Come On Labels

Common appliance policy – All for one, One for all – Energy Labels

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APPLIANCE TESTING

Summary paper on appliance testing procedures and good practices

(Work package 3 - Deliverable 3.4)

Final Report, July 2011

Author: **Milena Presutto, ENEA**
with the support of: ComeOn Labels partners

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NOTE: according to international standards dealing with quantities and units, the numbers in this study are written according to the following rules:

- the comma "," is the separator between the integer and the decimal part of a number
- numbers with more than three digits are divided by a blank in groups of three digits
- in case of monetary values the numbers are divided by a dot in groups of three digits

This document was prepared within the **Come On Labels project**, supported by the Intelligent Energy Europe programme. The main aim of the project, active in 13 European countries, is to support appliance energy labelling in the field of appliance tests, proper presence of labels in shops, and consumer education.

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1. INTRODUCTION

The concept of energy labelling was introduced in the 1990s within framework directive 92/75/EEC as a tool to increase the energy efficiency of household appliances and to reduce domestic electricity consumption. However, after over a decade and despite the fact that the infrastructure for using the energy labelling is in place throughout the EU, only very few Member States do apply a responsible policy for controlling its correct implementation and product compliance verification.

After the publication of the new labelling directive 2010/30/EC on 18 June 2010 four delegated Regulations followed, setting the new labels for the major household appliances refrigerators (Figure1), freezers, washing machines, dishwashers and televisions[1]. Contemporarily, the ecodesign Regulations published starting 2009 set minimum requirements that products shall fulfil to be placed on the EU market. The compliance with all these requirements needs to be verified as well as with the label declarations.

It will require a strong and consistent effort to effectively implement and verify the new legislation requirements, as well as the provisions of the "old" labelling scheme (Figure 2) which are still in force. The need for effective market surveillance is critical to ensure a level playing field for market actors and to protect consumers

The aim of this document is to present good practice activities carried out in some Member States and which the national Market Surveillance Authorities of other Member States could implement at their national level.

Figure 1 New label for refrigerating appliances

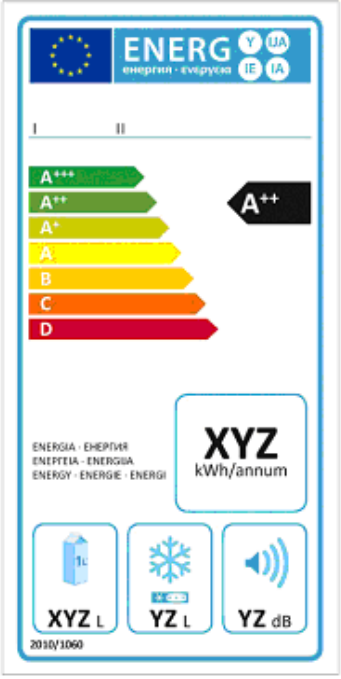
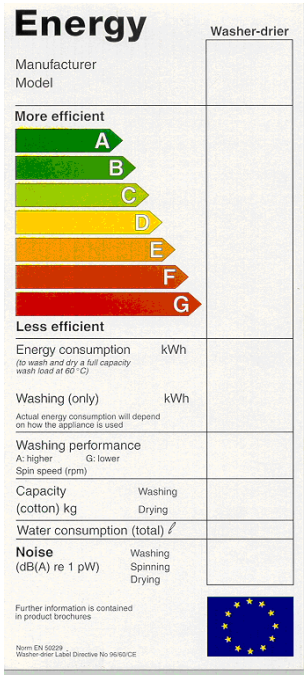


Figure 2: Current label for washer-dryers



[1] published on the EU O.J. 30 November 2010 and entered into force on 20 December 2010.

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2. AIM OF THIS SUMMARY

The goals of the Come On Labels project activities in the field of appliance testing are:

- review of appliance tests: overview of both official and non official tests – coverage of the majority of tests undertaken; promote an improved level of understanding and compliance with tests conditions of harmonised standards
- appliance test organisation by national authorities: support and encouragement to national authorities in undertaking tests by providing them with the best practice information and experience from other countries.

This report aims to summarize existing appliance testing good practice successfully developed at Member State or other levels (for example in already completed or still on-going IEE projects). The document is divided into two main parts:

– Initially the description of common verification procedures, defined test methods and selection of trained laboratories in the EU for the appliances covered by the labelling scheme and the ecodesign Regulations is given, along with a brief overview of existing legislation and legislation in preparation at EU level on energy labelling.
– Then a brief overview of current practice, if any, in the appliance testing in EU and MS is given in terms of amount of national official tests and products covered, non-official tests carried out for example by Consumers Associations, NGOs, national Agencies, etc.) without following the provisions of the EU legislation provisions and harmonised standards.

The expected outcome and impact of this document is:

– an overview of possible common verification procedures successfully developed at MS level or in other IEE projects, trying to explain and justify (from a legal, statistical and practical point of view) the need to use only the defined test methods and trained laboratories
– a motivation for the national Market Surveillance Authorities to develop a plan for undertaking product testing and to increase activities in exchanging this information with other national authorities
– a set of information to be disseminated to national authorities, manufacturers/ importers, consumer groups and media about tests carried out, level of testing in selected organisations and examples of test results.

