

Appliances – enforcement of MEPS and energy labelling requirements

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Abstract

MEPS and energy labelling of products can deliver a substantial part of the energy efficiency target, which the EU has set for 2020. Enforcement of regulations issued according to the Ecodesign and the Energy labelling Directives is the soft spot in realizing the potential savings. The two Directives consider laboratory tests as synonymous with market surveillance. This paper points out, that it is unrealistic to rely fully on laboratory tests, and it compares the outcome of markets surveillance within the Ecopliant project with national Danish experiences. The paper further outlines alternative ways of achieving an acceptable compliance rate, and outlines how improvement of energy efficiency knowledge among employees at retailers can enhance the effect of the energy label among private consumers.

Introduction

The energy saving and CO₂ abatements caused by legislation on MEPS, minimum energy performance standards (or just: standards) and energy labelling of products are substantial and very cost effective. During the recent collapse of the CO₂-Emission Trading System, the requirements laid down in the Ecodesign Directive 2009/125/EC and the Energy Labelling directive 2010/30/EC were the only Pan-European policy instruments able to deliver substantial results in respect to energy savings

of products. The contributions from implementing measures issued according to the Eco-design Directive (ED) and the Energy Labelling Directive (EL) are considerable, as outlined by René Kemna in a report submitted to Directorate General Energy of the European Commission. By 2020 the savings (caused by ecodesign, energy labelling, Energy Star and tyre labelling) amount to 9 % of the current EU energy consumption. The predicted savings for 2013 are 15 % of the EU energy consumption (Kemna, 2014).

A forecast conducted in 2013 (ENS, 2013) of the energy savings consequences of the two Directives in 2020 in Denmark showed that the existing implementing measures and those measures, which are in the pipeline, could deliver a reduction of 5,640 GWh per year as compared to a business as usual scenario. For comparison the 5,640 GWh corresponds to 5 % of the final energy consumption 2013 (transport excluded). 90 % of the forecasted energy savings are caused by the Ecodesign regulations and only 10 % can be ascribed to the energy labelling regulations.

Energy Savings and abatement of greenhouse gasses are not the only benefits of the implementing measures. End-users of the products – households as well at industry – will have their energy bill reduced and industry will become more competitive. Thus implementing measure under the Ecodesign and Energy Labelling Directives are not only promoting energy savings and climate policy ends but also contribute to the competitive capacity of industry.

The overall positive effects of standards and labelling of appliances in relation to other measures to cut greenhouse gas emissions were shown by McKinsey in 2007 (McKinsey 2007). Up-front, the implementation of the measures entail some but

few societal costs for the administration and enforcement of the regulations under the two Directives (Oxford Research, 2012). Each European Member State need to establish a market surveillance authority, entrusted with the powers to enforce the regulations in the market. The market has to be controlled and standards and labels for products need to be enforced, otherwise the legislation would be just a paper tiger. Based on a forecast of energy saving for Europe as a whole of 700 TWh in 2020 due to Ecodesign and Energy labelling of products, and a rather conservative estimate of an average rate of non-compliance of 10 % Paul Waide and associates in cooperation with Clasp (Waide, Paul 2011) calculated the lost savings to 70 TWh per year in 2020. This equals 9.5 billion Euros, or roughly €20 per capita. Non-enforcement leads to widespread non-compliance with a result of lost energy and lost monetary savings, critical consumers, less industry investment in energy efficiency, less public support to S&L programs, (Ellis, 2010).

Both the Ecodesign Directive and the Energy Labelling Directive contains provisions in an Article 3, which places the responsibility for enforcement on Member States. The wording of this article is a little different in the two Directives, but it is clear that Member States have to establish and run an active market surveillance.

How the enforcement is performed, is very much left to the Member States, including how severe the sanctions for not obeying the requirements of the regulations issued in according to the two Directives shall be.

How penalties should be set is spelled out in the Eco-design Directive (article 20). Here it says that *penalties provided for (by Member States legislation) shall be effective, proportionate and dissuasive, taking into account the extent of non-compliance and the number of units of non-complying placed on the Community market.* The labelling Directive has a similar article (article 15) on penalties.

