

Labelling of electrical appliances – An evaluation of the Energy Labelling Ordinance in Germany and resulting recommendations for energy efficiency policy

Barbara Schlomann, Wolfgang Eichhammer and Edelgard Gruber, Fraunhofer Institute for Systems and Innovation Research (ISI)
Friedemann Stöckle, GfK Marketing Services GmbH & Co. KG

1. SYNOPSIS

Based on detailed surveys, the degree of compliance with the Energy Labelling Ordinance in Germany and its effect on sales of household appliances and CO₂-emissions are examined.

2. ABSTRACT

The EU Directives on labelling of household electrical appliances were implemented in Germany by the Energy Labelling Ordinance of 30 October 1997 (First Amendment, 26 November 1999). Since 1998, most of the large household appliances have to be provided with uniform labels furnishing information on energy consumption and other product characteristics. An evaluation of dealers' and manufacturers' compliance with the regulation in Germany was carried out by Fraunhofer ISI and GfK on behalf of the Federal Ministry of Economics and Technology. The main results were:

- The study showed a very high degree of compliance among manufacturers. The degree of compliance in the retail trade varied widely between the individual distribution channels. The highest level of compliance was observed for large scale specialists, hypermarkets, and catalogue/internet offers, the lowest level for kitchen specialists and furniture stores. Overall, compliance with the regulation was much poorer for built-in appliances than for freestanding ones.
- On the other hand, the share of energy-efficient A- and B-appliances in total sales is high in Germany for most types of appliances and favourable in comparison with other EU-countries. The substantial and sustained shift from the poor to the good energy classes between 1995 and 2000 resulted in CO₂ savings of about 450 Kt.
- In order to improve the level of compliance and to further promote the sales of efficient appliances, information and motivation campaigns are especially recommended which address both the retailers and the consumers. At the Federal level, the new German Energy Agency could play an important part in the planning and realisation of such actions.

3. INTRODUCTION

The EU Directives on energy labelling of household electrical appliances were implemented in Germany by the Energy Labelling Ordinance of 30 October 1997 (First Amendment, 26 November 1999). Since 1 January 1998, the labelling is mandatory for refrigerators, freezers, washing machines, and dryers. In 1999, dish-washers and household lamps were also included in the labelling scheme. This means that, at present, about one third of total household electricity consumption in Germany (1999: 466 PJ) is covered by the EU energy label. Table 1 shows the time frame for energy labelling legislation in Germany. According to the law, all appliances offered for sale, hire, hire-purchase or displayed to end-users have to be provided with uniform labels furnishing information on energy consumption and other product characteristics. Suppliers of these household appliances must provide the label (Müller-Kulmann 1998).

The effectiveness of the law directly depends on compliance with the regulation among manufacturers and retailers. In order to check this, an evaluation of the Energy Labelling Ordinance in Germany was carried out by the Fraunhofer Institute for Systems and Innovation Research, Karlsruhe and GfK Marketing Services, Nürnberg, on behalf of the Federal Ministry of Economics and Technology, which was completed in March

2001 (Schlomann *et al.* 2001). This paper summarises the main findings of this study and also derives some recommendations for energy efficiency policy in Germany.

Table 1. Overview of German legislation on the Energy Consumption Labelling of electrical household appliances

German Law	Start of Labelling Obligation	Description	European Directives
Energy Consumption Categorisation Act (Energieverbrauchskennzeichnungsgesetz) of 1 July 1997		Indication of the consumption of energy and other resources of household appliances and setting of minimum energy efficiency requirements for household refrigerators and freezers	Framework Directive 92/75/EEC, 22. Sept. 1992 Directive 96/57/EC of the European Parliament and the Council, 3 Sept. 1996
Energy Consumption Labelling Directive (Energieverbrauchskennzeichnungsverordnung) of 30 October 1997 and First Ordinance for the Amendment of the Energy Consumption Labelling Directive of 26.11.99	1 January 1998	Energy labelling of household refrigerators, freezers and their combinations Energy labelling of household washing machines Energy labelling of household dryers Energy labelling of combined washer-dryers	Implementing directive 94/2/EC, 21 Jan. 1994 Implementing Directive 95/12/EC, 23 May 1995 Implementing Directive 95/13/EC, 23 May 1995 Implementing Directive 96/60/EC, 19 Sept. 1996
	1 March 1999	Energy labelling of household dishwashers	Implementing Directive 97/17/EC, 16 April 1997 and 1999/9/EC, 26 Feb. 1999
	1 July 1999	Energy labelling of household lamps	Implementing Directive 98/11/EC, 27 Jan. 1998

The following aspects of the energy labelling scheme are examined:

- The degree of compliance with the Energy Labelling Ordinance among retailers and suppliers.
- The development in sales of household appliances in the different label classes in Germany and a comparison with other EU-countries.
- Energy and CO₂ savings due to shifts to more efficient (A- and B-) appliances.
- Resulting recommendations for energy efficiency policy in Germany.