It is worth noting that one of the new legislative requirements for the EU Member States, included in Directive 2010/30/EU is to prepare every four years a report to the Commission including details about their enforcement activities and the level of compliance in their territory. This should include information on the appliance compliance testing, which this document is dealing with.

3 DESCRIPTION OF THE VERIFICATION PROCEDURE IN THE EU

3.1 Overview of the labelling and ecodesign legislation

The most common policies for appliances both within and outside the EU are labelling (efficiency or other type) and efficiency requirements, implemented in many countries.

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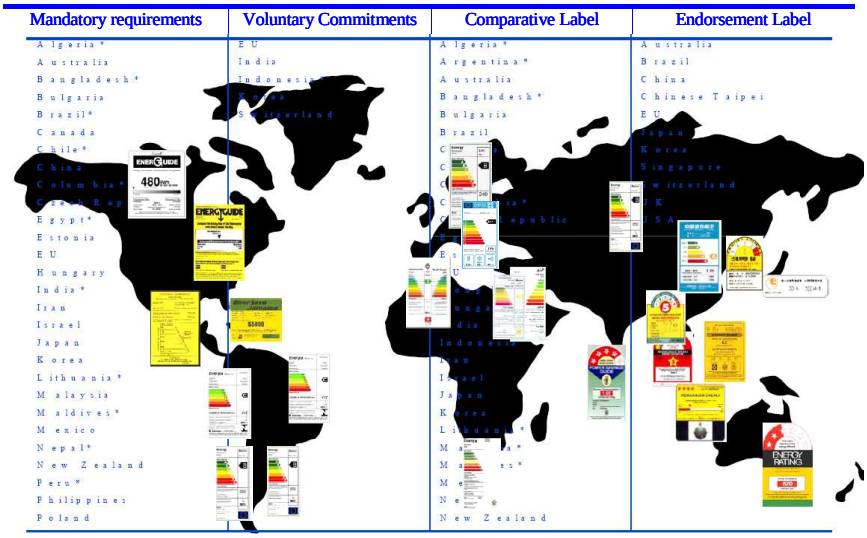
According to data published in 2008 by the International Energy Agency and referred to the 2005 situation, 61 countries worldwide - representing more than 80% of the worldwide population (Figure 3) - have implemented such policies.

Figure 3: Minimum requirements and labelling scheme spread worldwide in 2005 (source, Author's elaboration in IEA 2008 information)



At European Union level the consumption of energy and other resources and the functional performance of major household appliances, and more in general "energy related products[2]", are addressed by the combination of the implementing measures of two coordinated framework directives:

– Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) (OJ L 285, 31.10.2009)
– 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) (OJ L 153, 18.06.2010)

The ecodesign Directive is aimed at establishing a framework for the setting of ecodesign requirements for energy-related products, that have a significant potential for being improved in order to reduce environmental impacts and to achieve energy savings through better design, which also leads to economic savings for businesses and end-users. An ecodesign requirement is considered any requirement intended to improve the environmental performance of a product, or any requirement for the supply of information with regard to the environmental aspects of a product. In this respect generic and specific ecodesign requirements are foreseen where:

– 'Generic ecodesign requirement': is based on the ecological profile of a products as a whole without set limit values for particular environmental aspects

[2] According to Directive 2010/30/EU an 'energy-related product' is any good having an impact on energy consumption during use, which is placed on the market and/or put into service in the Union, including parts intended to be incorporated into energy-related products covered by this Directive which are placed on the market and/or put into service as individual parts for end-users and of which the environmental performance can be assessed independently (Art. 2.a).

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– ‘Specific ecodesign requirement’: is a quantified and measurable requirement relating to a particular environmental aspect of a product, such as energy consumption during use, calculated for a given unit of output performance.

The scope of the labelling framework Directive is to provide end-users with accurate, relevant and comparable information – in the form of a label and a technical fiche - on the specific consumption of energy and other essential resources of energy-related products, to influence their choice in favour of more efficient products, thus promoting their production from the manufacturer side.

The scope of the two framework directives is the same to create synergies between them, as well as with other existing Community instruments, in order to contribute to increasing their respective impacts and building coherent requirements for manufacturers to apply. The implementing measures of both framework directives are in the form of Regulations, i.e. immediately applicable at Member State level without any transposition.

3.2 Labelling & ecodesign for household appliances and other covered products

Ecodesign studies carried out by the European Commission (DG Energy and DG Enterprise) since 2008 as the basis for the preparation o ecodesing implementing measures have shown that for household appliances, the use phase has the highest consumption of resources (usually electric energy plus water in some cases) and environmental impact, therefore most of the generic and/or specific ecodesign requirements set in the product specific Regulations are related to this phase. Also the labelling schemes set for these appliances cover the use phase, although the energy consumption in low power modes is addressed for some products.

According to the European Commission (DG Enterprise[3]) the first nine ecodesign implementing measures (Table 1) should allow an energy saving of 341 TWh in 2020, corresponding to 12% of the EU electricity consumption in 2007.

