

SAVE II ACTION
Contract no. XVII/4.1031/ Z/99/283
Labelling and other measures for heating systems in dwellings

Appendix 7

Stakeholder impact analysis

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1 Study Design, Scope and Methodology

In Task 5.2 ‘Stakeholder Impact Analysis’ the impact of a labelling scheme for heating systems and other possible measures for improving energy efficiency in this sector are evaluated. A main point of this work included theoretical analysis and research aimed at estimating the effect on manufacturers. It included a series of structured interviews with selected manufacturers and the organisations representing manufacturers, and a questionnaire that was sent out to 35 manufacturers representing more than 60 percent of the European market for heating systems.

However, with the time and budget given a really representative survey of the total European heating systems industry was not possible. All results are therefore to be interpreted with appropriate care. Responsibility for all hypotheses and conclusions is with the authors alone. And we cannot guarantee that we really included all relevant opinions. But we hope that the sample shown above gives a deeper insight into industry’s views.

As a basis for the conclusions drawn in this Task report, we used primarily

- the information on market structures and current regulations in most EU countries, design of a potential labelling scheme for heating systems and other possible measures, and the expected effects of the proposed measures, gathered in the other Tasks of this project,
- the information of the most recent market analysis of fossil-fired heating systems in the EU carried out by Consult GB,
- the results of the Sharpe report which is a representative survey of all British manufacturers, carried out just recently,

¹ However, with the time and budget given a really representative survey of the total European heating systems industry was not possible. All results are therefore to be interpreted with appropriate care.

² The results of the questionnaire and especially the talks we had with industry were very helpful for us and we would like to thank all those people who used their time and provided valuable information for their co-operation.

³ Solar heated water used for heating as well as domestic hot water.

- information material and literature about the topic, especially the results of the most recent European heating fair ISH (May 2001) in Frankfurt.

Aside from this material we carried out our own survey of heating system manufacturers in the EU. This survey consisted of four main elements:

- A series of five structured personal interviews and talks with heating system manufacturers of all sizes. For structuring the interviews we used the questionnaire that we sent out later in a revised form to other companies.
- Talks to the relevant European industrial associations of EHI (European Heating Industry), AFECI (Association of European Manufacturers of Instantaneous Gas Water Heaters and Wall-Hung Boilers) and MARCOGAZ (European Natural Gas Suppliers) at a meeting of the project team in Delft, NL.
- One in-depth interview with a regional training centre for heating installers run by a regional chamber for craftsmen (Handwerkskammer).

And a detailed questionnaire that was sent to a total of 35 German, British, French, Italian, Austrian, Dutch, Liechtenstein and Danish companies producing heating systems (boilers) of all sizes, covering together more than 50 percent of the market for heating systems in the EU.⁴

Table 1: Size of companies surveyed

Number of Employees	Number of Companies
Below 100	2
100 – 500	5
500 – 1,000	1
More than 1,000	6

Source: Wuppertal Institute 2001

⁴ The lists of interviews, the list of companies asked and the questionnaires used are documented in the appendix to Task 5.2.

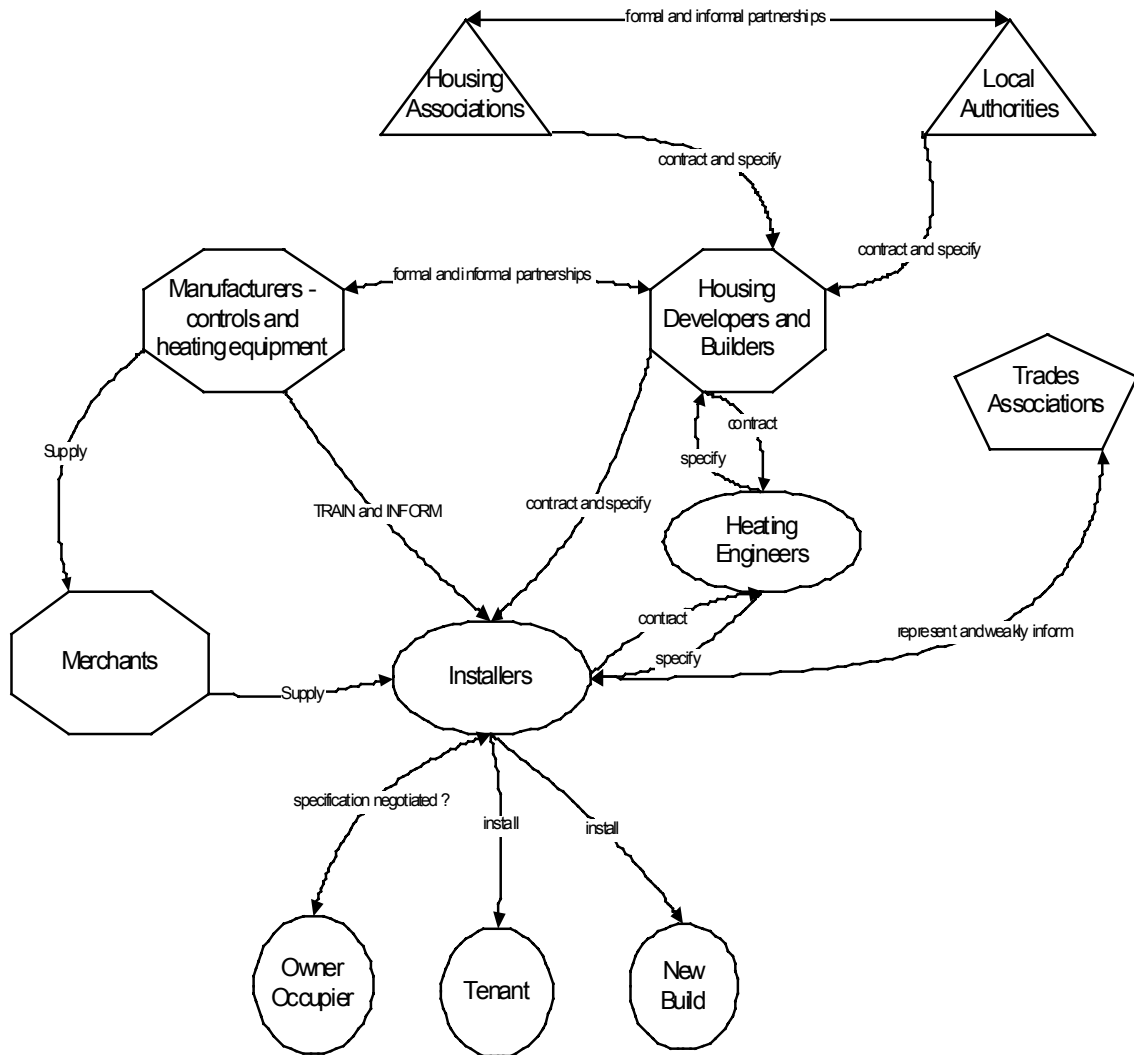
By the choice of companies and interview partners, we tried to obtain an overview of industry's opinions that is as wide as possible. By inviting the relevant market associations to a meeting and talking to their representatives, we also tried to include the common position of the manufacturers of heating systems in the EU. Answers of industry cover companies of all sizes and of different EU countries (with a certain focus on the biggest producing country, Germany). They also represent a majority of the market.

The companies that responded to the questionnaire or were interviewed cover together more than 30 percent of the European market for heating systems. The sample also contained companies of all sizes as shown in the following table. The dominant classes were first the big companies with over 1,000 employees, all being among the top ten of the European heating producers, and second medium-sized enterprises with between 100 and 500 employees. Additionally we were able to include the opinions of two small companies with less than 100 employees and of one intermediate company with between 500 and 1,000 employees.

2 Stakeholder Groups

The following figure shows the network of actors implicated in the specification of heating equipment for new heating systems in the UK.

Figure 1: UK network of actors implicated in the specification of heating equipment



Source: Banks, N (2000) Appendix C of Lower Carbon Futures.

This scheme can be applied with certain modifications to all EU markets. It refers especially to the new building sector which accounts for about 20 percent of all heating systems sold in the EU. Regarding the bulk of the market, that is the replacement market, the scheme is a lot easier. The owner or tenant of the dwelling together with the installer usually decides on replacements. Sometimes the landlord decides together with

the installer. The same applies to the rest of the market, that is first time installations in existing buildings.

Regarding this background, three main stakeholder groups can be determined that are involved in the decision-making process for the installation or replacement of a heating system in a dwelling.

- First, the customers who have to be subdivided into owner occupiers, tenants and landlords. The three do not always have the same interests and are in some cases differently affected by developments concerning the market for heating systems.
- Second, the installers who sell and install the heating system and who have a great influence on the relevant decision-making processes when a new heating system is purchased and installed.
- Third, the producers of heating systems, who via design and pricing of their products, advertising, marketing, information and education of installers, etc., actively determine the efficiency of heating systems.

All three groups mentioned above would more or less be affected by policies trying to transform the market of heating systems in the EU and especially by the introduction of a labelling scheme for boilers.

The focus of this Task is clearly on the **manufacturers** of heating systems. On the one hand they are important players influencing the efficiency of heating appliances. On the other hand it is their products and their market at which a labelling scheme and other measures are targeted. In the following chapters this market is analysed in detail to determine which companies could be harmed and which could profit from the proposed measures. The analysis is underpinned by a survey aimed at finding out the attitudes of the industry towards a labelling scheme for heating systems and their expectations regarding potential effects on the markets and the companies.

For the **consumers**, some benefits can be quite clearly seen. They will be able to make sounder purchasing decisions and will gain more information and are therefore better

able to take an active role in the decision. This gives consumers the opportunity to choose more efficient devices. Although fears were expressed that the label will be difficult to be understood by consumers, general confusion of consumers by a labelling scheme is not expected.

In general it can be said that the relation between costs and benefits of the measures proposed will mainly determine further effects for the consumers. These aspects are discussed in depth in Task 5.1 'Cost Benefit Analysis' of this study.

The **installers** are also affected by policy measures regarding energy efficiency of heating systems. They have to learn new regulations, comply and inform customers about new restrictions, etc. They also bear the main task of informing consumers about measures such as labels, etc. Together with the important role they have in the decision-making process, it is clear that they are crucial for the success of most policies and especially a labelling scheme for energy efficiency of heating systems.

Currently this importance does not seem to be reflected enough in most proposals for improving energy efficiency of heating systems. Here, therefore, is where there is the biggest lack of concepts and realisation and where the most work has to be done.

For this target group the expectations of industrial representatives are a little less optimistic. It is just fairly believed that they can emphasise the label in their advertising, customer information and consulting, but less believed that they can offer better advice with regard to energy efficiency.

Introducing a labelling scheme could mean more bureaucracy and work for installers. It could also bring a trend to more expensive systems requiring increased regular maintenance, etc. To cope with these new requirements better customer communication and higher skills in installation are necessary. It is still not evident that introduction of a label will result in bigger markets for installers, but the effects seem to go clearly in that direction. A labelling scheme and other measures for improving energy efficiency generally tend to increase the economic opportunities for installers.