When Member States have to choose the character of the enforcement they want to use, one have to study the implementing measures issued in accordance with the two Directives. All implementing measures of these two directives contain an annex titled "Verification procedure for market surveillance purposes". In these annexes, the focus is solely on (physical) testing of units. No other type of verification is foreseen, although nearly all implementing measures have generic requirements mostly on information and documentation. Energy Labelling regulations always contain demands on the content of product fiches and the Ecodesign regulations most often demand a number of product information to be displayed on a public website. The generic requirements also prescribe which specific data and information the manufacturer must make available to the national market surveillance authority. A manufacturer or importer of a product subject to either ED or EL regulation has to provide this information within 10 days upon the request of the authority.

Nevertheless, according to the rules in the regulations 'verification procedures' in implementing measures are considered as 'procedures of testing'. In this perspective, market surveillance is solely a matter of conducting tests of several units of a specific model of a product.

Verification through testing is an ideal solution, but no Member State has the resources to base their surveillance solely on physical testing of products, because:

- The number of products covered by Ecodesign and/or Energy Labelling measures have grown considerably in recent years. By January 2015, 19 product groups were covered by both an Ecodesign and an energy labelling implementing measure, 8 product groups were covered by only an Ecodesign regulation and there were 3 horizontal measures (covering several product groups) active.
- The newer product groups are more complex than older groups. Therefore, regulations are also more complex, and testing is more extensive and thus more costly.
- A limited number of MSA can require the manufacturer to provide products for tests for free, but most market surveillance authorities have to buy products, they want to inspect. New product groups being covered by the regulations are often more expensive per item to purchase than the 'classical' products.
- Even for products which have long experience of energy labelling regulation, as is the case for certain white goods, measurement standards are growing more complex requiring more measuring points and more sophisticated test reports by the laboratories each time the measuring standards is revised. E.g.: when the first regulation on washing machines was implemented, the measurement standard was described in a document of 8 pieces of A4 paper. Today the standard covers around 200 pages (EN 60456:1999 and EN 60456:2011) (Kjeldgaard 2013).
- Recent regulations covers industrial products, which are often marketed through business-to-business. Products like ventilation units, electrical motors and pumps are not found on the shop shelves. Often these products are only produced on demand and are not stock piled or to be found in retailers' product line.

ALTERNATIVE METHODS OF MARKET SURVEILLANCE

Thus, Member States need to find new ways of conducting market surveillance. One option is to cooperate across borders. The Ecopliant project is exploring how this can be practiced for products covered the Ecodesign Directive. The objective of the Ecopliant project is to help deliver the intended economic and environmental benefits of the Ecodesign Directive 2009/125/EC and provide a level playing field for business. This is achieved by strengthening market surveillance and so increasing compliance with the Directive and the relevant implementing measures.

One core outcome of the Ecopliant project will be a set of *best practice guidelines for coordinated and effective ecodesign market surveillance*. These guidelines will contain recommendations on how to monitor, verify and enforce ecodesign regulations. The guidelines will be based on the gathered information, experiences and practices gained during the project. The guidelines will be available from the project's web site by mid-April 2015.

Another option for MSA is to find alternative, cost-effective ways of enforcement in order to supplement or replace the more costly and more burdensome laboratory tests. This could be checks of the information requirements and inspections of the technical documentation.

This paper focuses on two alternative methods to the traditional enforcement by testing: a) Inspection of the documen-

Table 1. The relation between costs for lab tests and document inspection.

Products	Costs for inspection of technical documentation as a percentage of the costs for laboratory testing (per unit)	Remarks on test costs (per unit)
Consumer electronics (TV, standby, external power supply)	50–60 %	Relatively low test costs (€475–€1,000)
Household driers and vacuum cleaners	15–25 %	Medium test costs (€2,000–€2,500 – excl. noise)
Household refrigerators and freezers and small motors	20–30 %	Medium test costs (€1,300–€2,000)
Household washing machines and dishwasher	10–15 %	High test costs (€5,500–€7,500)
Air conditioners	< 10 %	High test costs (€9,000 – excl. noise)

The costs for inspection of technical documentation typically amounts to about €400/case – and up to €700/case for complex cases (one case equals one unit). The costs for laboratory testing vary considerably from €500/unit to more than €9,000/unit (excl. the administration cost in this respect).

tation, which the manufacturer has to draw up prior to placing a product on the European open market, and b) Guidance of manufacturers on how to understand and how to meet the codesign and energy labelling requirements for products.