Table 1: Estimated energy savings at 2020 of the first nine adopted ecodesign implementing measures

Adopted implementing measures	Estimated savings (yearly by 2020)
Standby and off mode losses of electrical and electronic equipment (household and office)	35 TWh
Simple set top boxes	6 TWh
Domestic lighting	37 TWh
Tertiary sector lighting (office and street)	38 TWh
External power supplies	9 TWh
Televisions	43 TWh
Electric motors	140 TWh
Circulators	27 TWh
Domestic refrigeration	6 TWh
	= 341 TWh

[3] http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/product-groups/index_en.htm

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The first Working Plan of the Ecodesign Directive, as requested in Art. 16, was adopted on 21 October 2008. It establishes a list of 10 product groups to be considered in priority for implementing measures in 2009-2011: Air-conditioning and ventilation systems; electric and fossil-fuelled heating equipment; food-preparing equipment; industrial and laboratory furnaces and ovens; machine tools; network, data processing and data storing equipment; commercial refrigerating and freezing equipment; sound and imaging equipment; transformers; water-using equipment. The Commission is required to produce a new work plan by 21 October 2011.

The first Delegated Regulations implementing the new energy labelling were adopted on 28.09.2010 by the Commission and were published on 30 November 2010 the OJ L314, after the final approval by the European Parliament and Council:

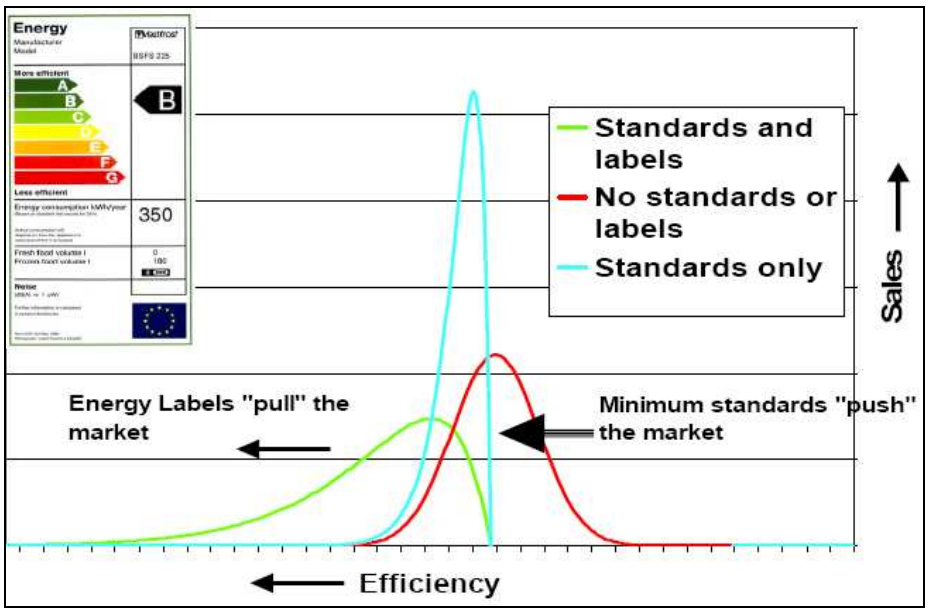
– Energy labelling of household washing machines (Regulation 1061/2010/EU)
– Energy labelling of household dishwashers (Regulation 1059/2010/EU)
– Energy labelling televisions (Regulation 1062/2010/EU)
– Energy labelling of household refrigerating appliances (Regulation 1060/2010/EU).

New ecodesign and labelling Regulations are under preparation for:

– Tumble dryers, currently covered by Commission Directive 95/13/EC
– Washer-dryers
– Water heaters
– Boilers
– Vacuum cleaners
– Air conditioners, currently covered by Directive 2002/31/EC
– Range hoods.

The synergic effect of the ecodesign requirements and of the energy labelling scheme is explained in the following Figure 4. Energy labels has a “pulling” effect because it allows consumers to select more efficient model on the market, while the ecodesign requirements have a “push” effect because they eliminate from the market the less efficient model.

Figure 4: Synergic effect of the ecodesign and the energy labelling



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The effect of the policy measures– essentially energy labelling for refrigerating appliances - has been recently summarized as presented in Figure 5 for the 10 larger EU markets (AT, BE, DE, ES, FR, GB, IT, NL, PT, SE). In the period 2000-2010 the share of the A+ class products (in pale green in the Figure) has increased to reach 40% in 2010, when 8% of class A++ was also present. It is worth noting that at the beginning of 2011 (Figure 6, referring to the sales in 13 Member States) some A+++ freezers were already on the market as effect of the voluntary application of the new labelling scheme by some manufacturers

Figure 5: Sales (%) of refrigerators and freezers in the period 2000-2010 in 10 Member States