These arguments justify not looking closer at the effects for installers as there are almost no problems to be expected and – as far as the authors could determine – also no fears

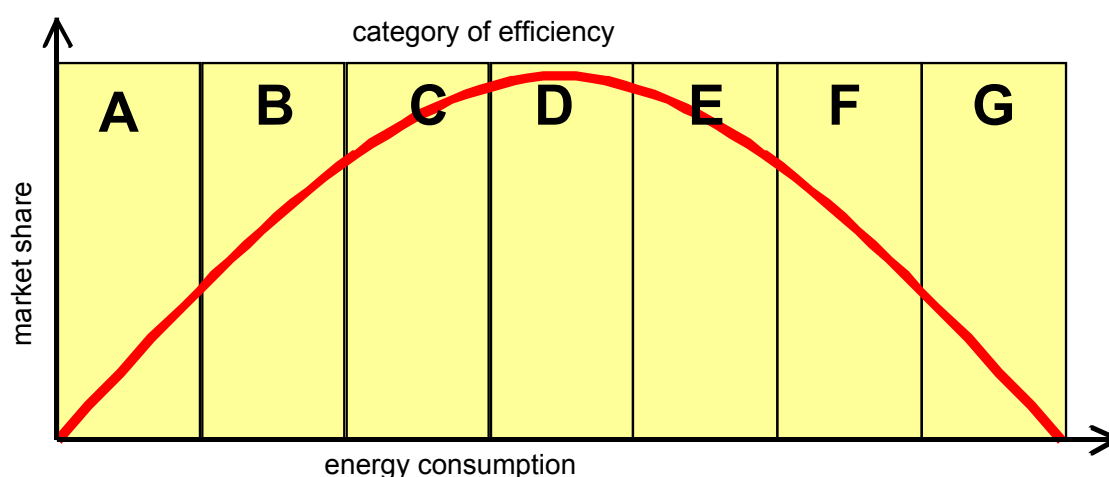
were publicly expressed. Our interviews and contacts with installer representatives indicated this.

However, when looking at the importance installers have for the success of a labelling scheme for heating systems and other measures, a closer look at their attitudes and interests including instruments to encourage them to play an active supporting role is very important.

3 The principle of market transformation with labelling and its potential effects on producers

Working economically and ecologically is a great challenge and a great opportunity for every company to be successful in the future. This is especially true for the heating industry that is developing, designing and selling an environmentally sensitive product. A forward-looking company is thus always on the lookout for new ways and solutions to strike the balance between economic development and the conservation of our environment. Producing efficient units is a contribution to reducing energy consumption and a way to minimise negative effects on our environment.

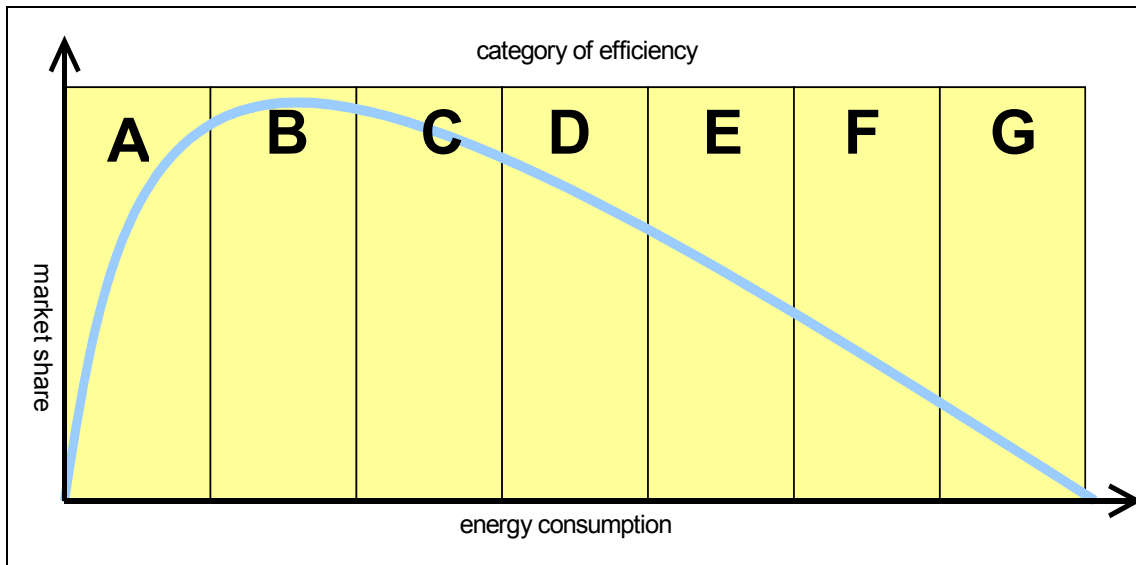
Figure 3: Market share before introduction of an efficiency label



EMBEDSource: Wuppertal Institute 2001

Figure 3 shows a typical distribution of energy consumption of heating (or other) appliances. The median is in the label class D and the number of units with very low energy consumption is as high as the number of units with very high energy consumption. This Gauss or normal called distribution shows the market share before intervention by labelling.

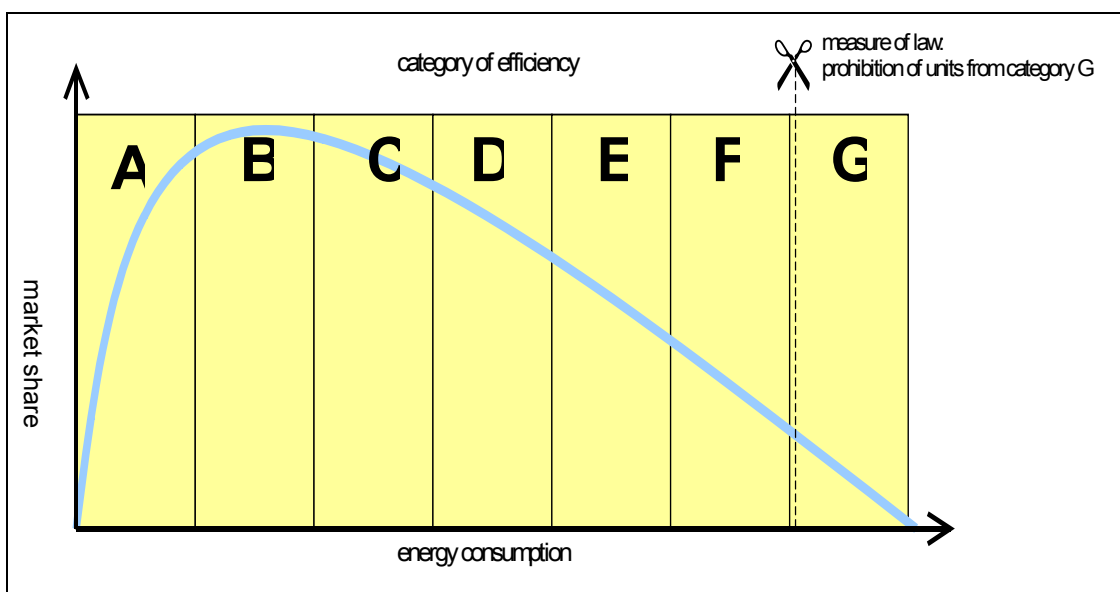
Figure 4: Transformation of the market by introduction of an efficiency label



Source: Wuppertal Institute 2001

The effect of a labelling measure is a transformation of market share tending towards units with less energy consumption. The reason for this effect is the information provided by the label, which helps customers to make an easy and more informed choice without having to acquire the knowledge of an engineer. Governments, companies and installers can enhance this effect by teaching consumers about the benefits of buying and selling more efficient appliances.

Figure 5: Further changes of the market by legal measures

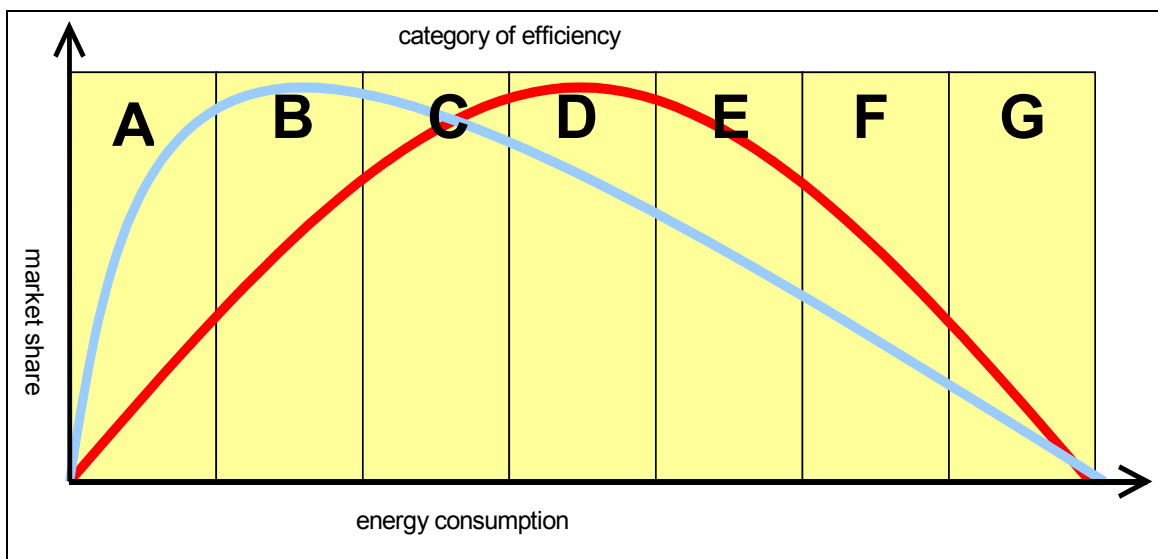


Source: Wuppertal Institute 2001

Removing the least efficient models from the market can result in a further change to the market. Therefore a mandatory minimum efficiency standard can be set. A voluntary agreement between producers or the prohibition of models from the least-efficient category by law adds to the label's effect.

Figure 6 shows the transformation by comparing the market share before and after the introduction of labelling. The question to be answered is, for which company is the transformation a competitive advantage and for which a disadvantage?

Figure 6: Comparison of market shares before and after introduction of an efficiency label



Source: Wuppertal Institute 2001

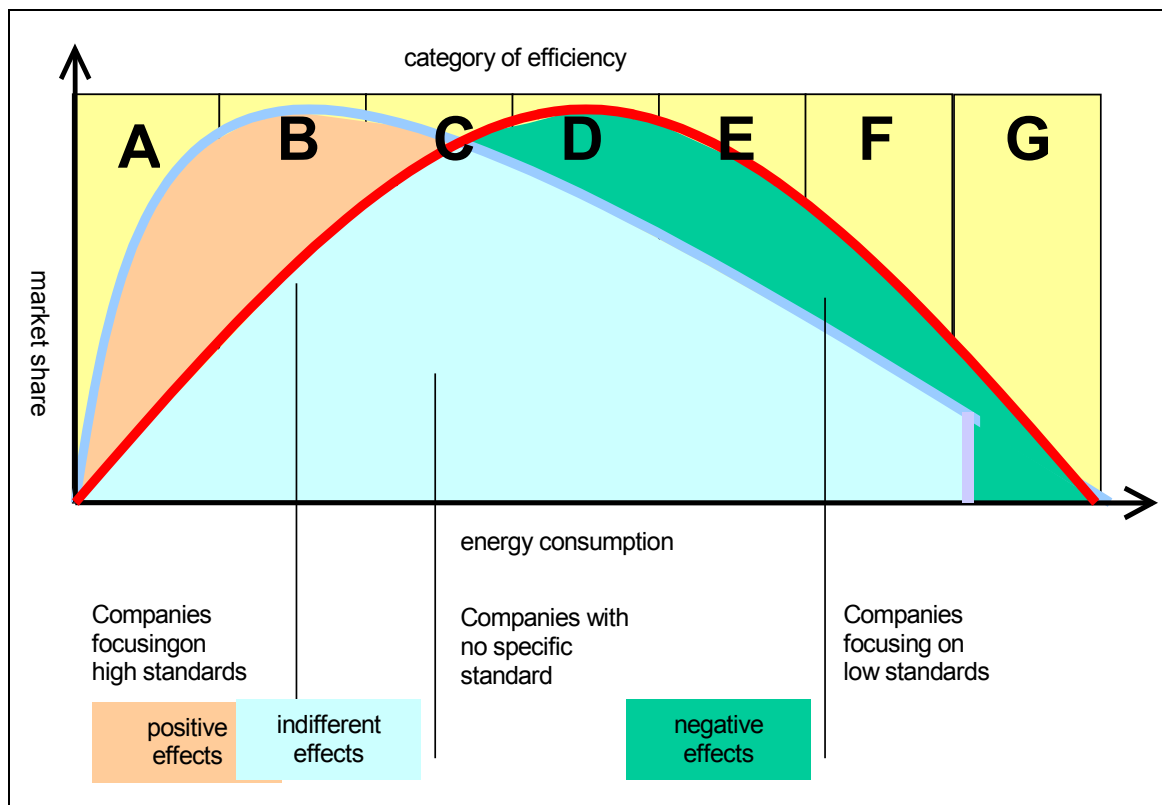
In general the advantage is the bigger the more products a company offers correspond to market demand.