4. COMPLIANCE AMONG RETAILERS

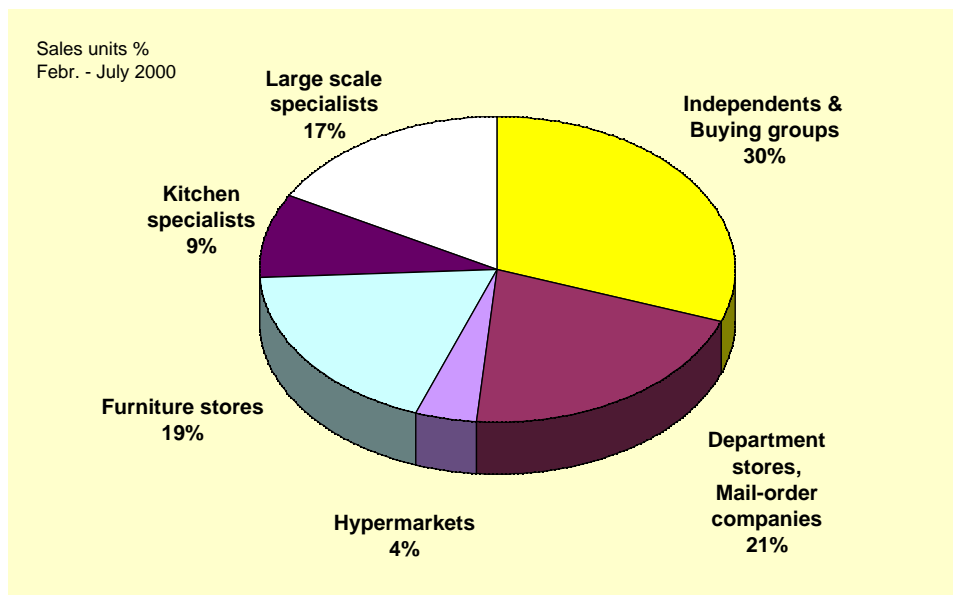
Methodological approach

In Autumn 2000, a field survey was carried out to examine the degree of compliance with the labelling regulation among dealers. This consisted of inspecting shops and making an inventory of the appliances displayed in the salesrooms and their labelling as well as interviewing dealers on the handling, difficulties with and effectiveness of the labels. The survey was based on the GfK retail panel, a market research instrument which has been used since the end of the seventies to observe the market supply and sales of large electrical household appliances. The sample of the whole panel represents all relevant types of outlets in which household electrical appliances are sold in Germany.

The following outlet types were considered in the survey: Independents and Buying Groups, Multiple Shops, Kitchen Specialists, Furniture Specialists, Hypermarkets¹. Figure 1 shows the respective share of each type in total sales of labelled appliances. The sample covered 312 shops representing all relevant distribution channels.

The following household appliances were distinguished in the survey: refrigerators, fridge-freezer combinations, freezers, washing machines, washer dryers, tumble dryers, and dishwashers.

Figure 1. Distribution channels for household appliances that have to be labelled in Germany



Source: GfK Marketing Services 2000

During the shops' inspection, it was registered which appliances were displayed and whether, how and where they were labelled. The second part of the survey consisted of comprehensive interviews with the dealers on the subject of energy consumption labelling. The dealers were asked to comment on handling labels, problems which occurred and effects on the customer advice and sales processes and to suggest measures to improve the labelling implementation. A "data warehouse" was used to evaluate the survey. This system enables a joint evaluation of both inspection and interview data.

Results of the shop audit

The audit of the household appliances presented in retail outlets more or less confirmed the results of former smaller surveys by the ZVEI (1998) and some consumer advice centres in the Federal Laender (Verbraucher-Zentrale NRW 1998; Verbraucherzentrale Baden-Württemberg 2000). In total, only 36 % of the appliances displayed in salesrooms were labelled "completely", 21 % were labelled "partially" and 44 % were not labelled at all (see Table 2). The "completely labelled" appliances had both colour background and data-strip. But they were not necessarily correctly labelled in compliance with the legal regulation as these also included cases in which both stickers were, e. g. inside or at a wall behind the appliance, i. e. not on the top or front as stipulated². "Partially labelled" appliances included those on which either the colour background or the data-strip was missing. "Not labelled" were appliances for which there was absolutely no indication of the labelling.

Within the different types of retail outlets, hypermarkets and large scale specialists for electrical appliances had a very high share of completely labelled appliances, whereas kitchen specialists and furniture stores had only 7 % of the appliances labelled completely and 80 % not labelled at all. Visual viewpoints are very important for these two groups; they are obviously very concerned about the appearance of the kitchens on display and therefore often place the labels inside appliances. Small independents and buying groups had the highest share of incompletely labelled appliances which indicates a certain information deficiency in this group.

As regards to the level of compliance by appliance type, washing machines, washer driers, driers, and also freezers had the best results. Refrigerators, fridge-freezer combinations and especially dishwashers, for which the labelling was obligatory more than a year later, were less accurately labelled. The main reason for these differences was, however, not a question of the timing of implementation in domestic law, but the difference between freestanding and built-in appliances. In general, the level of compliance was much lower in the case of built-in appliances than in the case of freestanding ones (see Table 3).

Table 2. Labelling behaviour according to distribution channels based on the displayed appliances

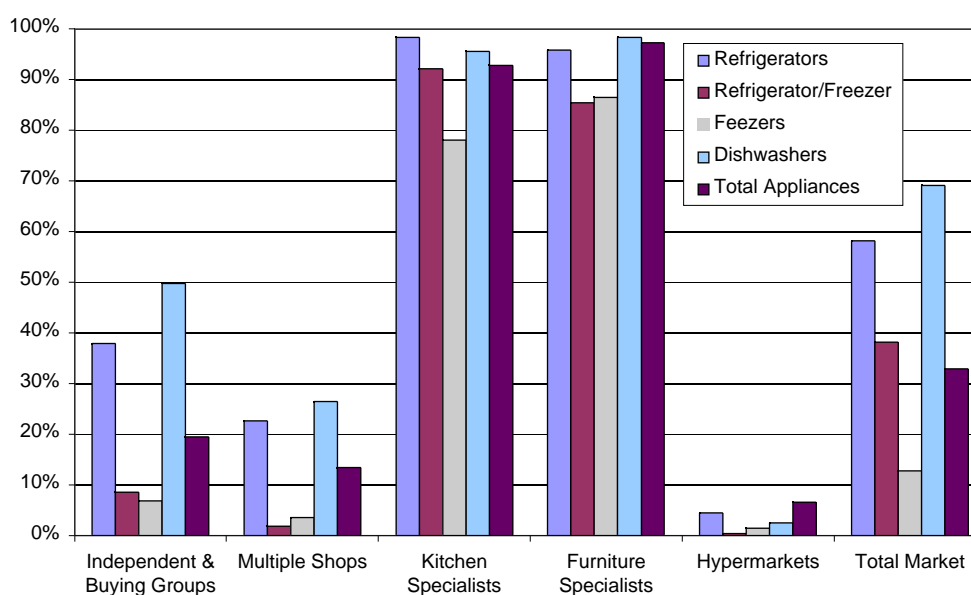
All Appliances	Independents and Buying groups		Large scale specialists	Kitchen specialists	Furniture stores	Hypermarkets	Total
	<2 Mio	>2 Mio					
	%	%	%	%	%	%	%
Complete	31	60	82	6	7	77	36
Partially	36	15	9	14	13	17	21
Absent	34	25	9	80	80	6	44

Table 3. Labelling of freestanding and built-in appliances

	Refrigerators		Freezers		Dishwashers		All appliances	
	Built-in	Free-standing	Built-in	Free-standing	Built-in	Free-standing	Built-in	Free-standing
	% of appliances							
Labelling:								
Complete	15	51	13	52	7	42	11	50
Partially	17	25	26	22	9	20	14	24
Absent	68	25	62	26	83	38	75	26

This means that the compliance rate was low for those types of appliance with a high share of built-in appliances (especially refrigerators, fridge-freezer combinations and dishwashers) and for those types of retailers with a high share of built-in appliances in total sales (especially kitchen and furniture specialists; see Figure 2).