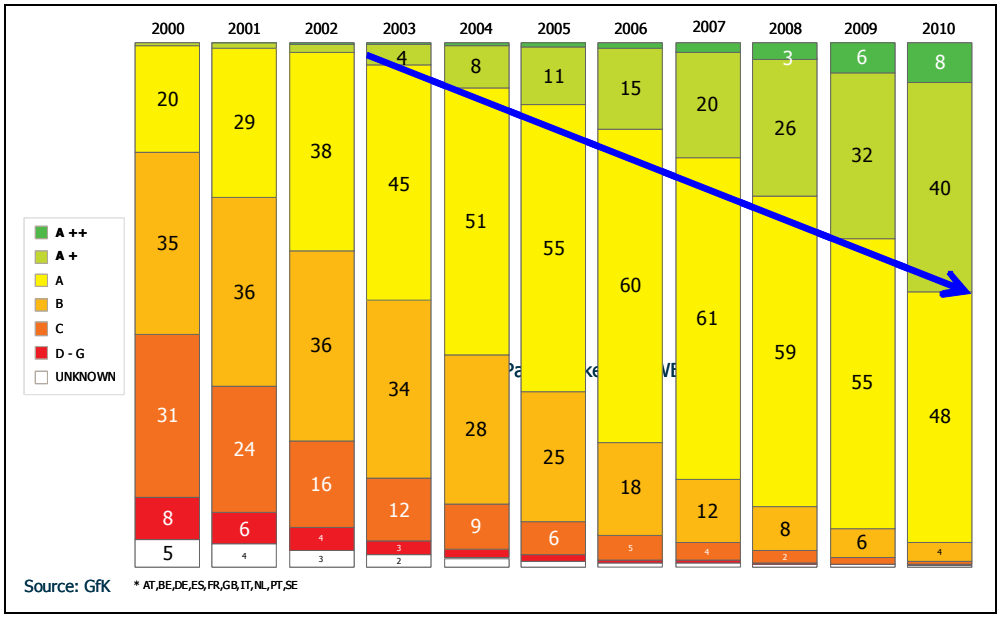
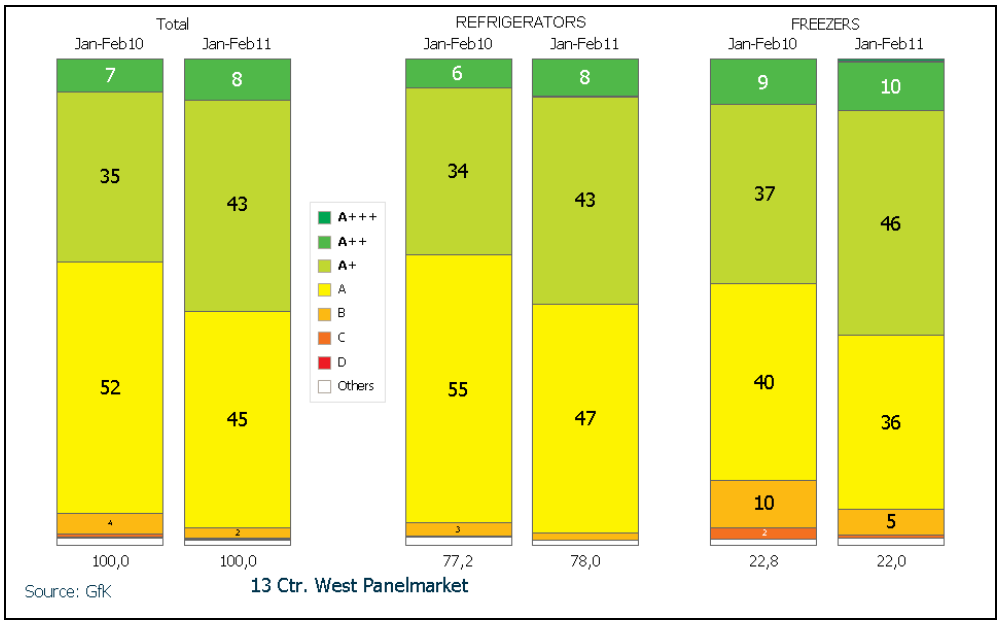


Figure 6: Comparison of the sales (%) of refrigerators and freezers in Jan-Feb 2010 and in 2011 in 13 Member States



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3.3 *Overview of the verification procedures followed in the EU for the labelling and ecodesign legislation on household appliances*

The verification procedure for the old energy labelling for major household appliances - still in force until when the provisions of the new delegated Regulations will mandatorily apply - is based on a specific Clause or Normative Annex of the harmonised standard(s) applicable to the specific product(s), which in turn is mentioned in the product specific directive(s). In the new labelling delegated Regulations, as well as in the ecodesign Regulations, the essential elements for the verification procedure are instead explicitly mentioned (in one if the Annexes) among the legislation provisions.

3.3.1 The formal procedure to be followed in Member States

3.3.1.1 Labelling and ecodesign verification procedure

Whether in the case of an old implementing directive or a new delegated regulation, the verification procedure is based on a two-step approach: in Step 1 the check is performed on one sample of the model; in case of non-compliance Step 2 is developed, checking three additional samples of the same model.

Depending on the parameter to be verified, a verification tolerance (that takes into consideration the uncertainty in the laboratory measurements) is applied to both Steps. In this respect it is worth noting that while in the old labelling directives the tolerance accepted in Step 1 was larger than that accepted in Step 2, in the new delegated regulations the allowed tolerance is the same in both Steps in most cases.

A summary of the EU verification system for the energy consumption for the old and new energy consumption declarations in the energy labelling and energy efficiency requirement schemes is presented in Tables 2 and 3.