- Because the market changes by labelling, those companies will have an advantage which already before the introduction of the label concentrated on more efficient articles than the average market or which can bring their production into line with the changed demand with little effort.
- The greatest disadvantage is experienced by those companies which are only represented in the cheap segment of inefficient articles and which are unable to produce more efficient articles or can only do so with great effort.

- The other extremes are the manufacturers of articles of above-average efficiency. Through labelling the market increases for this group of companies and therefore they can increase their sales.

The economic consequences of a labelling scheme for heating systems will be discussed in the following chapters.

Figure 7: Potential Effects of a Label on Different Types of Companies



Source: Wuppertal Institute 2001

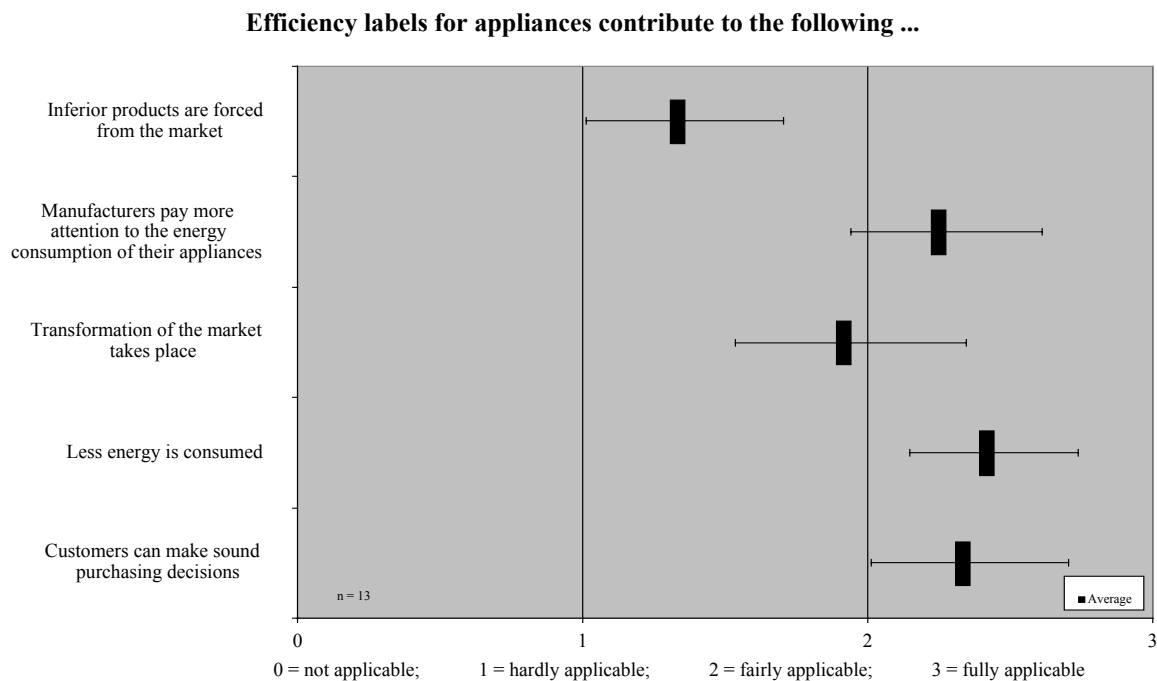
4 Results of the survey of companies producing heating systems

As a part of the stakeholder impact analysis and as an important basis for our discussion we carried out a survey of heating system manufacturers in the EU. In the following chapters first of all the structure and extent of the survey is described. Secondly, the results are presented, indicating industry's attitudes towards the potential effects of an energy efficiency label for heating systems, their opinions regarding the design of such a label and their expectations regarding the effects on industry in general and on their company specifically.

4.1 Attitudes regarding potential effects of a label

The second part of the questionnaire deals with the attitudes of the companies regarding the possible effects of a label on heating systems. The questions in this part relate first to their opinion on efficiency labels generally, then to a label for heating systems specifically.

Figure 8: Attitudes towards efficiency labels



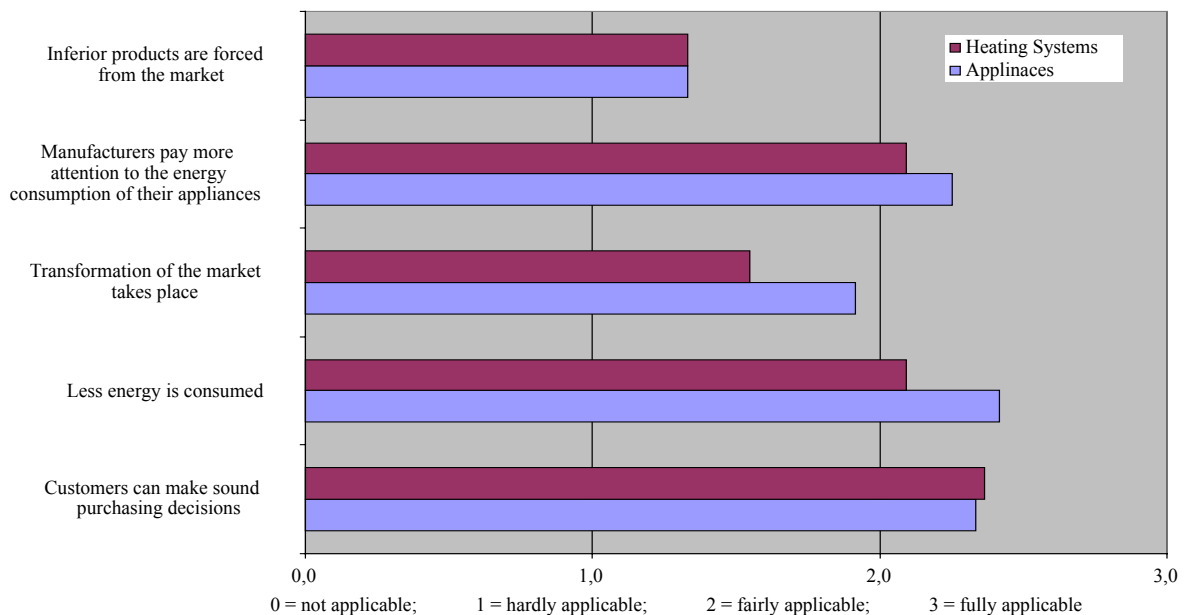
The first question in this part asks for the company's opinion on energy efficiency labels (denoting efficiency categories from A to G) that have been awarded for a long time

already on the EU level, e.g. for refrigerators, washing machines, freezers. It was asked what effects these existing energy efficiency labels have in general

The range of answers is shown in the figure above. The companies believe that the labels do save energy. They widely agree to the statement that less energy is consumed because of the introduction of efficiency labels for appliances. The main reasons for this effectiveness seem to be the facts that customers can make sound purchasing decisions because of the information function of the label and that manufacturers pay more attention to the energy consumption of their appliances. Both statements are widely shared by the manufacturers.

That these undoubted effects lead to market transformation or even to the removal of inferior products from the market is not so widely believed. A market transformation seems at least possible to the respondents but the removal of inferior products as an effect is hardly believed.

Figure 9: Attitudes towards efficiency labels on household appliances vs. a label on heating systems



The second question of this part deals specifically with possible effects of a label for heating systems. 17 hypotheses were stated, among them the five mentioned above. The following figure shows the differences in the attitudes regarding labels in general or a

specific label for heating systems. The upper columns in the figure indicate the attitudes towards a specific label on heating systems and the lower columns the general attitudes regarding energy efficiency labels for appliances.

Generally, the companies responding regard labels for heating systems as slightly less effective compared to labels on other appliances. However, it is believed that customers can make sounder purchasing decisions because of the availability of a label (even a slightly higher agreement rate than for labels in general). In contrast, the possible effect on energy consumption and the possible transformation of the market are estimated lower than for appliances in general. Especially in the latter hypotheses, the opinions are quite split. That inferior products would be forced from the market is – as for appliances in general – hardly believed. In line with these views, respondents expect that manufacturers will pay slightly more attention to the energy consumption of their appliances. Here also the expected lower effectiveness of the label on heating systems compared to other labels for appliances can be seen.

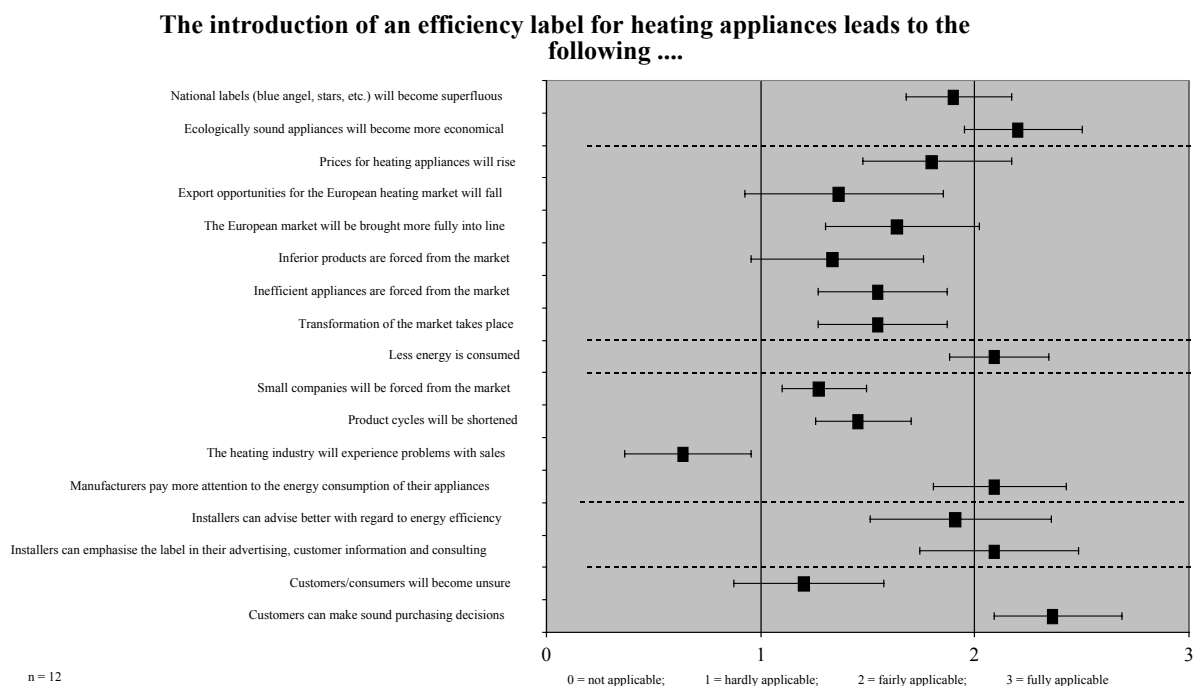
Further information gives detailed views on all answers regarding a possible energy efficiency label for heating systems (boilers). Five hypotheses are generally agreed with: The highest acceptance has the hypotheses that customers can make sound purchasing decisions, followed by the expectation that ecologically sound appliances will become more economical. Respondents also slightly agree that manufacturers would pay more attention to the energy consumption of their appliances and that installers can emphasise the label in their advertising, customer information and consulting and, as a general result, that less energy will be consumed.

