	212	12	A	1,02	B	1200	1200	0	B	47	45	50	11
27	2000-01		5	0,95	A	190	1,17	C	234	23	A	1,03	A	1200	1150	-50	B	58	54	60	11
28	2000-01		5	0,93	A	186	0,80	A	160	-14	B	0,95	D	1400	1200	-200	B	65	49	48	-2
29	2000-01		6	1,04	A	208	1,18	B	236	13	A	1,02	B	1200	1200	0	B	54	48	53	10
30	2000-01		5	0,95	A	190	1,12	B	224	18	A	1,05	A	1200	1150	-50	B	57	48	54	13
31	2002/3	Coloured garments 60 °C Stains	5	0,95	A	190	1,03	B	206	8	A	1,07	A	1200	1013	-187	B	58	45	45	0
32	2002/3	Normal Wash 60 °C	5	0,95	A	190	0,91	A	182	-4	A	0,99	C	1300	1230	-70	B	54	59	56	-5
33	2002/3	Programme 2	3	0,68	B	136	0,79	C	158	16	A	1,04	A	1000	1160	160	D	66	49	55	12
34	2002/3	Programme B 60 °C	3	0,92	D	184	0,95	E	190	3	B	1,00	B	900	915	15	D	60	54	55	2
35	2002/3	Coloured garments	5	1,03	A	206	1,14	C	228	11	A	1,02	B	1200	1165	-35	B	54	54	58	7

No.	Tested in (year)	Programme	Capacity (kg)	Energy consumption per wash Declared (kWh)	Energy consumption Declared (class)	Yearly energy consumption Declared (kWh)	Energy consumption per wash Measured (kWh)	Energy consumption Measured (class)	Yearly energy consumption Declared (kWh)	Deviation (%)*	Washing efficiency Declared (class)	Washing efficiency Measured (index)	Washing efficiency Measured (class)	Number of revolutions Spinning Declared (rpm)	Number of revolutions Spinning Measured (rpm)	Deviation (rpm)**	Remaining moisture content Declared (class)	Remaining moisture content Measured (%)	Water consumption Declared (litre)	Water consumption Measured (litre)	Deviation (%) ***
		60 °C																			
36	2002/3	Cotton 60 °C	5	0,92	A	184	1,09	B	218	18	A	1,02	B	1200	1200	0	B	52	39	49	26
37	2002/3	Programme 2 60 °C	5	0,95	A	190	1,01	B	202	6	A	1,02	B	1600	1545	-55	A	49	35	37	6
38	2002/3	Programme 2 60 °C	3	0,70	B	140	0,71	C	142	1	B	1,02	B	1000	990	-10	D	66	48	43	-10
39	2002/3	Normal Wash 60 °C	6	1,14	A	228	1,00	A	200	-12	A	0,96	D	1200	1215	15	B	56	59	50	-15
40	2002/3	Cotton 60 °C	5	0,95	A	190	1,13	B	226	19	A	0,99	C	1200	1180	-20	B	55	44	52	18
41	2004	Whites/ Coloured garments 60 °C Stains	5	0,85	A	170	0,81	A	162	-5	A	1,02	B	1300	1233	-67	B	57	43	51	19
42	2004 *	Cotton 60 °C	5	0,95	A	190	0,86	A	172	-9	A	1,03	A	1200	1287	87	B	62	49	52	6
43	2004	Whites 60 °C E	5	0,95	A	190	1,21	C	242	27	A	1,05	A	1200	1117	-83	B	57	49	55	12
44	2004	Cotton	6	1,04	A	208	1,09	B	218	5	A	1,01	B	1300	1220	-80	B	51	54	60	11