Table 2: Summary of the EU verification system and tolerances for energy consumption in the previous labelling and minimum requirements schemes

Appliance	Implementing Directives	Harmonised standard	Verification procedure			
			Step 1		Step 2	
			Units (n)	Tolerance (%)	Units (n)	Tolerance (%)
(old) Energy labelling scheme						
Refrigerators&freezers	94/2/EC/2003/66/EC	EN 153	1	15%	3	10%
Washing machines	95/12/EC/96/89/EC	EN 60456	1	15%	3	10%
Tumble dryers	95/13/EC	EN 61121	1	15%	3	10%
Washer-dryers	96/60/EC	EN 50229	1	15%	3	10%
Dishwashers	97/17/EC/99/9/EC	EN 50242	1	15%	3	10%
Air conditioning	2002/31/EC	EN 14511	1	15%	3	10%
Ovens	2002/40/EC	EN 50304	1	40Wh+10%	3	10%
Efficiency requirements scheme						
Refrigerators&freezers	96/57/EC	EN 153	1	15%	3	10%

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Table 3: Summary of the EU verification system and tolerances for energy consumption in the new labelling and ecodesign requirements schemes

Appliance	Implementing regulation	Standard	Verification procedure			
			Step 1		Step 2	
			Units (n)	Tolerance (%)	Units (n)	Tolerance (%)
(new) Energy labelling scheme						
Refrigerators&freezers	1060/2010/EU	EN 153	1	10%	3	10%
Washing machines	1061/2010/EU	EN 60456	1	10%	3	10%
Dishwashers	1059/2010/EU	EN 50242	1	10%	3	10%
Ecodesing requirements						
Refrigerators&freezers	643/2009/EC	EN 153	1	10%	3	10%
Washing machines	1015/2010/EC	EN 60456	1	10%	3	10%
Dishwashers	1016/2010/EC	EN 50242	1	10%	3	10%

3.3.1.2 Use of Harmonised standards

The establishment of an internal market based upon the free movement of goods critically depends upon an adequate level of technical harmonization. EU legislation defines the "essential requirements" that goods must meet when they are placed on the market (for example the specific ecodesign requirements or the efficiency/performance thresholds of the labelling classes), while the European standardisation bodies (CEN, CENELEC, ETSI) have the task of drawing up the corresponding technical specifications (i.e. the measurement standards) meeting such essential requirements, compliance with which will provide a presumption of conformity with the legislation. Such specifications are referred to as "harmonised standards". In this respect:

- products manufactured in conformity with harmonised standards are presumed to be conformant to the essential requirements;
- standards are not mandatory, they remain voluntary. Alternate paths are possible but the producers have an obligation to prove their products are conformant to the essential requirements
- standards must offer a guarantee of quality with regard to the essential requirements of the EU legislation
- national Authorities are still responsible for the protection requirements on their territory (e.g. market surveillance) and to take all appropriate measures to avoid (and even withdraw) non-compliant products from the national market.

The standards have the following characteristics:

- the standards (typically EN, ETSs) are drafted by one of three European Standards Organisations (CEN, CENELEC, ETSI)
- the work is based on consensus among the represented Countries and standards are adopted after a public inquiry encompassing a two-staged vote, with the national votes based on corresponding weighting features
- standards remain voluntary, but their transposition into national standards and the withdrawal of diverging national standards is mandatory according to the internal rules of the European Standards Organisations.

Additional conditions are superposed to the European standards to cover the specific role of harmonised standards:

- the Commission issues a standardisation mandate according to the procedure of Directive 98/34/EC (consolidating Directive 83/189/EEC)

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- the standards are developed to take into account the essential requirements described in the legislation
- the reference of the standard is published in the Official Journal with the indication of the EU legislation for which the presumption of conformity should apply.

3.4 Existing legal obligations for Member States on market surveillance

The New Legislative Framework (NLF), the modernisation of the New Approach for marketing of products, was adopted in Council on 9 July 2008 and finally published in the Official Journal on 13 August 2008. This broad package of measures has the objective of removing the remaining obstacles to free circulation of products to boost the trade in goods between EU Member States. Existing market surveillance systems for industrial products are strengthened and aligned with import controls, thus reinforcing the role and credibility of CE marking. The NLF consists of two complementary instruments, Regulation 765/2008/EC[4] on accreditation and market surveillance and Decision 768/2008/EC establishing a common framework for the marketing of products.

The objective of the package is to facilitate the functioning of the internal market for goods and to strengthen and modernise the conditions for placing a wide range of industrial products on the EU market. The package:

- introduces better rules on market surveillance to protect both consumers and professionals from unsafe products, including imports from third countries. This particularly applies to procedures for products which can be a hazard for health or the environment for instance, which in such a case will be withdrawn from the market;
- enhances the confidence in and quality of conformity assessments of products through reinforced and clearer rules on the requirements for notification of conformity assessment bodies (testing, certification and inspection laboratories) including the increased use of accreditation; a reinforced system to ensure that these bodies provide the high quality services that manufacturers, consumers and public authorities need;
- enhances the credibility and clarifies the meaning of CE marking. In addition the CE marking will be protected as a community collective trade mark, which will give authorities and competitors additional means to take legal action against manufacturers who abuse it;
- establishes a common legal framework for industrial products in the form of a toolbox of measures for use in future legislation. This includes provisions to support market surveillance and application of CE marking, amongst other things and it sets out simple common definitions (of terms which are sometimes used differently) and procedures which will allow future sectoral legislation to become more consistent and easier to implement. The provisions are split for legal reasons, but must be considered in parallel, as they are fully complementary and together form the basis of consistent legal framework for the marketing of products. The provisions of the Decision will be fed into existing Directives as and when they are revised - in effect, it is a basis for future regulation.