On the consumer side the expectations of respondents are consistent. It is believed that customers can make sounder purchasing decisions but will hardly be made unsure in their decision by a label.

Despite this fact, the installers are especially important in the decision-making process for heating systems. For this target group the expectations are a little less optimistic. However it is slightly believed that they can emphasise the label in their advertising,

customer information and consulting, but a little less believed that they can give better advice with regard to energy efficiency.

Figure 10: Effects of an efficiency label for heating systems



For themselves the manufacturers believe that they will pay more attention to the energy consumption of their appliances. Problems are on the other hand not perceived as very high. It is hardly believed that industry will experience problems with sales. Respondents also have no big fears that product cycles will be shortened or small companies will be forced from the market.

These expectations are in line with the expectations concerning the influences on the market. Here all answers are quite indecisive, which is partly because the general effects of a label are not regarded as very high. A slight agreement can be seen on the hypothesis that the prices for heating appliances could rise. An opinion that is at least partly contradictory to the much more agreed hypothesis that ecologically sound appliances will become more economical. A second possible result of a label could be that the European market would be brought more fully into line. This is a current trend that could be partly supported by a label especially if national labels would be removed because they have become superfluous – a fact that is fairly agreed upon by respondents. To the respondents it seems a little less probable that a transformation of

the market will take place and that inefficient appliances are forced from the market. The hypothesis that inferior products are forced from the market by a label is little more than hardly agreed to. Industry also hardly believes that the export opportunities for the European heating market will fall by the introduction of a label.

4.2 Opinions on possible design of a label

The third part of the questionnaire (questions 10 to 13) offered respondents the opportunity of stating some opinions on a possible design of an energy efficiency label for heating systems.

The first question was ‘What parameters should be considered and to what degree when introducing a label for heating appliances?’ As possible parameters CO₂ (carbon dioxide) emissions, emissions of pollutants (CO, NO_x...), consumption of primary energy, consumption of final energy and consumption of auxiliary energy were given.

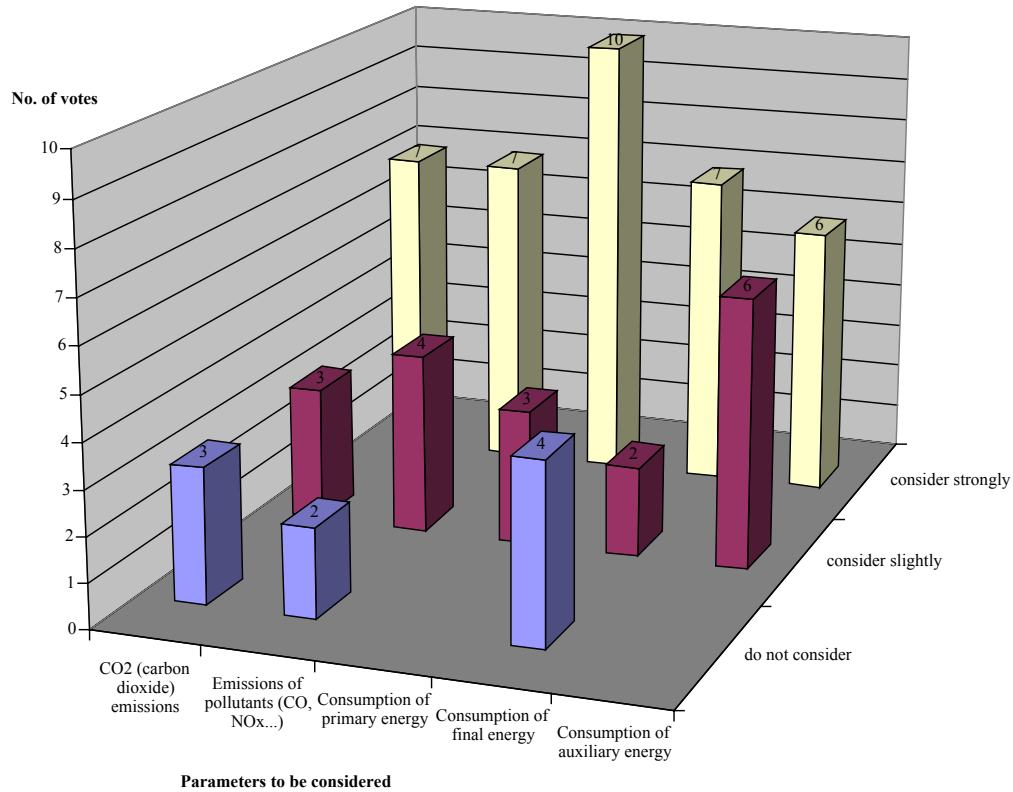
Although the answers to this question were very diverse and often clearly reflecting the interests of the particular groups among producers of gas-fired heating systems, oil-fired heating systems and electric heating systems, some results can be seen in the graph shown below.

The number one parameter for the respondents is the primary energy consumption, which the majority wants to be considered strongly and which no one rejects from consideration. Also not rejected is the parameter on consumption of auxiliary energy. But respondents are split whether to consider this parameter strongly or just slightly. On CO₂ emissions and emissions of other gases as well as final energy consumption, about half of the respondents are positive. But as always, especially for final energy, there is a strong fraction against considering this parameter.

Summing up, one can say that the majority of industry respondents want primary energy consumption to be the central parameter for the label. Emissions and auxiliary energy consumption are also generally accepted as important or slightly important parameters. Only on final energy the opinions are split.

Figure 11: Parameters to be represented by a label for heating appliances

What parameters should be considered and to what degree when introducing a label for heating appliances?



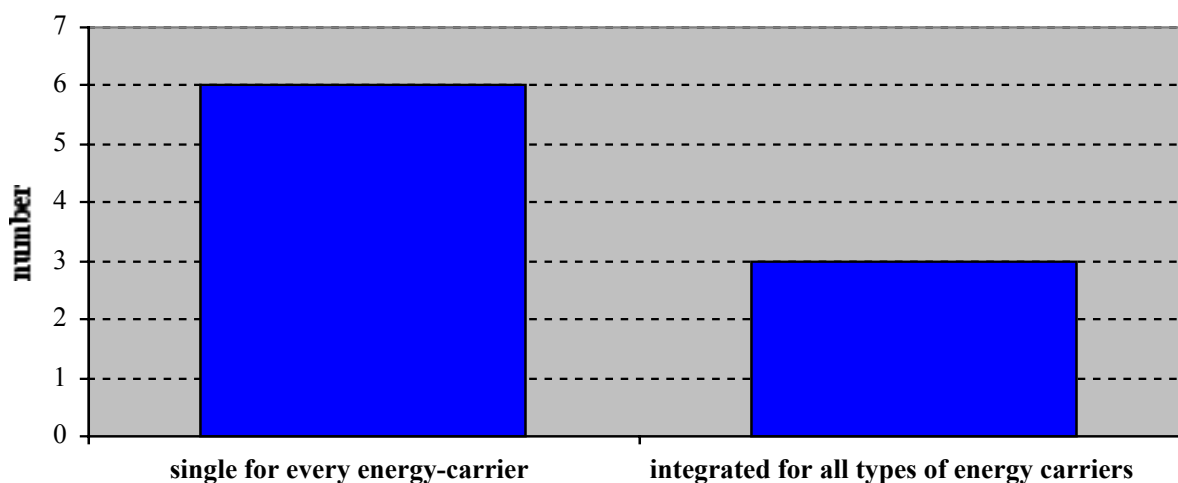
The reason for this can be seen in the fact that a label has to concentrate either on the primary energy or on the final energy. And especially on this point are the interests and therefore the positions of the industry group producing electric heating systems contradictory to the other producers. The reason for this is the fact that electric systems have quite high efficiency based on the final energy level. But when regarding the losses in the electrical system, especially in the power plants, their efficiency is quite low. All other systems have, however, very small losses between final and primary energy and therefore their producers have no problem in accepting this parameter that includes also the losses in production and distribution of the fuel until it reaches the final customer. In this case it is also interesting that the producers of electric systems do not oppose the use of primary energy as parameter but just opt for considering it only slightly. The reason for this could lie in the fact that despite their own interests they cannot deny that the parameter is more objective. Furthermore, most respondents are

German and in Germany primary energy was selected as the central parameter just recently.

This result also fits into the official statement that the German Heating Industry Association (BDH) made to our questionnaire⁵. Although being very critical regarding the labelling of boilers, they are very clear that primary energy consumption must be the main parameter for an integrated label for all energy carriers. Final energy as a parameter is clearly rejected by them. They do favour the use of auxiliary energy as a parameter but pledge to wait until the common certification system for this is available (a German norm is currently being prepared).

Figure 12: Separate versus integrated Label

Should the label be single for every energy-carrier or should it include all types of energy carriers by means of their efficiency, primary energy consumption or CO₂-emission



n = 13

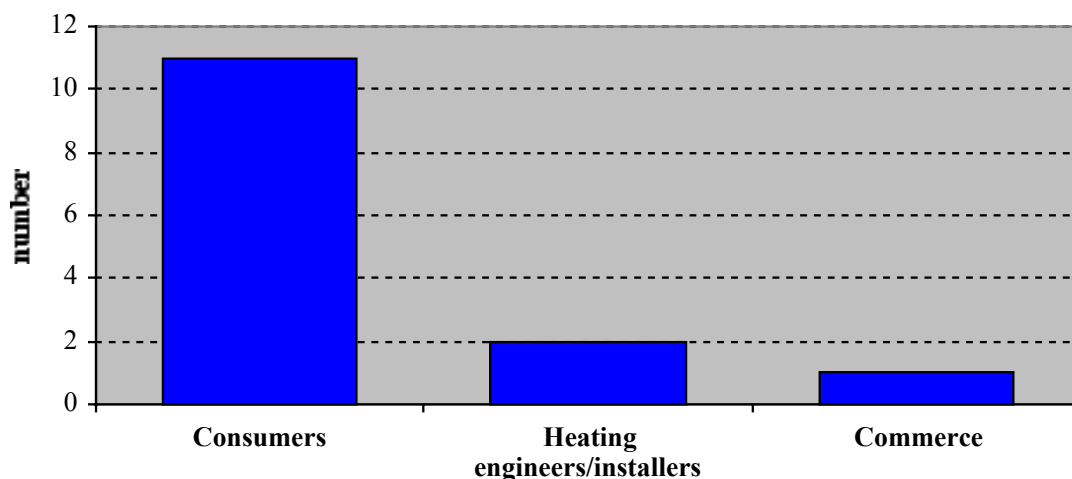
Closely linked to this question is the question whether there should be a separate label for every energy carrier or whether one label should include all types of energy carriers by means of their efficiency, primary energy consumption or CO₂ emissions. On this question the responding companies are split. Half of them are – like their association –

⁵ We did not send questionnaires to manufacturers' associations. The BDH got the questionnaire from one of their members and reacted with a letter to us stating their position on the issue. We also received a reaction but no statement from the Italian manufacturers' association assotermica.

in favour of an integrated label for all energy carriers. The other half, including the companies producing electric systems, are more in favour of separate labels. Many respondents added arguments. Apart from personal advantages or disadvantages as arguments for separate labels, most respondents who favour this solution state that gas gains an advantage over oil because the efficiency of gas-fired appliances is higher than that of oil-fired ones. On the other hand, this is exactly one of the advantages of an integrated label that substitution potentials from oil to gas could be included in the effects of the label.