If the degree of compliance is related to the number of shops rather than the appliances displayed, the following picture results (see Table 4): only 8 % of shops have labels on every appliance, 10 % on almost all. 29 %, in contrast, have not labelled any appliance. The category "almost all" was defined as being "more than 85 % of appliances" in order to take into account the existence of older appliances which are not covered by the labelling ordinance. The majority of those questioned (53 %) had labelled at least one appliance but less than 85 % of appliances. Based on this result, 18 % of shops can be classed as having a satisfactory labelling behaviour. Here, again, it was clear that kitchen specialists and furniture stores show the lowest degree of compliance with the ordinance: half of them had not labelled any appliance in their salesrooms.

Figure 2. Shares of built-in appliances in total appliances by types of retailers in Germany (2000)

Source: GfK Marketing Services 2000

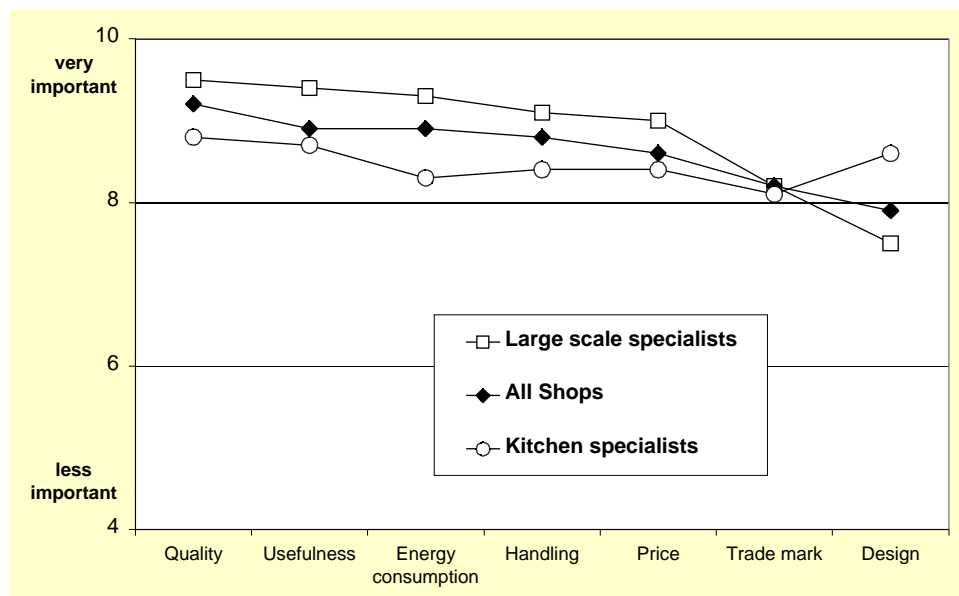
Table 4. Labelling behaviour based on the number of shops

	Independents and buying groups		Large scale	Kitchen	Furniture stores	Hypermarkets	Total
	small	medium	specialists	specialists			
% of shops							
Completely labelled:							
all appliances	12	5	14	0	7	14	8
more than 85 %	8	28	47	2	1	41	10
85 % and less	62	60	37	48	44	45	53
no appliance	18	7	2	50	49	0	29

Results of the interviews with the retailers

One significant result was that the energy consumption of the appliances is seen as an important criteria for the buying decision of the consumers. For kitchen and furniture specialists, the design was the most important criteria, for hypermarkets the price (see Figure 3). According to the interviews, the energy labelling of the appliances has an important influence on the purchasing and advice process. Only for kitchen and furniture specialists, was this less important. The retailers also think that more than two thirds of the consumers are willing to pay more money for A-appliances (highest values for refrigerators, freezers and dishwashers).

Whereas the handling of the labels does not seem to cause severe problems, many retailers complained about problems with removing labels from the appliances. However, these problems only partially explain the low level of compliance. For many dealers who do not label their appliances at all, any problems with handling the labels are not important, because they have never thought about labelling.

Figure 3. Importance of different product features for the purchase decision

Mail- and Internet-Order Compliance

Department stores and especially mail order houses account for a high labelling relevant sales share in Germany (see Figure 1). Shop audits in this channel were not carried out since the vast majority of the sales are done via catalogue or internet sellings. Therefore, a survey of the 4 most important mail-order catalogues and of 10 web sites of the most important internet suppliers was carried out, taking into account more than 2 800 appliances. With regard to the *general presence of the mandatory information*, there was a very high degree of compliance among distance selling. In total, it can be stated that more than 90 % of the mandatory information were present in catalogue offers. There was a similar result for the internet offers examined. However, with a little more than 80 %, the share of total information present was about 10 per cent lower than in the mail order catalogues. If the

order is regarded in which the information is presented and not just the presence of the mandatory information, it can be ascertained that the legally required manner is not always respected. In the mail-order catalogues, about 38 % of the items of information were placed incorrectly, among internet offers the proportion of incorrectly positioned items was somewhat higher at 43 %. This confirms the results of the first European evaluation of the energy labelling directive (Winward *et al.* 1998). However, it is often the case that changes in the stipulated order are due to understandable reasons regarding content or sales technique. In general, the clarity and legibility of the information was good to satisfactory, whereby the internet was rated better than the catalogues in this point.

Summary of compliance in the retail trade

Even though the results of the survey in the retail sector and the survey of distance selling are difficult to compare due to the very different legal stipulations for the labelling of displayed and non-displayed appliances, an attempt has been made to summarise these in Table 5. According to this, 36 % of appliances displayed in the retail sector are completely labelled and about 90 % of the mandatory information are contained in the catalogues and internet offers (although not always in the correct order). For the retail sector overall, a degree of compliance of around 47 % results.