[4] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93.

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Decision 768/2008 does not have legal effects: it is designed to work as toolbox containing those provisions which are common elements of technical harmonisation legislation. Instead, Regulation 765/2008 - become applicable on 1 January 2010 - sets direct rights and obligation for Member States and individuals for the market surveillance actions and planning. In particular:

- Article 16 sets the general principle that Member States shall organise and carry out market surveillance to ensure that products covered by Community harmonisation legislation and suspected to compromise the health or safety of users or that otherwise do not conform to applicable requirements are withdrawn from the market or their being made available on the market is prohibited or restricted. The public, the Commission and the other Member States are informed accordingly. In addition national market surveillance infrastructures and programmes shall be set to ensure that effective measures can be taken;
- Article 18 sets the obligations of the Member States regarding the organisation of the market surveillance. Member States in fact shall:
  - establish appropriate communication and coordination mechanisms between their market surveillance authorities
  - establish adequate procedures
  - entrust market surveillance authorities with the powers, resources and knowledge necessary for the proper performance of their tasks
  - ensure that market surveillance authorities exercise their powers in accordance with the principle of proportionality
  - establish, implement and periodically update their market surveillance programmes
  - periodically review and assess the functioning of their surveillance activities.
- Article 19 states that Market surveillance authorities shall perform appropriate checks on the characteristics of products on an adequate scale, by means of documentary checks and, where appropriate, physical and laboratory checks on the basis of adequate samples.

4. OVERVIEW OF SUCCESSFUL EXAMPLES (GOOD PRACTICES) AND PROCEDURES FOR COMPLIANCE VERIFICATION OF APPLIANCES

This chapter describes the market surveillance procedures and actions developed in the last decade in the EU along with the achieved results, that were collected by Come On Labels project. These example, although limited in number, are all considered Good Practices that could be considered by the national Market Surveillance Authorities of other Member States. Although not all good practices achieved the same success, lessons can be drawn by each example on the way an effective and successful verification exercise should be designed.

4.1 Sweden

In Sweden the Swedish Energy Agency has been running almost regularly appliance testing over the past years. The report “Ten Years of Energy Labelling of Domestic

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Appliances 1995–2005"[5] states the conclusion of ten years energy labelling and showed also the result of appliance testing from one single test:

– 101 cold appliances, 15 deviated more than allowed (14,9%).
– 19 ovens, 2 deviated more than allowed (10,5%).
– 28 dishwashers, 13 deviated more than allowed (46,4%).
– 48 washing machines, 20 deviated more than allowed (41,7%).
– 14 tumble dryers, 2 deviated more than allowed (14,3%).

Since only the Step 1 of the two-stage verification procedure of the labelling scheme has been completed, it is not possible to draw conclusions about the actual compliance rate of the tested products. Additional information at: www.energimyndigheten.se.

4.2 Denmark

On behalf of the Danish Energy Agency, the Energy Labelling Denmark checks compliance with legislation. Energy Labelling Denmark is responsible for administration of sample checks of products, including the selection of the products to be checked, the retrieval and review of technical documentation from manufacturers and the follow-up of test results with manufacturers and suppliers.

Every year tests are run on 5-20 items of each product group, equivalent to 1-5% of the national market. The preconditions for the annual work are established by the Danish Energy Authority in cooperation with Energy Labelling Denmark and the laboratories that test the products. The models to be checked are selected either as a random sample or according to set criteria that might include: discrepancies in the information on the energy label, previous unacceptable results for the same supplier, the desire to check a number of appliances that have features in common or the appliance type's market share; efforts are also made to include all suppliers and brands in the check, though not necessarily every year. An annual report is prepared showing the results achieved in the previous year and also the followings of the verifications run in the previous years

The Annual Report of the activities for 2007[6] and 2008[7] (covering the activities from 1st January to 31st December of each year) show (Table 4) that the compliance testing action initiated in 2007 has not yet completed in 2008. Unfortunately the follow up of the test results is not fully understandable from the Annual Reports: in fact it is not clear if – and how many - models have been re-tested in Step 2 and confirmed non-compliant or if the action taken by the supplier (label declaration modification, technical modification of the product, discontinue of the product from the market) were the consequence of a bilateral discussion with the Market Surveillance Authorities over the results of the tests done on the first unit or of a final assessment of the model non-compliance after three additional units were tested.

[5]The Swedish Energy Agency, Ten Years of Energy Labelling of Domestic Appliances 1995–2005, ER 2006:18.
[6] Annual Report 2007 Report on the work of Energy Labelling Denmark on checking energy labelling of household appliances, air- conditioning systems and household lamps in Denmark, Energy Labelling Denmark, 2008.
[7] Annual Report 2008, Report on the work of Energy Labelling Denmark on checking energy labelling of household appliances, air conditioning systems and household lamps in Denmark, , Energy Labelling Denmark, 2009.