Figure 13: Target group of an efficiency label for heating systems

The label should be aimed primarily at which target group?

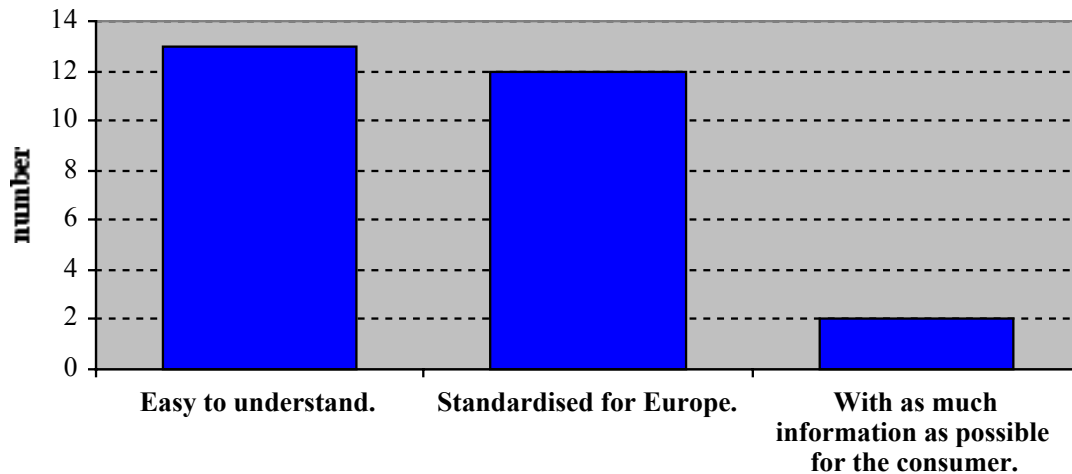


n=13

Regarding the target group of a future energy efficiency label for heating systems the respondents clearly opt for the consumers. Installers and commerce are not seen as relevant target groups for the label. This answer is consistent with the attitude towards possible effects of a label shown above. There the respondents see the main effect of the label in the fact that customers can make sounder purchasing decisions. Respondents do not seem to believe that a label could have positive effects on the important group of the installers although they think that the installers can emphasise the label in their advertising, customer information and consulting (see above).

Figure 14: Features of a label

In your opinion what features must a label have, or how should it be designed to be of use to both the consumer as well as the heating industry?

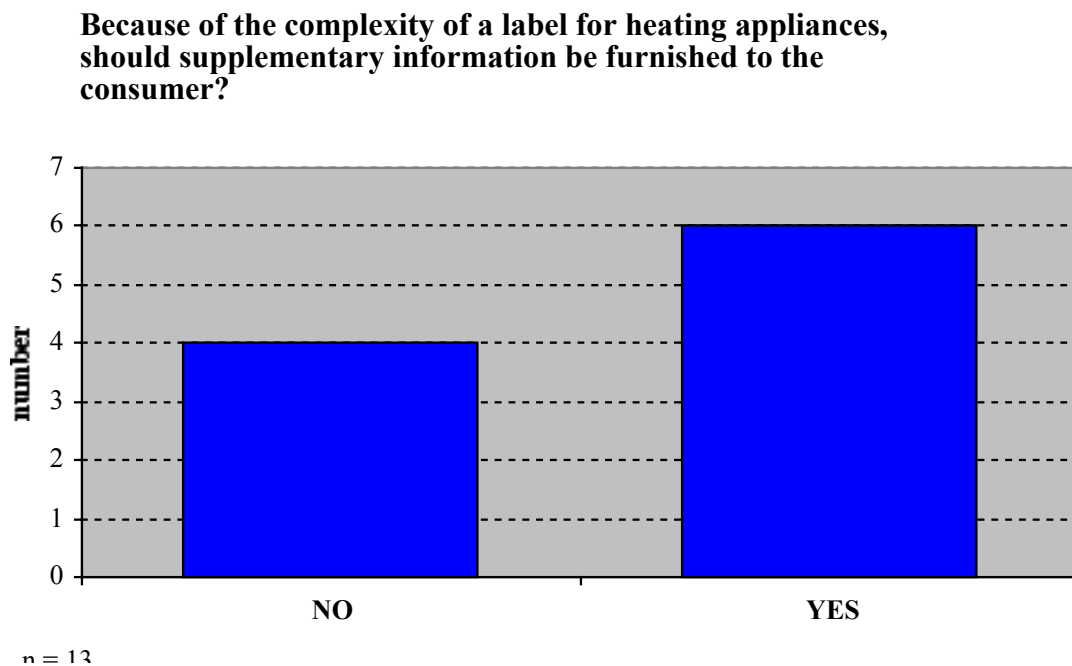


4-12

About the general design of the label, industry is also of one opinion. It should first of all be easy to understand and almost equally important standardised for Europe. Respondents clearly disagree with the proposal to integrate as much information as possible into the label. Some express the concern that consumers could become confused by a too complex label design.

Against this background the respondents are quite split whether – because of the complexity of a label for heating appliances – supplementary information should be furnished to the consumer. A small majority is in favour of supplementary information, others object to this proposal. Possible reasons for the objection is the fear of confusing consumers but also the fear of having even more bother and work with providing and displaying this information.

Figure 15: Complexity of a label



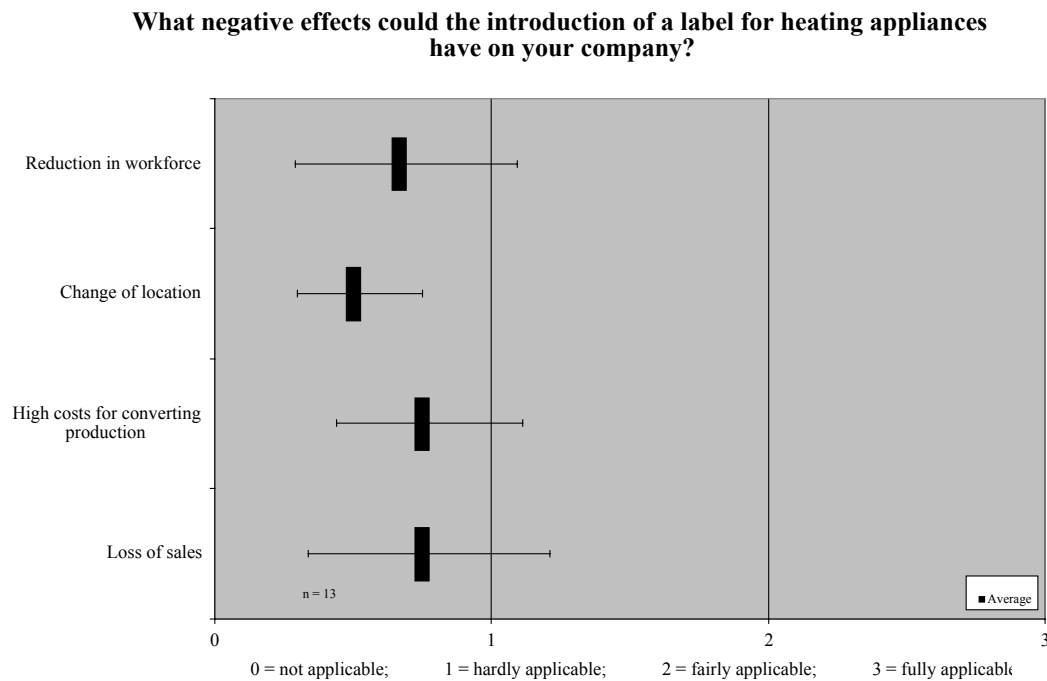
4.3 Perceived effects of the labels for the companies

The fourth part of the questionnaire (questions 14 to 18) asks for the potential effects of a future energy efficiency label for heating systems on the companies.

The first question in this part asks what negative effects the introduction of a label for heating appliances could have on the company of the respondent. In the questionnaire four possible effects were stated: loss of sales, high costs for converting production, change of location and reduction in workforce.

The answers that the industry gave to the question are in line with the perception of the label having small market effects. In general companies did not agree to the negative effects stated. They anticipate neither loss of sales, nor high costs for converting production. Consequently, changes of location and reductions in workforce are not regarded as possible consequences of a label. However, companies producing electric heating systems did have a differing view. They do in fact fear losses in sales and to a certain degree also high costs of converting production. They consequently also expect problems with reduction in workforce but no consequences regarding the location of companies.

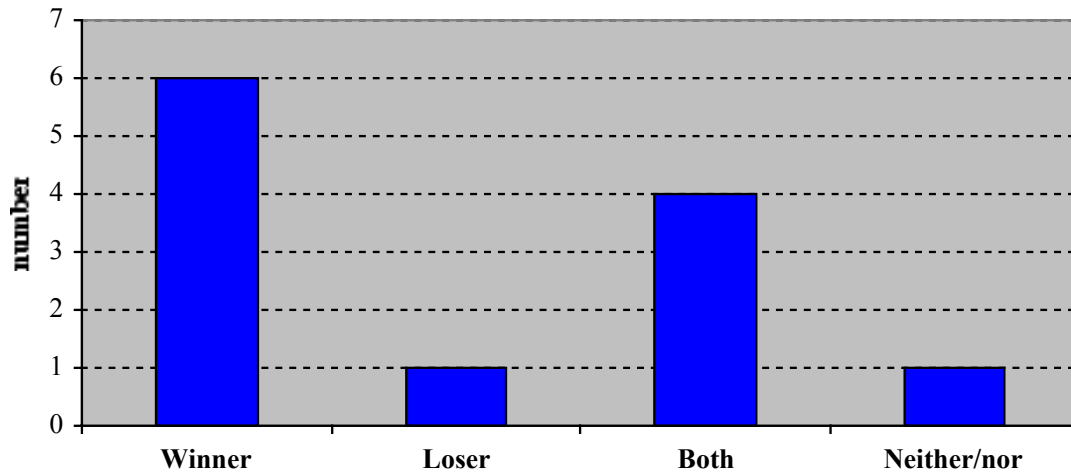
Figure 16: Negative effects of a label on manufacturers



The next question ‘In comparison with other companies, would your company be more likely classed with the winners or with the losers upon introduction of a label?’ asks for the relative position of the company regarding the effects of a label. In this case about half of the companies regard themselves as winners of the labelling. Just one sees itself as a losing company. The other half sees themselves as both, for they see segments of their production that will profit from a label as well as other segments that will face disadvantages. One company regards the effects so marginal that they expect neither positive nor negative effects for their production.