Table 5. Summary of compliance with the energy consumption labelling regulation in the retail trade

Labelling of the appliances displayed/ information present in catalogue or internet	Displayed appliances ¹⁾ %	Distance selling ²⁾ %	Total retail trade ³⁾ %
Complete / Proportion of information present	36	91	47
Incomplete / proportion of information missing	21	9	19
No indication / no information in appliance description	44	0 ⁴⁾	34

¹⁾ Results of the primary survey in the retail trade

²⁾ Results of the survey of distance selling (overall result for catalogues and internet)

³⁾ Weighted with the share of both distribution forms in the total sales of large electrical household appliances: distance selling: 20 %, other retail: 80 %.

⁴⁾ Catalogue or internet descriptions were not found in which all the mandatory information under the energy consumption labelling regulation was absent. That means that, for distance selling there were no cases in which the stipulations of the Energy Consumption Labelling Regulation were completely ignored.

5. COMPLIANCE AMONG SUPPLIERS

The supplier compliance was mainly examined by using the model data of the various brands within the GfK databases. More than 3 000 models of the appliances to which the Energy Saving Ordinance is applied were checked. In total, about 8% of the models have not had an energy efficiency class determined by the manufacturer. However, for most of these non-labelled appliances the market introduction occurred in 1997 or earlier, i.e. before labelling became obligatory. If these appliances are not considered, the share of appliances without any details of energy efficiency class in total models on the market is only about 1 %. In summary, it can be stated that at least the manufacturers of well-known brands comply with the labelling obligation. Almost all newer models are labelled.

The accuracy of the energy class which was declared by the manufacturer was not examined in the study. There are indications from an EU-wide evaluation (Winward *et al.* 1998) and tests in other countries (e.g. for Sweden Konsumentverket 2000 and for the Netherlands Ministerie van Economische Zaken 2000) that some inaccuracies exist. Since these tests are very costly and time-consuming, an EU-wide co-ordination of such measurements would make sense, especially because many of the products are sold throughout Europe.

6. DEVELOPMENT OF SALES BY ENERGY CLASS

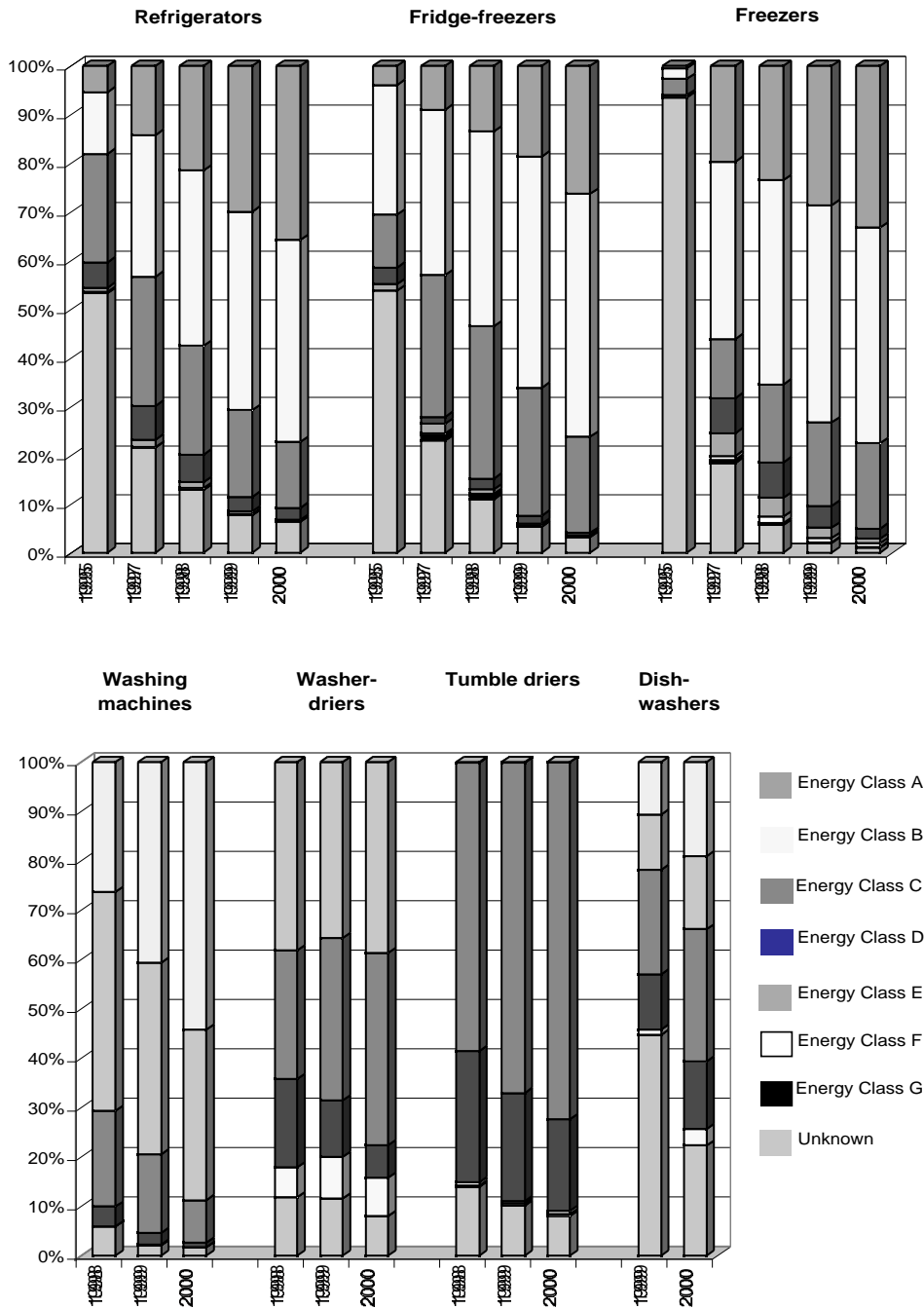
Though the results of the survey indicate that there is some lack of compliance among some parts of the retailers in Germany, the share of energy-efficient A- and B-appliances in total sales in the year 2000 was very high for most types of appliances³. In addition, a substantial and sustained shift from the poor to the good energy classes could be observed in Germany between 1995 and 2000 (see Figure 4). The share of A-appliances in total sales of refrigerators and freezers rose from 5 % or less in 1995 to almost 35 % in 2000. For washing machines, the share of A-appliances even exceeded 50 % in 2000. Only the sales of dishwashers show a smaller amount of A-appliances, which may also be due to the later implementation of the labelling directive. The very small percentage of washer dryers and tumble dryers A-appliances sold is mainly due to the fact that there are only a few A-appliances on the market.