ENFORCEMENT BY INSPECTING DOCUMENTS

Since 2010, Denmark has been developing and refining a surveillance programme, where technical documents related to a product are systematically inspected. Manufacturers are requested to forward their own measurement data and calculations, which document all data and information, which the manufacturers themselves provide on specific models. Manufacturers are not allowed to place a product on the EU market before the technical documentation is elaborated and compliance has been established. The manufacturer must forward the elaborated documents within 10 days upon request of the authority (EL, Article 5(c), ED Article 8(3)). The technical documentation must show the fulfilment of the efficiency requirements in the ED regulation, and if the product is also subject to EL regulation, the documentation must verify if the manufacturer's declaration of the energy class. In short: Every piece of information or data the manufacturer states for a product, must be substantiated in the manufacturer's technical documentation. Thus, the authority only asks for the documents, which anyway should be present with the manufacturer already.

Laboratory testing is not at all excluded, but usually, models for testing are primarily chosen on the basis of the results from

inspection of the documents. In this way, document inspection serve both as valid form of market surveillance in itself, and as a way of screening models in order to qualify the selection of models for testing. By applying both document inspections and lab testing, the resources of the MSA are stretched and only product models which are expected to be non-compliant need to be tested. Since laboratory testing is more costly than checking the documents, the MSA can cover more models, compared to enforcement based exclusively on testing. Table 1 shows that the cost of document inspection is considerably lower than the costs of lab testing. For washing machines and dishwashers, a single test in a laboratory, even excluding measurement of noise emission, costs 7 to 10 times as much as a document inspection of the same product. If a full compliance test including noise measurement was chosen, the contrast would be even more glaring. For air conditioning products, it is more than 10 times as expensive to carry out a lab test, than to do a document inspection.

Thus, since the resources are more or less unchanged despite more products are subject to ED and EL regulations, the inclusion of document inspections in the enforcement programme enables the market surveillance authority to cover more models and more product groups, than would have been the case if market surveillance were restricted to lab tests.

Table 2 shows the relationship between the outcome of document inspections and laboratory tests in the Ecopliant project. In Table 3, the same data for the Danish market surveillance are listed.

Table 2. Inspection of products within the Ecopliant project.

Product group	Laboratory tests Ecopliant (No. of units)	Passing rate Laboratory tests	Document inspection Ecopliant (No. of units)	Passing rate Document inspection
Industrial products ¹⁾	76	100 %	Not available	
Consumer White goods ²⁾	–	–	11	90 %
Air conditioners	9	Not available	28	Not available
Consumer Electronics ³⁾	56	95 %	22	85 %
Lighting products ⁴⁾	35	Not available	35	40 %

Notes: 1) Motors, water pumps and circulators. 2) Dishwashers and washing machines. 3) TV-sets and external power supplies. 4) Lamps and ballasts.

Table 3. Inspection of product by the Danish Market surveillance Authority 2011–2014.

Product group 2011–2014	Laboratory tests (No. of units)	Passing-rate Laboratory Tests	Document inspection (No. of units)	Passing rate Document inspection
Industrial products ¹⁾	41	93 %	55	70 %
Consumer white goods ²⁾	88	68 %	143	67 %
Air conditioners	18	72 %	109	50 %
Consumer electronics ³⁾	35	82 %	168	88 %
Lighting products ⁴⁾	30	100 %	37	73 %

Notes: 1) Motors, water pumps, fans and circulators; 2) Dishwashers, refrigerators, tumble driers, freezers and washing machines; 3) TV-sets, standby and off, and external power supplies; 4) Lamps, luminaires and ballasts.

In both tables, the rate of compliance is higher for laboratory tests than for document inspection. A common reason for non-compliance in document inspections is the lack of evidence supporting the stated energy consumption or the declared energy class of the product. Another explanation for the different compliance rates is that there is no tolerance-loop-hole when documents are inspected; inspections reveals that a number of producers tend to misunderstand the purpose of the tolerances stated in the “Verification procedures” of the regulations. Producers must base their declaration values on actual measurement results whereas the MSA’s lab testing in general has to include a 10 % tolerance on all measurements.