Figure 17: Winners and losers of a labelling scheme

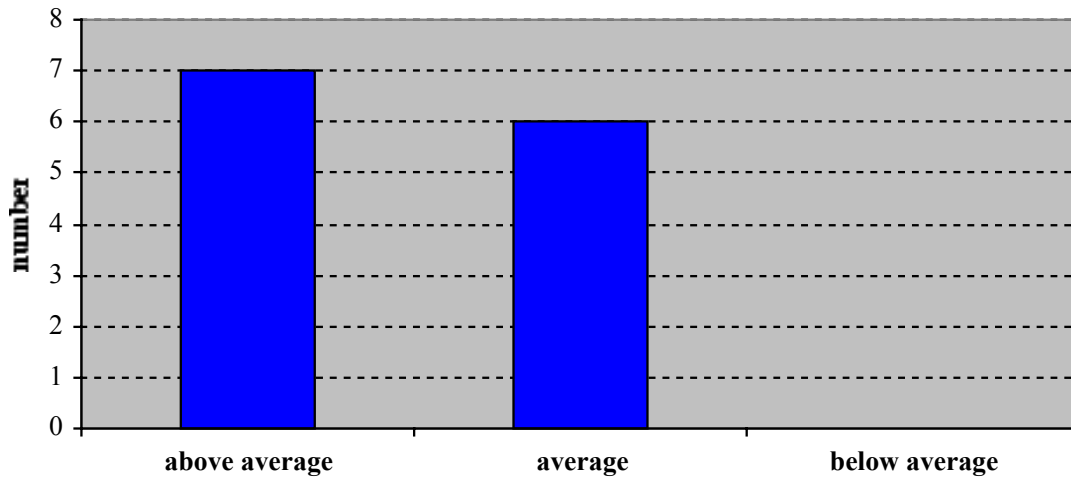
In comparison with other companies, would your company be more likely classed with the winners or with the losers upon introduction of a label?



Their ability to adapt to the changed market conditions of a label compared to their competitors is estimated above average by the majority of the responding companies. A fairly smaller group sees themselves at an average position when adapting to changing market conditions. No company sees its ability to adapt to changed market conditions as below average.

Figure 18: Ability of manufacturers to adapt to changed market conditions

How do you assess your company's ability to adapt to the changed market conditions of a label compared to your competitors?

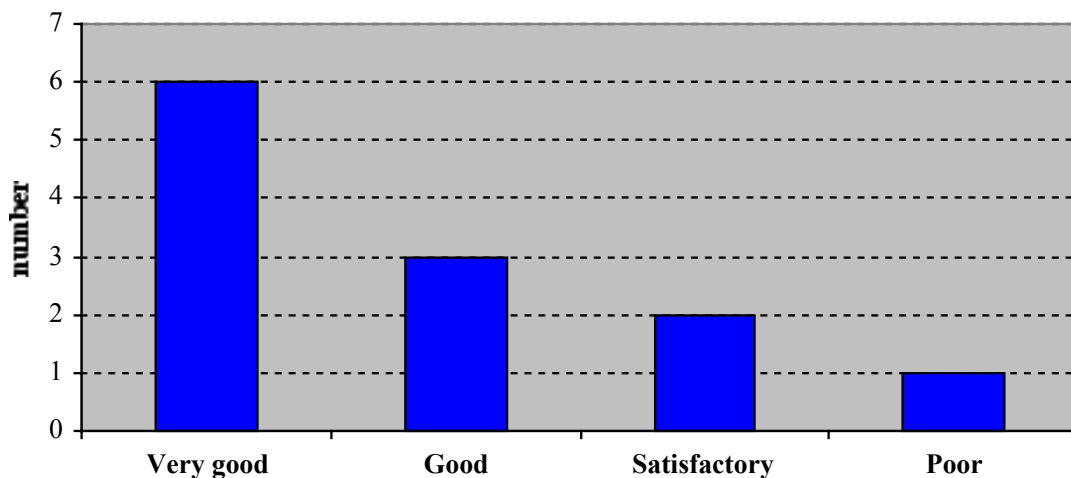


n = 13

As the next graph shows the majority of companies expect that they can use a label effectively in advertising. About half of the responding companies see very good possibilities and a quarter good possibilities for using the label. Only two responders regard their possibility as satisfactory, one as poor.

Figure 19: Usefulness of a label for advertising

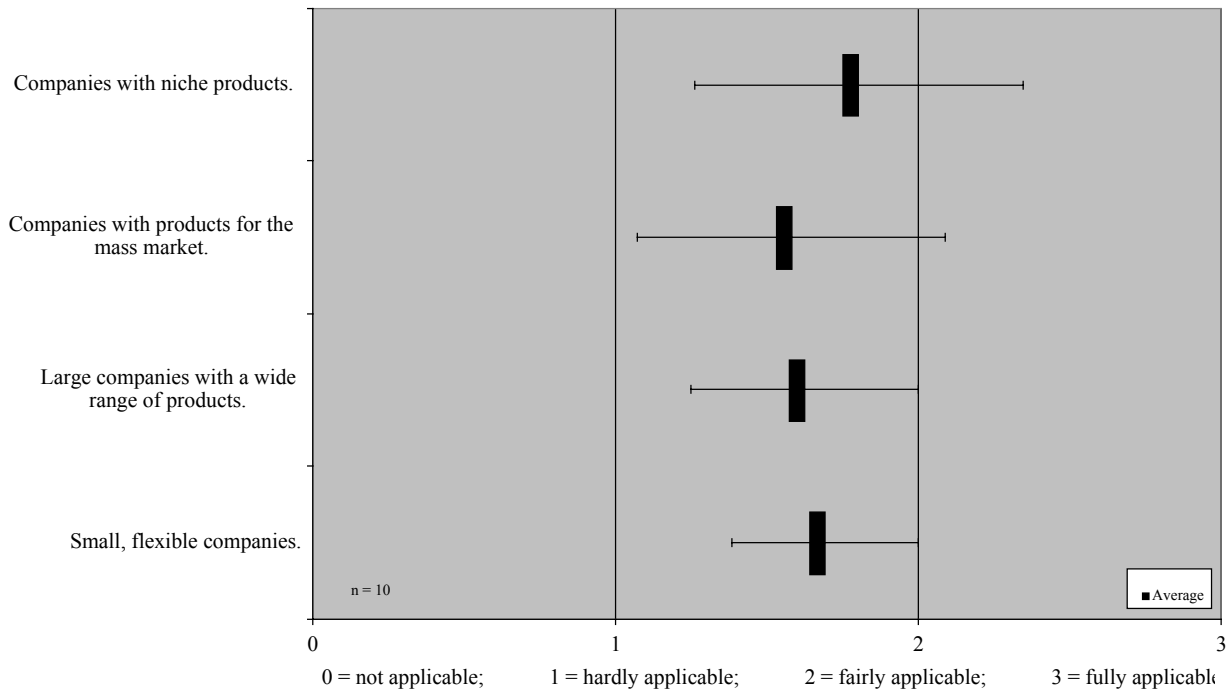
How do you assess your company's possibilities to effectively use a label in your advertising?



The last questions of this part asks for an opinion whether small flexible companies, large companies with a wide range of products, companies with products for the mass market or companies with niche products will profit most from the introduction of an energy efficiency label for heating systems. Here again the answering persons have quite different views which result in an average that is relatively clearly in the middle of the possible range for all mentioned types of companies. Within this small range of average values, companies with niche products and small flexible companies are expected to profit a little more from a label. This opinion is probably related to two facts. First, some niche products currently exist, such as solar heating systems, biomass-fired systems, gas heat pumps, etc., that are clearly designed for people caring about energy consumption and environmental issues. These customers are usually well informed and often ask the installers for these particular products. For these products a label would be a further step to improving their promotion. (This would also be one of the most important effects of a labelling scheme.) The other fact is that especially the energy-efficient condensing gas-boilers are a product that many small and medium-sized companies are specialised in. They could also take advantage of a label.

Figure 20: Company types profiting most from the introduction of a label

Which companies would profit most of all from the introduction of a label?



A little less positive is the expectation for (large) companies who produce for the mass market. These companies that are primarily oriented to the mass market with a relatively low efficiency standard could face relatively higher efforts to adapt and are therefore less probably the companies that will profit most from a label.

4.4 Perceived advantages and disadvantages of a label

The last two questions of the questionnaire asked for a free description of the

- worst fears with the implementation of an efficiency label for heating appliances and
- the greatest advantage with the implementation of an efficiency label for heating appliances.

Almost all respondents took the opportunity to state their opinions on these two issues.

The worst fears expressed by the responding companies are:

- That a new label will produce new costs for testing, approval, placement of labels and advertising.
- That this label will be difficult to understand for consumers and will just be an additional label to national labels.
- That testing and approval will not be objective. Here companies stated especially the fear of cheap and bad testing procedures in some countries of the EU.
- Another fear expressed was that the big companies will use the label aggressively for advertising and that small companies therefore have to fear disadvantages.

The greatest advantages are seen in:

- Energy savings and reduction in emissions.
- A Europe-wide harmonised performance scale to compare products.
- Better information for customers.
- Better prospects for energy-efficient and innovative products.

5 Industry's attitudes to labelling and the potential effects on the companies

The following analyses concentrate on those groups of companies which are primarily producing low efficiency products, and which therefore are most likely to face negative effects.

First we derive some hypotheses on which groups of companies might be affected by a possible label. The real effects will of course be closely connected to the total effectiveness of the label and its concrete design. The following is an idealised list of company types possibly affected:

- Companies producing only or mainly low-standard boilers that are likely to be forced from the market by labelling and subsequent legal measures.
- Companies will be affected which produce heating technologies that have lower rankings in an integrated labelling scheme compared to competing energy carriers. This would probably apply to electricity as an energy source for heating and to a far lower extent to oil. Other energy carriers like biomass and solar systems and even electric heat pumps are more likely to profit from such effects. Partly in contrary to this we found fears that separate labels for all energy carriers could mean a disadvantage for gas and oil fired systems in southern European markets. And therefore have possibly unwanted substitution effects in favour of electric systems.
- Small and medium-sized producers which have administrative problems applying for a label and which do not have the capacity to follow the market trends promoted by the label.
- By introducing energy efficiency labels and other measures, concentration trends on the market for heating systems are promoted.