Looking at the sales data by retailer type, the independents and buying groups and the multiples have the highest shares in A-appliances, whereas the kitchen and furniture specialists have less. The lowest share of A-appliances are sold by the hypermarkets, which is, however, less important because of their minor importance in total sales in Germany. An analysis of the sales data by energy class and average price more or less confirms the assumption that the price rises with the energy class. This means that, in general, A-appliances are the most expensive. There are, however, other quality features which also have an influence on the average price.

The international comparison of sales data within the European Union also shows that the appliance structure in Germany is more efficient than in most of the other EU-countries (see Figure 5). In Germany, the share of A-appliances in total cooling (refrigerators and fridge-freezers)⁴ was 26 % in 1999, A- and B-appliances amounted to almost 70 % of the market. Only Belgium and the Netherlands have a similar high share of A-appliances, the share of B-appliances is lower than in Germany. Especially in the southern European countries, the share of A-appliances in total cooling was rather small in 1999.

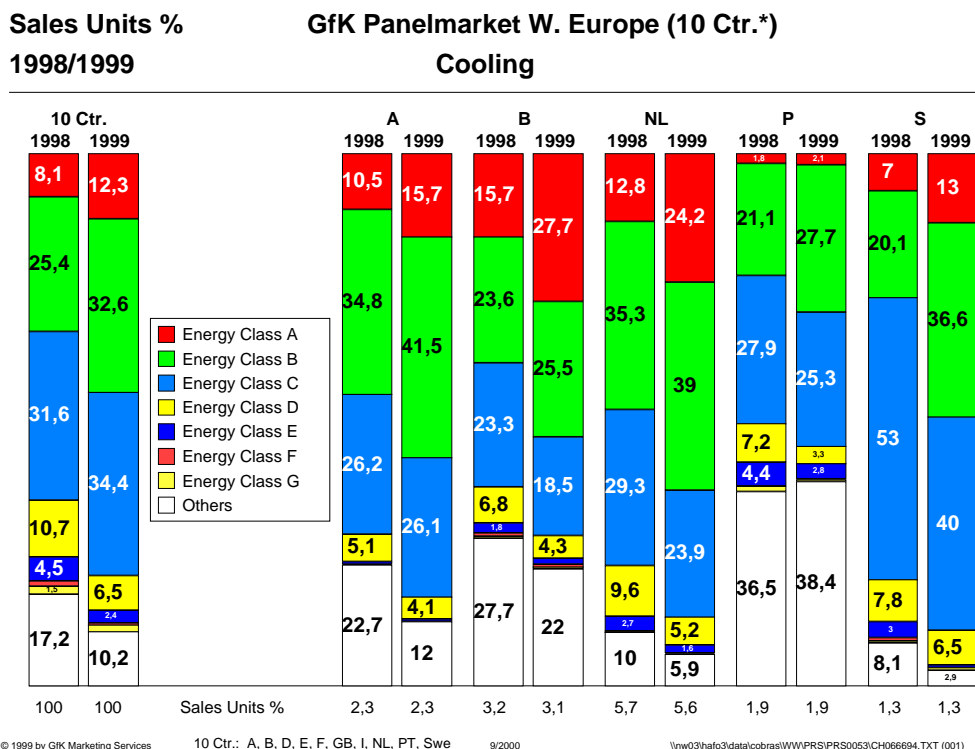
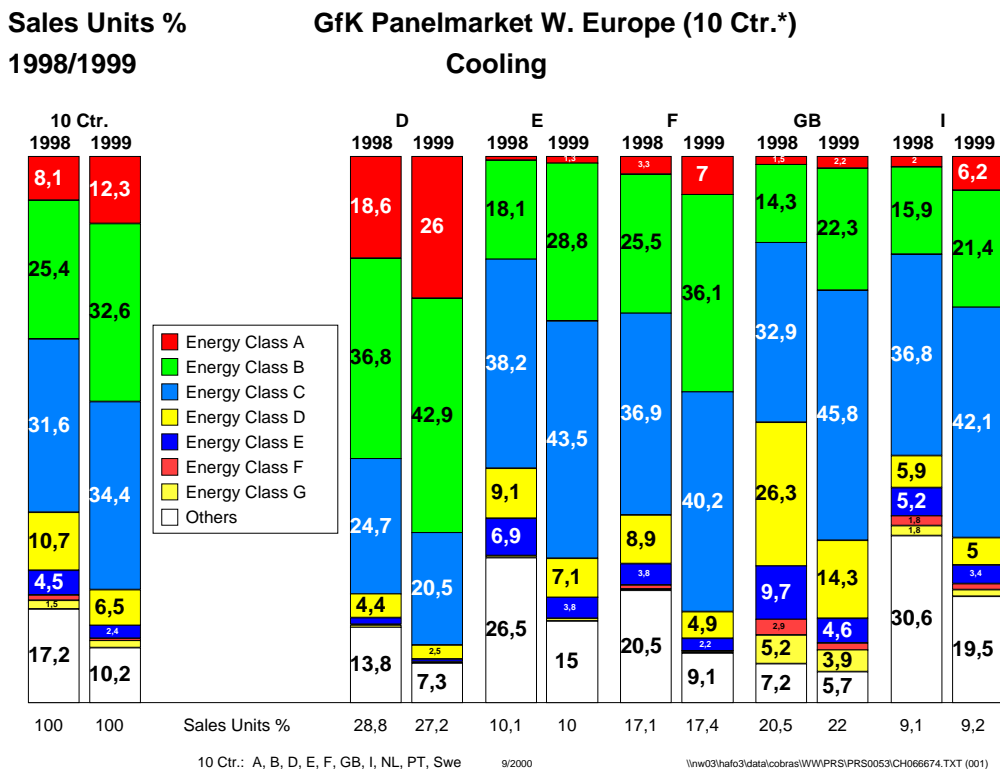
The international comparison also shows that a high level of compliance with the labelling directive among retailers is not essential in order to reach a high share of efficient appliances in total sales and therefore a reduction in electricity consumption – which is probably the most important objective of the energy labelling scheme. There are two EU-countries with an especially high degree of dealer compliance according to recent surveys, the Netherlands and Sweden⁵. In Sweden, about 80 % of refrigerators, freezers, washing machines and dryers were accurately labelled (Konsumentverket 2000); in the Netherlands, the compliance level was almost 90 % for these appliances (Ministerie van Economische Zaken 2000). But only in the Netherlands are these good results also reflected in the relatively high shares of A- and B-appliances. In Sweden, the share of A-appliances in total sales of cooling appliances is significantly lower than in Germany or the Netherlands.