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Table 4: Results of the 2007 tests on household appliances in Denmark

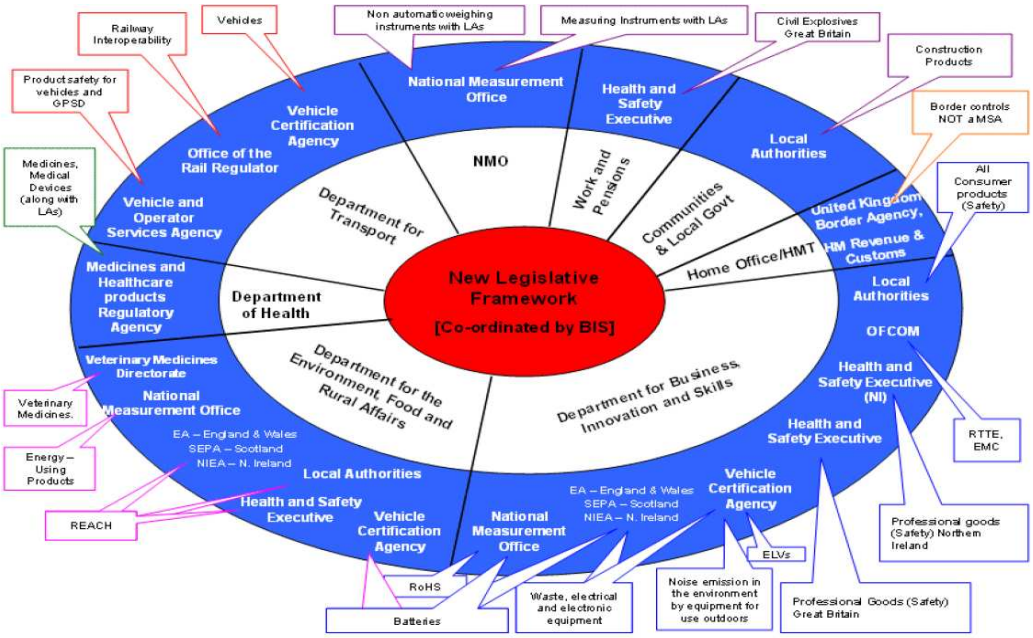
2007 tested products	Number of models	Relevance for the market	Non-compliant models after Step 1	Models gone to Step 2	Non-compliant models after Step 2
Household refrigerators, free-zers and their combinations	30	3%	12	7	not completed in 2008
refrigerators	10		1	0	not done
refrigerator-freezers	10		5	4	not completed in 2008
uprigth freezers	6		2	0	
chest freezers	5		4	3	not completed in 2008
washing machines	7	3%	4	0	
Washer dryers	3	12,5	2	0	
Dishwashers	10	3%	4	4	
Electric ovens	5 + 4*	1%	3	2	not completed in 2008
Air-conditioning systems	4	n.a.	1	1	not completed in 2008

*four models came from a Norwegian product compliance action

4.3 UK

The annual general National Market Surveillance Programme for the legislation that implement Community harmonisation legislation (CHL) as required by Article 18(5) of the Regulation (EC) No. 765/2008, was published in December 2010. The overall UK market surveillance system, coordinated by BIS (department of Business Innovation and Skills) is shown in Figure 7: although only the bottom left part of the overall scheme (highlighted in pink in the figure) is relevant for the verification of household appliances and other products, the overall scheme gives an immediate outlook of the complexity of a market surveillance system under the New Legislative Framework.

Figure 7: UK market surveillance system



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Within the above scheme, DEFRA - the UK government department responsible for policy and regulations on the environment, food and rural affairs - has carried out since 2004 compliance verification tests on household appliances. Enforcement and compliance are in fact considered essential components to deliver the desired energy savings but also create a level playing field for industry. At present the rate of non-compliance in the UK is estimated to be around 10 to 15% at manufacturing level (failure to meet the claim on the label) and 20% at retail level (absent or incorrect labelling).

For example, in 2005[8] a set of energy label tests were carried out on 8 ovens, 10 washer driers, 20 tumble dryers and 20 refrigerated appliances for DEFRA via the Market Transformation Programme (MTP) in order to monitor compliance to the EU labelling directive provisions. The specific research for refrigerators and freezers involved the purchase of 20 domestic refrigerating appliances from high street traders and testing them to measure whether the products complied with the values declared for the energy consumption and the storage volume on their energy labels displayed at the time of purchase: the scope was limited to testing one sample of each appliance (i.e. only Step 1 of the verification procedure was carried out). The following protocol was used in producing the list of brands for purchasing:

- for the refrigerator-freezers, ten models were selected from different brands that were being promoted under a British Gas EEC scheme in a retailer during January 2005. At that time only a limited number of 'class A' energy rated models from a limited number of brands were promoted through this scheme. The scheme was subsequently extended to include all 'class A' energy rated refrigerator-freezers, but the brand list was not changed as it covered a representative selection of suppliers. The majority of the samples were bought from the same retailer, but three were sourced from other retailers.
- for the five refrigerators and freezers were chosen from brands not already represented in the refrigerator-freezer list. The selection included three retailer own brands.

The results are presented in Table 5. The final analysis of the results made by the MTP was that 15 out of the 20 selected models did not comply with the energy class as claimed on the energy label.

But the actual situation is different: in fact only Step 1 of the 2-step verification procedure was developed and the permitted tolerance at this Stage (15%) was not correctly considered. The verification report states that of the 15 models considered not complying, 10 models have energy consumption and/or volumes at least 10% worse than that claimed on the energy label, and 8 models were in excess of the allowed 15% tolerance on energy consumption. Therefore, when considering only the energy consumption, only 8 models failed Step 1 (by having a measured value exceeding the 15% allowed tolerance), and 12 models were fully compliant for this parameter. Since Step 2 test (on additional 3 units) was not run, no final conclusions can be drawn on the actual compliance rate for the energy consumption of the 8 refrigerating appliances having failed Step1.