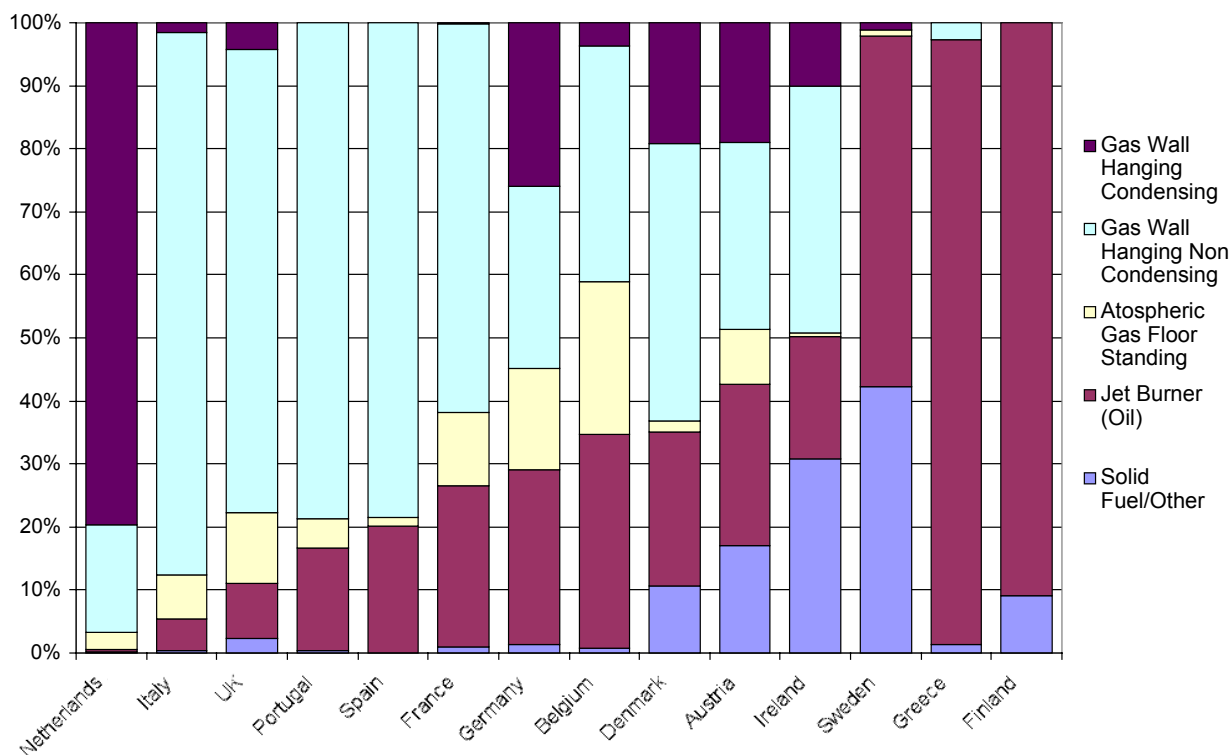
To begin with the result: In our survey and interviews as well as in the existing market analysis we found little evidence that companies belonging to the problem groups mentioned above are very widespread or very important in industry.

5.1 First hypothesis: Companies focusing on low efficiency standards

A country comparison of heating systems (scheme 3) shows that there are many differences between the European countries. The fundamental reason for this can be found in the existence and utilisation of own resources as well as in the existing infrastructure. The Netherlands, for example, have large natural gas resources, consequently the rate of gas heating is especially high (nearly 100 percent). In contrast, in Sweden and Finland a natural gas supply is almost missing. Here the markets are very complex with high shares of electricity, biomass, wood and oil. The Greek market is dominated by oil heating. Here also a natural gas supply practically does not exist. In all other EU-15 countries, gas-fired heating systems dominate the market with shares between 50 and 90 percent.

Figure 21: Markets for heating systems in the EU (without electric systems)

EMBED



Source: Wuppertal Institute 2001, Data: ConsultGB 2001

The market share of condensing boilers as the currently most energy-efficient gas-fired heating system varies also substantially between the specific national markets. In the

Netherlands condensing boilers dominate the market with about 80 percent of all devices sold. This is followed by Germany, Austria and Denmark where condensing boilers have close to a 50 percent market share of gas-fired heating systems. This is also the fact for Sweden, where gas is unimportant in absolute numbers. In Ireland condensing boilers currently make up for about 20 percent of gas-fired devices sold. The UK just has a share of about 5 percent but with clear signs of a take-off in the future. In Belgium, Italy and France condensing boilers still have smaller market shares but in all these countries further increases are possible if market conditions and administrative measures support the still small but growing trends. Portugal and Spain are the only gas-dominated markets in which condensing boilers are uncommon.

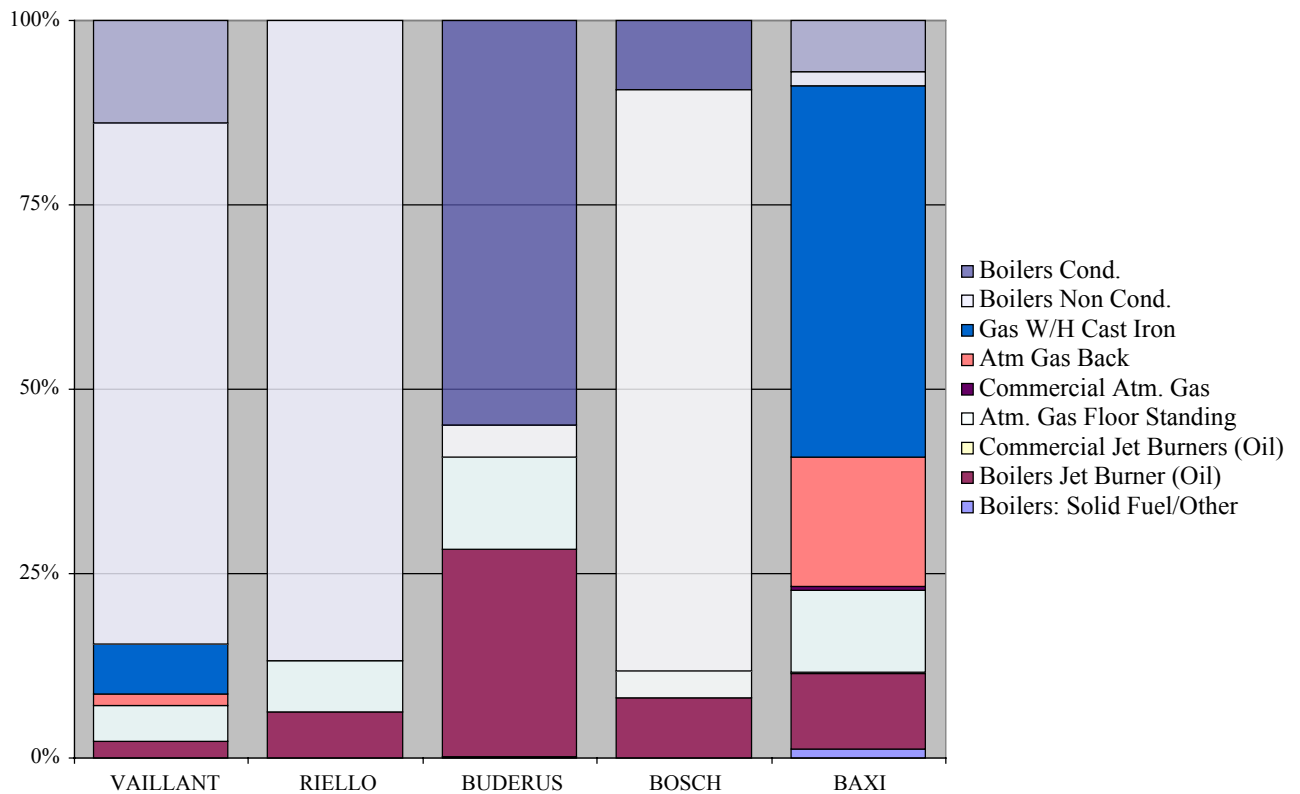
Companies producing devices with low efficiency standards are mainly found in those countries where these low-standard products dominate the market. For the gas-fired heating systems, which form the vast majority of the European market, this is mainly the case for the markets in the UK and Ireland and the markets in the southern countries such as Spain, Portugal and maybe parts of Italy. In Greece gas-fired heating systems are unimportant.

In the **UK and Ireland** the market is currently dominated by technologies which generally have low efficiency standards, such as gas back-boilers and cast-iron boilers which make about third of the gas fired heating systems market. A British survey (Sharpe, 2001) brought out that the British producers of these systems are very much willing to continue to produce these systems for the opinion dominates that they bring the highest revenues. But on the other hand the survey also came out with the result that all companies are able to produce more efficient products. All of them are making condensing boilers, but in small quantities. But “they have plans to begin development of new designs when they see the time as right“ (Sharpe, 2001). The survey concludes: „The (UK) industry is therefore well placed to respond to any growth in demand for condensing boilers.”

In the **Spanish and Portuguese** market wall-hanging non-condensing systems account for almost 100 percent of the gas-fired heating systems and for more than three quarters of the total heating systems market. The Vaillant group with Saunier-Duval and the Bosch-Junkers group, who together supply about 45 percent of the market, dominate

this segment. The Spanish companies Roca and MCC who are also leading in the other segments of floor-standing oil and gas burners hold another quarter of the market. Vaillant and Bosch both produce condensing boilers and will therefore be able to supply also devices of higher efficiency. For Roca and MCC we did not obtain specific information, but it seems to be evident that these bigger companies have the capability and probably also the resources to follow market trends to more efficient products. Unclear is for the, according to industry's estimates, more than a hundred smaller producers in Spain and Italy. Some of these companies, with often negligible market shares and of small or very small size, might face problems to move their product range into a more efficient segment. On the other hand it is known from Germany and the UK that especially smaller companies brought condensing boilers into the market. During our own survey we interviewed one smaller company with about 40 employees which had a complete product range from oil fired jet burners, via non-condensing to condensing wall-hanging gas boilers also with integrated water heating and separate water heating. These experiences led us to the conclusion that altering efficiency standards need not be a problem for smaller companies. The technologies needed are not of an exclusive kind. However we can not state that there will be no problem, especially among smaller southern European producers. But it seems to be improbable and if existing only relevant for some companies with relatively small numbers of production units and employees. The hypothesis is stated that the effects of a possible label will not be significantly higher than the effects of the ongoing concentration process within the market.

Figure 22: Heating systems sold by the EU-Top 5 manufacturers, by type



Source: Wuppertal Institute 2001, Data: ConsultGB 2001

EMBEDFinally, the graph above shows the product ranges of the top five European producers which together sell more than 40 percent of all heating systems in the EU and more than 50 percent of all gas-fired heating systems. The graph shows that the top five have very different product ranges. Buderus is the only producer whose main emphasis is (with its Dutch subsidy Nefit) on the technology of the condensing boiler. Bosch, Riello and Vaillant mainly focus on conventional wall-hanging gas heating systems. BAXI's sales are dominated, with almost 75 percent, by generally inefficient wall-hanging cast-iron heaters and back-burners. All five have condensing boilers in their assortment. Only for Riello condensing boilers have smaller numbers. From this point of view, among the top five heating producers higher standards do not create a bigger obstacle to economic development. Only the British market leader Baxi faces larger changes in product range.

5.2 Second hypothesis: Substitution effects between fuels

Heating systems use different energy carriers or fuels, which have different environmental impacts. For this and also for energy policy reasons the switch between different fuels will in future be subject to political measures including policy for promoting energy efficiency and the environment.

If the future labelling scheme on heating systems is integrated for all energy carriers, it will effectively also address this substitution of fuels.

In spite of the various practical problems, almost all companies we talked to were in favour of integrating all types of fuels into one single labelling scheme, which is also the official opinion of the Germany Heating Industry (BDH). However, the results of our questionnaire were more diverse on this point. This wide agreement to an integrated label for all energy carriers has the following background. By an integrated label the customer will be able to compare systems fuelled by different energy carriers and therefore be able also to include fuel substitution into his decision pro or contra a certain system.