Figure 4. Development of the shares of energy efficiency classes in total sales of large electrical household appliances in Germany 1995 to 2000 ¹⁾



1)1995-1999: February to January of the following year respectively; for 2000, February to September
 Source: GfK Marketing Services, 2000

Figure 5. Shares of the efficiency classes in the total numbers of refrigerators sold (including fridge-freezer combinations) in 10 countries of the European Union



7. ENERGY AND CO₂ SAVINGS CAUSED BY SHIFTS TO MORE EFFICIENT APPLIANCES

Based on the annual sales data by energy class described in Chapter 6 and additional data on the average energy consumption for each type of appliance, energy and CO₂ savings caused by the observed shifts to more efficient energy classes can be calculated. The energy consumption per appliance type decreased considerably due to the shifts to better energy classes: for refrigerators and freezers by 13-19 % between 1995 and 2000, for washing machines and washer dryers by 7-10 % since 1997⁶. In the case of tumble dryers, this development has only just begun.

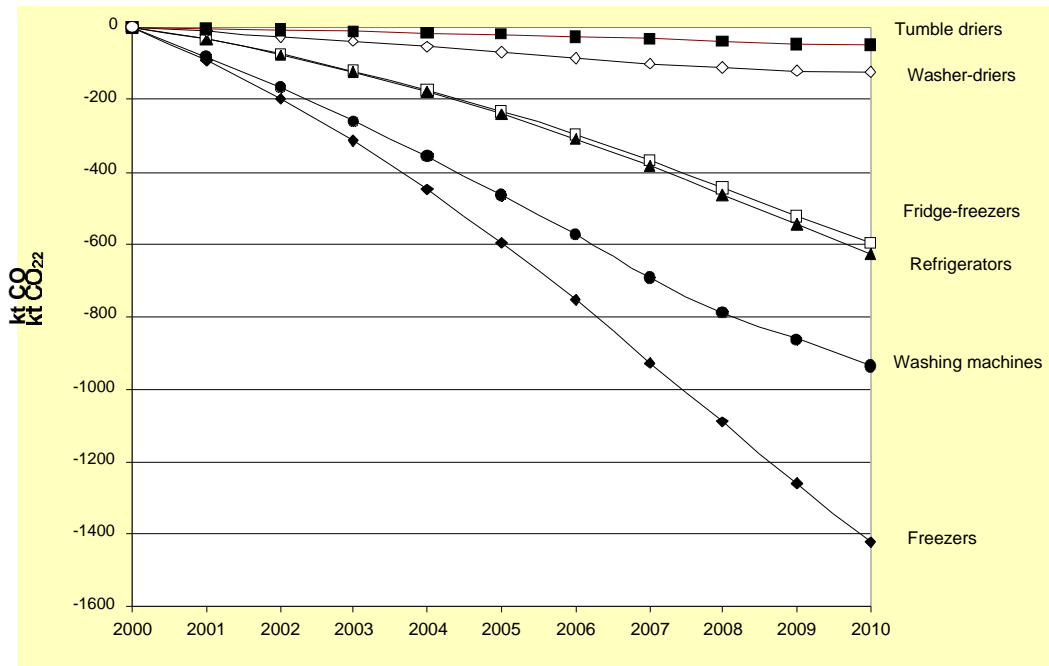
The cumulated CO₂ savings which were caused by these shifts to more efficient appliances were calculated in comparison with a reference scenario with constant efficiencies and the base year 1995 (1997). The savings were calculated using the method of factor decomposition which is particularly suitable for such a question (see e.g. Diekmann *et al.* 1999). As a result, between 1995 (1997) and 2000, about 450 Kt CO₂ were saved by the shift to more efficient (A- and B-) appliances in Germany. Most of the savings were achieved by refrigerators (see Table 6). Not all of these savings can, however, be attributed solely to the Energy Labelling Ordinance which was only implemented in 1998 in Germany. Part of the savings was also due to the autonomous technical progress in energy efficiency of the appliances and expected implementation of the EU directives in Germany. In the case of refrigerators and freezers, the mandatory minimum energy-efficiency standards, valid in Germany since 1998, may also have had an influence.

**Table 6. Yearly CO₂ savings by types of appliances in Germany 1995-2000
(washing machines, washer dryers and dryers: 1997-2000)**

Kt CO ₂	1996	1997	1998	1999	2000	total
Refrigerators	-25.2	-33.2	-51.6	-66.3	-74.5	-250.8
Fridge-Freezers	-1.9	-8.2	-14.3	-22.2	-26.7	-73.3
Freezers	-3.0	-6.3	-15.7	-22.4	-26.5	-73.9
Washing Machines			-9.7	-15.7	-18.9	-44.3
Washer Dryers			-1.5	-1.1	-2.0	-4.6
Tumble Dryers			-1.9	-2.1	-1.8	-5.8
Total	-30.1	-47.7	-94.7	-129.8	-150.4	-452.7

Two scenarios were set up in order to estimate developments in the next decade. Scenario 1 assumes no further shifts within the energy classes after 2000, Scenario 2 assumes a continuation of the trend to more A- and B-appliances which was observed between 1997 and 2000. Between 2000 and 2010, the additional CO₂ savings amount to about 1.8 Mt in Scenario 1 and 3.8 Mt in Scenario 2 (see Figure 6).

Figure 6. CO₂ reduction 2000–2010
 (Scenario S2: shift towards more A and B appliances continues the trend of 1997–2000)



8. CONCLUSIONS AND RECOMMENDATIONS

Overall, the study showed a very high degree of compliance with the energy consumption labelling ordinance among manufacturers. The degree of compliance in the retail trade varies widely between the individual distribution channels. Of the appliances displayed, which were examined in the frame of a market inspection in showrooms, the highest share of completely labelled large household appliances were found in large specialist stores, hypermarkets and medium-sized specialist electrical shops. In small specialists, the labelling was often incomplete, in kitchen specialists and furniture stores, the level of compliance was generally poor. For the non-displayed appliances offered via mail order or the internet, the information on consumption labelling required by law for this distribution channel was usually provided, although frequently in a different order than the legally stipulated one. On the other hand, the partly low degree of compliance obviously had a negligible influence on the supply and sales of energy-efficient appliances. In Germany, there has been a continuous increase in the proportion of A appliances sold and their share is favourable compared to other EU-countries. This means that the essential goal of the Energy Labelling Ordinance has more or less been achieved. Nevertheless, a more accurate labelling of the appliances could contribute to an even better exploitation of existing electricity saving potentials (see e.g. Brohmann *et al.* 2000).