This provides a further incentive for supplementing the traditional enforcement of the standards and labelling requirements by applying systematic inspections of documents.

The past 3 years Denmark systematically developed the use of document inspection. The introduction of document inspections has not reduced the annual number of lab tests, on the contrary as seen in Table 4 the number has increased. In 2011, the Danish market surveillance programme was changed. A secretariat dedicated to maintain all the practical and administrative tasks of market surveillance was established. The first year the priority was to carry out as many inspections as possible. The number of inspections carried out in 2011 is around

the highest possible number of inspections possible to carry out within the Danish budget size. In the following years, the Danish Energy Agency decided to prioritise other inspection such as shop inspections and guidance brochures as part of the market surveillance program as well.

The Danish experience is that the MSA need both types of market surveillance and as an ideal rule-of-thumb, between $\frac{1}{3}$ and $\frac{1}{4}$ of the total number of inspections should be tests; the rest may be document inspections and inspection of manufacturers' web sites. This seems to provide for a fruitful balance between tests and inspections of documents

Contrary to the lab tests, inspection of technical documentations require the cooperation of the manufacturer/importer and the MSA. When new product groups are becoming subject to Ecodesign or energy labelling regulation, the Danish market surveillance authority has experienced that it can be very hard for market actors to provide the requested documents. One explanation is that the companies often have well-established practices and methods for documenting their products and tend to be reluctant to accept another approach originating from a new regulation. Another explanation could be that the regulation is not understood, and hence not incorporated into the established documenting practices.

In practice, a market surveillance activity often includes several follow-up letters to the manufacturer with detailed information about the insufficiencies of their documents. Very often, the material forwarded by the manufacturer is incomplete or consists of documents irrelevant in respect to the inspection. This becomes even more typical when inspections of new product groups are carried out.

GUIDANCE AS PART OF MARKET SURVEILLANCE ACTIVITIES

Since early 2014, the Danish Market Surveillance authority has tried new ways of enforcement with more emphasis on the 'information pillar' of market surveillance. Specific sectors of trade and specific companies have been offered customised

Table 4. Number of inspections.

Year	Document inspection (No. of items)	Laboratory testing (No. of items)
2009	31	31
2010	64	13
2011	265	96
2012	121	61
2013	126	77
2014	118	74

* Covers inspection of technical documentation and inspection of websites and are counted as individual, separate inspections.

information sessions on ED and EL rules, including specific attention to the obligations of their sector or company. These customised informational sessions are announced and promoted by stressing the time and money saving possibilities for private companies.

At the tutorial sessions, MSA can combine traditional information activities with in depth counselling and explanation of the background for the requirements. Hereby it is possible to better motivate the companies to be compliant. MSA also involve the trade organisations, in order to have them as supporting agents of this alternative enforcement activity. However, companies represented in these organisations are often the well-established bigger ones, which often also have sufficient resources in their organisations to elaborate documentation. Therefore, an extra effort should be made to reach the small and medium sized companies including importers, who gain most from the dedicated information provided.

Meeting "the authorities" at the sessions establishes a better ground of common understanding and a good communica-