Effects on electric heating systems

If we assume that the integration of different energy carriers would be realised by a primary energy approach, this would result probably in negative effects for, for example, electric direct or storage heating systems.

This problem was clearly seen by the representatives of the electric heating systems' producers. They fear certain negative effects on their sales of conventional electric systems if they received labels reflecting the relatively low primary energy efficiency. However, they also were in favour of a label integrating all types of fuels.

As with the other heating systems, electric systems are also connected to certain national market conditions. Most producers are producing mainly for their home market.

The biggest market for electrical systems is France. Here electric direct heaters dominate the market. Storage heaters are a new system in the French market currently gaining some market share. In Germany and the UK night-storage heaters are the typical system. In Germany they have fans for additional convective heat distribution in the UK

usually they don't. In Sweden, Austria and Germany electric heat pumps are also relevant heating systems.

While non-reversible heat pumps⁶ are very efficient and therefore able to even out the bad primary energy balance of the production of electricity, all other forms of electric heating systems will probably get bad rankings in an integrated labelling scheme.

The potential effects on producers have to be regarded separately for the different countries.

In France there are currently two main market trends relevant for this issue. On the one hand electric heating systems are gaining in market share from collective heating systems for blocks. Collective systems have been gradually dismantled in recent years and substituted by individual systems such as electricity and partly gas. On the other hand fossil-fired heating systems are gaining in market share in the new building sector and from existing electric systems.

A label telling consumers that electric systems are not as energy efficient as competing fossil systems could influence both trends. In the first case it would possibly alter the share of gas-fired systems from this conversion market. Because in these cases a completely new system has to be installed in a house, the consumers are relatively free in their decisions so that a label could have an influence. In the second case, the existing system is electric and the switch to a different energy carrier would mean the decision for a completely new and different system. Although a label could support this existing trend, a really fast substitution trend is not probable because this requires a complete system change.

Regarding these facts and also the fact that the main market for electric heating systems is in the replacement sector, we can conclude that negative effects of an integrated label on the sales of electric heating systems are possible but their extent will – based on theoretical estimates – be restricted. The bulk of the market for electric heating systems

⁶ However in the case of reversible heat pumps any heating efficient gains which are achieved in the winter months could be lost if they are used as air conditioners in the summer.

will in the short and medium term probably not be heavily influenced by an integrated label because alternatives are not available, and if available connected to strong barriers.

In Germany electric night storage systems are used in about 8 percent of the households. Most of the systems were installed in the seventies and eighties. In the market for newly built houses they are irrelevant. The total number is slowly decreasing. Consequently the market is almost totally in the replacement sector. In this segment a label could have a certain influence but – as mentioned above – changing the energy carrier would mean a total change of the heating system. The effects of an integrated label cannot be estimated correctly but it seems to be evident that at most the current market trend will be slightly supported. Additionally, the building regulation is based on a primary energy approach, and for new electric storage heating systems quite high eco-taxes apply.

For the UK the effect of an integrated label could probably be estimated as being analogous to France and Germany. Electric heating systems are used in almost 10 percent of all households.

A slightly different situation is probably found in Spain and maybe also in the south of Italy, Portugal and France. In these regions temperatures are quite moderate so heating systems are not used very much. In this situation it is relatively more economic to buy a cheap heating system even if the energy costs are high. Some manufacturers of fossil-fired heating systems expressed their concern that a labelling scheme and other measures only targeted at fossil systems would make them more expensive and therefore less competitive compared to electricity. The result would be losses in market share for newly built houses, first time installations and replacements. In this case an integrated label would not have substitution effects from fuel fired to electric heating systems which separate labels could possibly have.

Generally this brief look at the markets for electric heating systems shows that the sales of conventional electric systems could be affected by the introduction of an integrated

labelling scheme based on primary energy efficiency. This could be a source of trouble for those producers that are typically not active in the segment of fossil-fired boilers. But it also seems clear that regarding their main segment, the replacement market, substitution always needs a decision for a completely new system. This obstacle guarantees that all possible effects of a label will not be very extensive, at least in the short and medium terms. Producers of electric heat pumps, however, could also be among the winners of a labelling scheme, as our interviews showed.

Effects on oil-fired heating systems

The switch between oil and gas as energy carriers is often a lot easier than the switch from electricity.

For the switch to natural gas a connection to the gas grid and a new boiler (or just a new burner) is necessary. For the switch from gas to oil a modification of the boiler or a new one is necessary. The main problem is usually the oil tank that is needed. The heat distribution system is usually not affected by the change of energy carriers.

Since the wide use of natural gas as an energy carrier for final use which began with the building of gas grids in many European countries, gas has increased its market share constantly. Although the oil industry and other groups try to retain their market shares with improved technologies and new services, the trend has not been stopped and is predicted to continue in the next few years.

In this context an integrated efficiency label reflecting the generally higher efficiency of gas appliances (if measured with net calorific value) would probably just strengthen this long and persistent trend. The significance of this effect however cannot be determined easily. Especially for labels and other measures promoting energy efficiency, the effect is mixed with a second effect. As the age of the stock of oil-fired heating systems is quite high, all measures will probably induce a certain modernisation with a subsequent probable increase in the market.

This makes it difficult to assess the potential effects of substitution on the producers. The first result of market analysis in this case is that most producers offer both gas and oil-fired appliances. If the market concentrations are regarded, it is evident that the market for gas-fired appliances is more dominated by the big producers than the market

for oil-fired ones. An effect could thus be a strengthening of the ongoing concentration processes in the industry. For most individual producers, however, an adaptation strategy would be possible for usually both types of devices are produced.

Effects on biomass-fired and solar heating systems

Biomass-fired and solar heating systems are currently niche products. But in some countries such as Austria for wood, and Germany for wood and solar, their markets are rapidly emerging. In most cases these systems are more efficient or emit less than fossil-fired technologies. As technologies marking a step in the politically approved direction of renewable energy systems, some Member States and a lot of communities support these technologies.

As discussed above these technologies could clearly profit from a label that shows their high efficiency in terms of primary energy consumption and/or emissions.

The possible effect would be a better marketing basis for these technologies. A credible and widespread performance scale could be used for extending their markets and for giving customers proof of their environmental benefits, which is a central marketing argument for these technologies.

5.3 Third hypothesis: Potential effects on SMEs

The some one hundred existing small and medium-sized producers of heating systems in the EU could be another group of companies possibly affected by a labelling scheme. The hypothesis is that they could have administrative problems applying for a label and could also not have the capacity to follow the market trends promoted by the label.

To verify this hypothesis is of course extremely difficult for SMEs represent a big and quite diverse group of producers. Within this group it is probable that different companies have quite different structures and could therefore experience problems or opportunities with a labelling scheme.

Here we will use the results of our own survey that also contained interviews and responses of SMEs.

In our questionnaire we asked for an opinion whether small flexible companies, large companies with a wide range of products, companies with products for the mass market or companies with niche products will profit most from the introduction of an energy efficiency label for heating systems. On this issue the persons answering had quite different views (see Figure 20). As a result companies with niche products and small flexible companies are expected to profit a little more from a label than others. This opinion is probably related to two facts. (see chapter 4.3)

First, some niche products currently exist, such as solar heating systems; biomass-fired systems, gas heat pumps, etc. that are clearly designed for people caring about energy consumption and environmental issues. These customers are usually well informed and often ask the installers for these particular products. For these products a label would be a further step to improving their promotion. (This would also be one of the most important effects of a labelling scheme.)

The other fact is that especially energy-efficient condensing gas-boilers are a product that many small and medium-sized companies are specialised in. They could also take advantage of a label. Small companies could even achieve relatively higher benefits, compared to larger companies, from public funded market transformation activities following the introduction of the label; e. g they could obtain a considerable amount of free publicity from these measures. In the case of small companies this could be comparable to any direct publicity that themselves undertake. As an example producers taking part in the energy+ market transformation programme for very efficient refrigerators obtained this advantage⁷.

Some of our interview partners and respondents to the questionnaire name bureaucracy and the costs of a possible label as a main problem for smaller companies. This is a serious fear of industry that should be considered when designing the label. One possibility is to reduce the number of national labels – a proposal that was made by many companies – to give the companies some compensation.

⁷ Information from scientific participants of the programme from EnergiE and Wuppertal Institute.

However, the problem of the multitude of national labels and the number of approval procedures seems to us not to be the central problem for small companies. They usually operate in restricted national or even regional markets. The main reason for this restriction is the necessity to build up adequate distribution and maintenance structures. As small companies therefore are almost always restricted to smaller markets, they do not have the problem of adapting their products to lots of different national regulations and labels, etc. They also do not have the marketing possibilities to offensively use labels as marketing instruments – and therefore do not feel the need to apply for every possible label.

The costs and management problems of a multitude of regulations and labels therefore seem to be more a problem of the medium-sized companies. They are active on several national markets and in this case have to compete with the market leaders. The market leaders in principle face the same problems but with higher numbers and sales will probably not be affected so much.

Another problem voiced in our survey was the general problem of small companies gaining customer acceptance without having the possibility of wide marketing. It is feared that this problem could increase with the introduction of a label. The big players would use the label for aggressive marketing campaigns to further establish the position of their brands. The small companies fear that they will not be able to convince consumers that their products are comparable to those of the well-known brands, although the label gives them an objective quality certificate. This fear stands therefore in contradiction to the theoretical result that a neutral label and related measures like information campaigns etc. give them some free publicity and better opportunity to prove that their products are of comparable quality. The reason for this contradiction is that – in their view – the main problem is not to convince installers and consumers of the quality of the products, but merely to become known as an alternative to the dominating brands.

5.4 Fourth hypothesis: Market concentration and possible effects of a label

The following table shows market concentration in the European heating system market by certain product types. With 4.4 million boilers sold, gas-fired systems dominate the

market. Of these almost 90 percent are wall hanging, which is now by far the most common heating technology in the EU.

The table shows the market share of the leading producers and the five biggest groups for the five most relevant boiler market segments. In total, about three quarters of all heating systems are supplied by the 47 leading producers; the top five supply 41 percent of the total market. The most concentrated market segment is that of the condensing boilers of which the five biggest companies sell 72 percent. Very flat concentration structures dominate on the other hand in the markets for solid-fuel boilers for which the leading producers hold only one third of the market.

These numbers show on a very rough level that market concentration increases with the rising efficiency level of the heating systems. However it is a fact for many technologies such as condensing boilers, solar systems, heat pumps, etc., that more efficient technologies are not necessarily of exclusive character.

Table 2: Market concentration of the different segments of the boiler market

	Market Volume (1 000)	leading producers	Top 5
Boilers: Gas W/H Cond.	660	76%	72%
Boilers: Atm. Gas Floor Standing ^{a)}	470	72%	56%
Boilers: Gas W/H Non Cond. ^{b)}	3 310	62%	46%
Boilers: Jet Burner	990	61%	35%
Boilers: Solid Fuel/Other	120	33%	20%
Total	5 550	66%	41%
^{a)} UK & IRL: including cast iron, combi, system and light-weight-vented,			
^{b)} UK & IRL: including commercial and back burners			

Source: Wuppertal Institute 2001 based on Consult GB Data

With these market patterns, it seems to be clear that policy measures targeting at higher shares of more efficient devices could support the still existing trends to higher market concentrations. On the other hand it would appear that actions promoting higher efficiency must not necessarily be harmful to smaller companies. On the contrary, solar systems, heat pumps, biomass, etc., are niche technologies that bring market opportunities for innovative smaller companies.

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