Due to these heterogeneous results, the recommendations for further measures also have to be differentiated: on the one hand with regard to the different distribution channels with their different degrees of compliance with the labelling ordinance; on the other regarding measures to increase compliance with the regulation and those to promote the sale of energy-saving appliances.

Suggested measures aimed at retailers

As shown by the retail survey, electrical specialist stores are in general making an effort to implement the ordinance. Retailers in smaller shops have to deal with lots of different product groups and cannot devote themselves in any detail to the energy efficiency of large household appliances and labelling. They need help. By far the worst degree of compliance with the labelling ordinance was found among kitchen specialists and furniture stores, the distribution channel with a traditionally high proportion of built-in appliances. In all distribution channels there is a group of retailers who find the labelling a nuisance, cannot see the point of it, have no time for it or who gradually forget about the obligation. It is therefore recommended:

- to conduct regular promotional information campaigns and reminders for retailers about every two years with particular emphasis on the benefits of the labelling for trade and
- to produce and distribute materials to support sales advice with regard to energy efficiency (e. g. a rotating disc to calculate saved energy costs).

The co-ordination and implementation of such campaigns could be managed for example by the German Energy Agency⁷, supported by the regional energy agencies and the German trade association of appliance manufacturers (ZVEI), which conducted the previous information campaigns for retailers on energy consumption labelling. A parallel information campaign for consumers could contribute to a greater success in the retail sector because consumers who keep asking about energy labels would almost certainly represent a considerably greater incentive for labelling than, e.g. occasionally imposed fines. Education courses for retailers on the energy efficiency of appliances are useful in principle, but there is less time available for further training than in the past due to the extension of shop opening hours and increased overtime.

Besides, implementing the ordinance should be made as easy as possible for retailers. Existing difficulties with handling the labels, attaching them and removing them have to be sorted out. It should also be ensured that the retailers have enough colour backgrounds available by sending them these from time to time or offering to do so.

The labelling procedure could also be simplified in general. This would involve legal amendments. The classification of energy efficiency using letters, which is well established, should definitely be retained. It would perhaps be sufficient to label the appliances on the outside with the letter alone and to place a product fiche from the manufacturer inside containing the additional information. This would also be a way around the appearance problem affecting built-in appliances which would especially please kitchen specialists and furniture stores. Attaching only the relevant letter might also encourage customer enquiries and thus initiate consultation which would principally promote the purchase of energy-saving appliances and at the same time would raise levels of customer loyalty. In addition, the retail staff could set up a clearly visible notice about the energy efficiency classes in the salesroom. This would not be too much trouble even for very busy retail staff. Should a general simplification of the regulation not be feasible, a special regulation for the built-in appliances displayed by kitchen specialists and furniture stores should at least be considered as the regulation in its current form is obviously least suited to these two channels of distribution and thus generally not accepted.

In principle, greater compliance with the labelling ordinance could also be achieved through increased controls and imposing fines for non-compliance. The Laender (regional governments) are responsible for this in Germany, although many Laender have not yet even determined which specific authority should be responsible for the enforcement of the regulation. The Laender should therefore be reminded of their law enforcement obligations. Increased supervision of compliance with the energy labelling regulation is not recommended, however, before measures like the information campaigns described above and perhaps even modifications of the labelling process have taken place. Generally speaking, the voluntary co-operation of retailers is needed most of all and the barriers to implementation must therefore be taken seriously. Permanent supervision is, in addition, very time consuming and expensive for public authorities and there are other areas in consumer and environmental protection for which this seems more justified than for compliance with the energy labelling regulation.

For distance selling, there was basically a very high degree of compliance with the energy consumption labelling regulations in the offers in catalogues and the internet. Most of the mandatory information on consumption labelling for this channel of distribution was present. However, the legally stipulated order in which the information should be present was frequently not upheld, although this was often due to understandable reasons of content and/or sales technique and did not impair the clarity of the depiction. The results of this survey suggest that it may be more sensible to limit the legal stipulations to the mandatory information and allow the suppliers to determine the order themselves. Again, this would require an amendment of the legislation.

Recommendations regarding the Information and Motivation of Consumers

Consumers are the last but very important link in the sales chain of electrical household appliances. Their behaviour can make a decisive contribution to greater compliance with the energy consumption labelling obligation in the retail sector and to the extent that A appliances are offered by the manufacturer. Conversely, however, even if retailers comply with the energy labelling obligation, this does not mean that consumers actually purchase energy-saving appliances.

Among measures aimed at consumers, broadly based promotional information campaigns using different media deserve particular consideration. Where possible, these should run parallel to campaigns aimed at retailers. They are used to draw attention to the energy conservation potential when purchasing appliances and serve as a reminder about energy consumption labelling. The German Energy Agency could conduct such a campaign possibly in co-operation with regional energy agencies as well as consumer associations. There are also numerous activities on a regional level, a municipal one, of consumer advice institutions and public utilities to inform and motivate the consumers. Good examples should be advertised more strongly. This could also be a task of the German Energy Agency.

Financial subsidies for purchasing energy-efficient A appliances as, e.g. awarded in the Netherlands since January 2000, are not recommended for Germany. According to the results of the assessment of the Dutch subsidy programme, the subsidy costs per reduced tonne of CO₂ are rather high (Jeeninga/Uyterlinde 2000). If a subsidy programme were to be considered at all, then specific particularly efficient (large energy-savings) appliances should be subsidised, not just A appliances in general. In fact the labelling of particularly efficient appliances would be a useful information and motivation measure in any case for consumers and retailers, as well as acting as a development incentive for manufacturers.

It is also recommended to conduct consumer surveys every two years on the role of the energy label and purchasing patterns. These should include other electrical and electronic appliances alongside large household appliances (which is also the case for the information and motivation campaigns suggested).