No.	Tested in (year)	Programme	Capacity (kg)	Energy consumption per wash Declared (kWh)	Energy consumption Declared (class)	Yearly energy consumption Declared (kWh)	Energy consumption per wash Measured (kWh)	Energy consumption Measured (class)	Yearly energy consumption Declared (kWh)	Deviation (%)*	Washing efficiency Declared (class)	Washing efficiency Measured (index)	Washing efficiency Measured (class)	Number of revolutions Spinning Declared (rpm)	Number of revolutions Spinning Measured (rpm)	Deviation (rpm)**	Remaining moisture content Declared (class)	Remaining moisture content Measured (%)	Water consumption Declared (litre)	Water consumption Measured (litre)	Deviation (%) ***
		60 °C																			
45	2004	Cotton 60 °C	5	0,95	A	190	0,98	B	196	3	A	1,02	B	1200	1163	-37	B	51	60	64	7
46	2004	Whites/ Coloured garments 60 °C intensive	5	0,85	A	170	0,88	A	176	4	A	1,02	B	1400	1408	8	B	40	45	49	9
47	2004	Coloured garments 60 °C	6	1,05	A	209	1,15	B	230	10	A	1,06	A	1200	1193	-7	B	49	49	55	12
48	2004		5	1,03	A	206	1,13	B	226	10	A	1,05	A	1200	1190	-10	53	59	49	51	4

* The maximum deviation allowed for energy consumption is 15 per cent.

** The maximum deviation allowed for number of revolutions for spinning is 10 per cent or 100 rpm.

*** The maximum deviation allowed for water consumption is 15 per cent.

Appendix 7. Test results tumble dryers

Results from testing of declared values on the Energy Label for air vented tumble dryers 1997–2005

No.	Tested (year)	Capacity cotton (kg)	Capacity synthetics (kg)	Energy consumption, cotton cupboard dry Declared (kWh)	Energy consumption Declared (class)	Energy consumption, cotton cupboard dry Measured (kWh)	Energy consumption Measured (class)	Deviation (%) **	Energy consumption, cotton iron dry Measured (kWh)	Energy consumption, synthetics cupboard dry Measured (kWh)	Yearly consumption Measured (kWh)	Time consumption Measured (min)
1	1997	5	2	3,40	D	3,73	D	10	2,96	1,11	351	121
2	1997	5	2	3,40	D	3,72	D	9	2,89	1,08	345	122
3	1997	5	2	3,30	C	4,00	E	21	3,00	1,08	348	115

Results from inspection of declared values on the Energy Label for condenser tumble dryers 1997–2005

No.	Tested (year)	Capacity cotton (kg)	Capacity synthetics (kg)	Energy consumption, cotton cupboard dry Declared (kWh)	Energy consumption Declared (class)	Energy consumption, cotton cupboard dry Measured (kWh)	Energy consumption Measured (class)	Deviation (%) **	Energy consumption, cotton iron dry Measured (kWh)	Energy consumption, synthetics cupboard dry Measured (kWh)	Yearly consumption Measured (kWh)	Time consumption Measured (min)
1	1997	6	2,5	4,38	C	5,06	D	16	4	2	392	155
2	1997	5	2	3,80	D	4,10	D	8	3	1	393	105
3	1997	5	2,5	3,50	C	3,72	D	6	3	1	356	96
4	1997	5	2,5	3,65	C	3,64	C	0	3	1	354	99
5	2000	5	2,5	1,75	A	1,93	A	10	1	1	183	118
6	2000	5	2,5	3,50	C	3,82	D	9	3	1	362	117

No.	Tested (year)	Capacity cotton (kg)	Capacity synthetics (kg)	Energy consumption, cotton cupboard dry Declared (kWh)	Energy consumption Declared (class)	Energy consumption, cotton cupboard dry Measured (kWh)	Energy consumption Measured (class)	Deviation (%) **	Energy consumption, cotton iron dry Measured (kWh)	Energy consumption, synthetics cupboard dry Measured (kWh)	Yearly consumption Measured (kWh)	Time consumption Measured (min)
7	2000	3	1,5	2,45	D	2,79	F	14	2	1	449	106
8	2000	5	3	4,10	D	4,15	F	1	*	2	*	117
9	2000	5	2,5	3,65	C	3,92	D	7	*	2	*	124
10	2004	6	3	4,20	C	4,49	D	7	4	2	354	144
11	2004	5	2	3,65	C	3,81	E	4	3	1	369	114

* Does not stop at correct remaining moisture content. Therefore not possible to measure energy consumption.

** The maximum deviation allowed for energy consumption is 15 per cent.