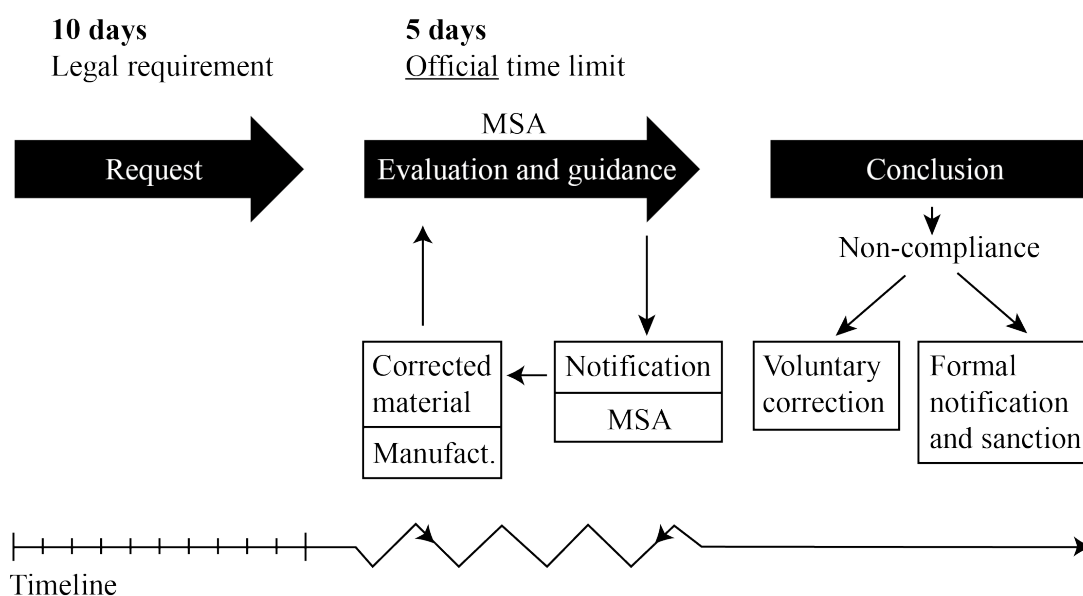


Figure 1. Inspection process.

Table 5. Market surveillance – before and after.

Document inspection water pumps	
2012/13:	5 manufacturers were approached with a request to forward technical documentation for a specific model of water pump.
Result:	None of the selected products could be comprehensive documented by the manufacturers
Casework time:	App. 4.5 month
TUTORIAL SESSION MARCH 2014	
2014:	5 manufacturers (same as in 2012 but other product models) were again approached with a request to forward documentation.
Result:	Now they can prove full compliance through their technical documentation. Only a little guidance is necessary and all inspections show full compliance.
Casework time:	App. 2.5 month

tion platform. Experience show that manufacturers feel more confident to contact the authorities afterwards with specific and detailed questions on the regulation demands and doubts in general. Those companies, which previously were hard to reach, are becoming forthcoming and open-minded instead of trying to stay outside the spotlight of the authorities.

To a large extend the tutorial assistance is customised to each individual company and thus becoming close to what private consultants can offer to Industry. According to the legal acts implementing the ED and EL, the MSA is expected to provide general information on new regulations, but not to give tutorial assistance to selected companies. The principles of public administration requires that all operators are treated equal and that governmental institutions do not engage in 'commercial' activities unless this is specifically allowed for in an act. One can certainly argue, that it is not the role of an authority to provide consultancy and to carry out such specific and detailed guidance of individual companies. However, this way of using "the carrot instead of the stick" has shown to be cost-effective both to the authority and to Industry. The four tutorial assistance sessions carried out in 2014 have already shown some positive effect, although it is hard to provide hard data to prove this point of view.

As it appears from Table 5, the market surveillance authority subsequent uses less time and resources to obtain the requested information from the companies. The companies also benefit from the counselling. As they now know which data to present, they are able to prepare correct and adequate technical files for future models in their product line.

Results from the past years market surveillance activities make it obvious, that this dialogue-based approach cannot be applied to all types of regulations and not on all types of companies. The tutorial approach should be preferred for product categories newly regulated which have not been regulated by ED and EL previously (Danish Energy Agency, 2014).

Some product categories show rather low compliance, although having been regulated for many years. An example is cold appliances. This product category has been regulated for more than 15 years, the requirements should be well understood and Industry should be able to provide precise and quick responses to the requests of market surveillance authori-

ties. However, this is not necessarily so, which the compliance rate for white goods in Table 3 indicates. The cause for the high level of non-compliance could be a more competitive market for cold appliances than for other white goods. Another reason could be that the producers never did elaborate documentation to support their declaration, as market surveillance authorities, per tradition, did not request these documents. Thus, the Danish MSA have had to use some effort to correct the misinterpretation by the manufacturers of the "verification procedure" included in all ED and EL regulations.

Because of the poor compliance rates, cold appliances have to be repeatedly included in the yearly inspection programmes, demanding considerable resources out of a limited enforcement budget. In such cases, a gentle and forthcoming approach with tutoring does not seem adequate. In this case, the traditional way of testing seems more appropriate.