Other Recommendations

Since the classification of energy efficiency is based on claims made by manufacturers, test measurements should be carried out from time to time to check the accuracy of these declarations. As European experience has shown, the classification is sometimes inaccurate. These checks would not necessarily have to be done on a national level, but could be co-ordinated throughout Europe.

That there is a need for greater differentiation within the A efficiency class between more and less energy-saving appliances is a frequent criticism of the energy consumption labelling regulation in Germany as well as other countries. Generally, the classification should take technological development into account. If the energy consumption figures for the classes remain static over many years, there is not enough incentive for manufacturers to develop energy-saving appliances and consumers do not have sufficient orientation possibilities.

Updating the classification at least for refrigerators and freezers, which is actually based on 1994 figures, has been the subject of debate for some time at a European level. An additional label on a voluntary basis could be a relatively simple and fast option to make especially efficient appliances stand out, similar to the Energy Star in the USA, or as introduced in Switzerland and subsequently in Germany for electronic office equipment. For example, the top third or the best 25 % of A appliances could be given an award and published in a list. This labelling can be updated annually and thus respond directly to technological development. Furthermore, other criteria could be included which are not important for consumption labelling, such as the size of refrigerators and freezers.

In general, a regular examination of the effect of laws and accompanying measures is recommended, about every two years as is the case, for example, in Sweden. In order to assess the success of measures carried out to improve energy consumption labelling, regular and, above all, up-to-date figures on the development of appliance sales by energy class are necessary.

9. REFERENCES

BMWi: Bundeswirtschaftsminister Müller gibt Gründung der Deutschen Energie-Agentur bekannt. Tagesnachrichten vom 02.10.2000 (Nr.: 11050). <http://www.bmwi.de>

Brohm, B. *et al.*: Klimaschutz durch Minderung von Treibhausgasemissionen im Bereich Haushalte und Kleinverbrauch durch klimagerechtes Verhalten. Band 1: Private Haushalte. Darmstadt, Berlin, Freiburg: Öko-Institut 2000.

Diekmann, J.; Eichhammer, W.; Rieke, H.; Schlomann, B.; Ziesing, H.-J.: Energie-Effizienz-Indikatoren. Statistische Grundlagen, theoretische Fundierung und Orientierungsbasis für die politische Praxis. Heidelberg: Physica-Verlag, 1999. Summary (40 p.) also available in English (published as: Energy Efficiency Indicators: Statistical Basis, Theoretical Foundations, and Guide for Political Practice. BMWi-Dokumentation No. 456. Bonn/Berlin, March 1999. <http://www.bmwi.de>).

Verbraucherzentrale Baden-Württemberg: Neues Energieverbrauchslabel: Über ein Drittel der Kühlgeräte falsch gekennzeichnet. 2000. <http://www.verbraucherzentrale.de/energie> (Stand: 26.09.00).

Verbraucher-Zentrale NRW: Immer noch kein Faible fürs Energielabel im Handel. Unzureichende Kennzeichnung von Haushaltsgeräten. Press report, 4.11.1998.

Schlomann, B., Eichhammer, W., Gruber, E., Kling, N., Mannsbart, W., Stöckle, F.: Evaluierung zur Umsetzung der Energieverbrauchskennzeichnungsverordnung (EnVKV). Report on behalf of the Federal Ministry of Economics and Technology. Karlsruhe, Nuernberg (to be published in spring 2001). Summary (40 p.) also available in English.

Müller-Kulmann, W.: Energieverbrauchskennzeichnung. Textausgabe mit einer Einführung, Erläuterungen und ergänzenden Materialien. Köln: Bundesanzeiger-Verl. 1998.

GfK Marketing Services: Data on sales and energy consumption of large household electrical appliances in Germany and other EU-countries. Nürnberg, 2000 (contact: Friedeman Stöckle; e-mail: friedemann.stoeckle@gfk.de).

Jeeninga, H., Uyterlinde, M. A.: The Sky is the Limit! Or why can more efficient appliances not decrease the electricity consumption of Dutch households. ECN: Petten, 2000.

Konsumentverket (Sweden): Fem år med energimärkning av kylar, frysar, tvättmaskiner, torktumlare och diskmaskiner (Five years with energy labelling for refrigerators, freezers, washing machines, driers, and dishwashers). Rapport 2000: I6, Konsumentverket (Konsumentenagentur) (2000). http://www.konsumentverket.se/diverse/2000_16_energimarkning.pdf

Ministerie van Economische Zaken (The Netherlands): Press report from 26.07.2000.

ZVEI (German Trade Association of Appliance Manufacturers): Praktikumsbericht über die Befolgung der Kennzeichnungspflicht von Elektrogroßgeräten in Deutschland. Frankfurt 1998.

Winward, J. *et al.*: Cool Labels. Energy Environmental Programme, Environmental Change Unit, University of Oxford. Oxford 1998.

10. END NOTES

¹ Department stores and mail order houses were not included in the shop audits since the vast majority of the sales are done via catalogue and internet sellings. Instead, a check of catalogues and web sites was carried out.

² About 92 % of the correctly labelled appliances or 33 % of all appliances were labelled in accordance with the law.

³ All sales data given in this chapter are from the *GfK Retail Panel* which covers about 80 % of the total German market of household appliances. The panel includes sales data from 1995 and is updated in a bi-monthly rhythm. For the survey, data until September 2000 was used.

⁴ The sales data by energy class for the European countries shown in Figure 5 are from the GfK Retail Panel for Western Europe. Current data for refrigerators and other household appliances (available up to December 2000 in April 2001) are also available from the GfK against payment.

⁵ The great differences in the level of compliance both between the types of retailers and between freestanding and built-in appliances which were shown by the German audit indicate that the methodological approach of the audits for different countries should be comparable in the way in which the different types of retailers are considered. Otherwise, a comparison of the compliance rates between countries could be misleading.

⁶ Data for refrigerators and freezers were available since 1995, data for washing appliances since 1997. Dishwashers could not be considered in the calculations due to data uncertainties.

⁷ The German Energy Agency (DEnA) was set up on 29 September 2000 by the Federal Ministry of Economics and Technology and the Kreditanstalt für Wiederaufbau. The focus of the new institution is the promotion of energy efficiency in private households, industry and public services (BMWi 2000).