TUTORIAL MEASURES RELEVANT TO ENERGY LABELLING:

The traditional way of enforcing energy labelling requirements is to establish inspections at retailers checking that products are correctly and properly labelled. However, the character of the energy label has changed since it was introduced in the 1990s.

In order to be able to use the same label in the entire EU/EEA, the label has become langue neutral by incorporating icons and pictograms. In many respects, this is an improvement of the label. But this and the introduction of the special classes A+, A++ and A+++, has complicated the label. The most difficult aspect for consumers to understand is how the Ecodesign requirements shorten the scale of the energy label by gradually banning the lowest energy classes. One extreme example is refrigeration appliances, where eco-design requirement do not allow products poorer than energy class A+ on the market. While the label indicates a product range from A+++ to class D. Buying an A+-fridge may seem to be an efficient choice by the consumer, but is in fact the lowest energy efficiency allowed.

As understanding of the information on the label has become more difficult for the end-users and often customers turn to the employees at the retailers for help. In order to promote the energy efficient products, the Danish market surveillance authority has developed tools that can assist the retailers in guiding the end-users with correct and relevant information. The idea

behind this information material is to improve the knowledge of the retailer's employees on energy efficiency issues.

Among the more traditional tools is a pocket size 'handbook' on the label and one covering how the energy efficiency scale varies according to the product group. Another publication is an 'extended' version of a leaflet meant for end-users. This extended version is only distributed through the shops and their employees.

A new initiative, which not only assist the retailers but also delivers feedback to the market surveillance authority, is the launch of educational videos covering: 1) Washing and drying, 2) refrigeration and ovens and 3) TV-sets. Each video last 5–8 minutes and by watching the video, the employee learns the important phrases and parameters of each product group. In order to check whether the viewer has understood the message each video has a quiz at the end. This helps the employee to see if he or she comprehends the essential messages, and it provides the market surveillance authority with a feedback on the effect of this tutorial measure and on how difficult it is to understand the various regulation.

In the last 6 month of 2014, more than 400 employees from over 200 shops watched the videos. In general, the attendees managed 80–99 % correct answers in the quiz. Respondents from some shops show a much lower score. The Danish MSA will study the answers in more detail to see if any themes or regulations are harder to comprehend than others, and evaluate whether development of additional educational materials and initiatives are needed. MSA will approach the relevant chain head offices and/or shops owners and design relevant follow up actions – in cooperation with the retail management. The follow up actions will be carried out during first half of 2015.

Videos and questionnaire is available at these webpages:

Video and quiz TV-sets: <http://sparenergi.dk/forbruger/el/energimaerkning-af-apparater/spoergeskema-om-tv>

Video and quiz Refrigeration and ovens: <http://sparenergi.dk/forbruger/el/energimaerkning-af-apparater/spoergeskema-om-koele-fryseskabe-og-ovne>

Conclusions

That enforcement of standards and labels can include other activities than just laboratory testing has been shown in the text above. The Ecopliant project is the first Pan-European attempt of a systematically co-operation on Ecodesign requirements between 10 national market surveillance authorities. In this cooperation the use of document inspection have successfully been tested in several of the participating authorities. The Danish market surveillance authority has developed its competence within document inspections, but has also explored new 'softer' ways of achieving a higher compliance rate among regulated product groups. Such 'softer' ways are evolved on a basis of informational activities and varies from ED to EL. The evaluation of these new measures so far indicates that the new initiatives can be proven successful. Future measurement will show for how long time the effect will stay.

Abbreviations

ED	Eco-design Directive, Directive 2009/125/EC of The European Parliament and of The Council of 21 October 2009 establishing a framework for setting of codesign requirements for energy-related products (recast).
Ecopliant	European Ecodesign Compliance project. Website: http://www.ecopliant.eu/ .
EL	Energy labelling Directive, Directive 2010/30/EU of the European Parliament and of The Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast).
MEPS	Minimum Energy Performance Standards, often just termed 'Standards'.
MSA	Member State Authority/-ies. The authority/-ies responsible for enforcing the regulations within the scope of the Ecodesign Directive and/or the Energy Labelling Directive.

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