[8]Nicola King, Market Transformation Programme, 2005 Energy Label Compliance Testing Post-Consultation Report, September 2005.

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Table 5: Results of the 2005 energy label compliance tests for refrigerating appliances in UK

Code	Measured differences	Comments and action after consultation
EC1	Energy label class: same Energy consumption: pass Refrigerator volume: pass Freezer volume: **fail**	Supplier believes all declarations to be correct.
EC2	Energy label class: **one class worse** Energy consumption: pass Refrigerator volume: pass Freezer volume: **fail**	Error noted in the declared freezer volume calculation which will be **changed for this and related models**. Disagree over whether fridge compartment is 'frost-free' and use of the frost-free factor in calculating the energy label class.
EC3	Energy label class: **one class worse** Energy consumption: pass Refrigerator volume: pass Freezer volume: pass	Not required
EC4	Energy label class: **one class worse** Energy consumption: **fail** Refrigerator volume: pass Freezer volume: pass	Product no longer available.
EC5	Energy label class: **one class worse** Energy consumption: **fail** Refrigerator volume: pass Freezer volume: pass	The unit was returned to the supplier, who investigated the unit and found it had virtually no refrigerant in the system. A split was found in the condenser tubing. It is not known when the damage occurred, but if the system had leaked some refrigerant before testing this may have caused the poor result.
EC6	Energy label class: **one class worse** Energy consumption: pass Refrigerator volume: pass Freezer volume: **fail**	Model will no longer be manufactured in UK.
EC7	Energy label class: **one class worse** Energy consumption: **fail** Refrigerator volume: **fail** 2* compartment: pass Freezer volume: **fail**	No comments
EC8	Energy label class: same Energy consumption: pass Refrigerator volume: pass Freezer volume: **fail**	Supplier claims that the freezer volume should be measured with the drawers removed. However, as there are no shelves the test lab believes the volume should be measured with the drawers in place in the same way as the energy consumption is measured.
EC9	Energy label class: **one class worse** Energy consumption: pass Refrigerator volume: pass Freezer volume: **fail**	The incorrect volume was declared on earlier products, this was identified by supplier prior to these tests and was **changed**.
EC10	Energy label class: **one class worse** Energy consumption: pass Refrigerator volume: pass Freezer volume: **fail**	Supplier included a slim tray in the volume measurements. The test lab did not because it was less than 52 mm deep. There is no instruction to users that the tray can be removed, so the volume was measured with tray in place. The model has been discontinued, and any future models with a slim tray will include instructions for users that the tray may be removed for increased volume.
FR1	Energy label class: same Energy consumption: pass Refrigerator volume: **fail**	Volume outside tolerance, there may be some confusion between net and gross volumes. The **volumes will be checked and any necessary changes made**.
FR2	Energy label class: same Energy consumption: pass Refrigerator volume: pass	Not required
FR3	Energy label class: **one class worse** Energy consumption: pass Refrigerator volume: pass Freezer volume: pass	Not required
FR4	Energy label class: same Energy consumption: pass Refrigerator volume: pass Freezer volume: pass	Not required
FR5	Energy label class: **two classes worse** Energy consumption: **fail** Refrigerator volume: **fail** Freezer volume: **fail**	Model discontinued. Supplier will be having **independent checks** undertaken on all current models and future introductions.
FZ1	Energy label class: **five classes worse** Energy consumption: **fail** Freezer volume: **fail**	The supplier has started to investigate why this model did not perform as claimed
FZ2	Energy label class: **four classes worse** Energy consumption: **fail** Freezer volume: pass	Supplier says the **handbook has since been modified** to show that the top tray is not suitable for food. Not loading this area would give different test results.
FZ3	Energy label class: **four classes worse** Energy consumption: **fail** Freezer volume: pass	No comment received
FZ4	Energy label class: **one class worse** Energy consumption: pass Freezer volume: **fail**	Seeking clarification of volume measurements
FZ5	Energy label class: **one class worse** Energy consumption: pass Freezer volume: pass	Supplier was surprised to see higher energy consumption, but model is no longer supplied and fell within tolerance allowed.

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4.4 EU-wide projects

At EU-wide level more recently some IEE projects have been developed to assess the compliance of different products.

4.4.1 The ATLETE project

The ATLETE project: the project started in June 2009 and is due to officially end in May 2011, brought together five partners that have an interest in the issue of rational energy use and energy saving: ADEME, CECED, ENEA, ISIS and SEVEn. The project received 75% of its financing from the EC's Intelligent Energy Europe Programme. The aim was to increase the EU-wide implementation and control of energy labelling (and eco-design) implementing measures through:

- providing a concrete guidance to EU and National Authorities for an increasingly effective market surveillance
- setting of a largely shared procedure for the verification of the manufacturers declarations including a methodology for laboratories accreditation and models selection
- providing the first pan-EU testing results on a large number of household appliances: 82 models of refrigerators and freezers selected among the "best sellers" models in the EU in February 2010.

Within the project the two steps foreseen by the labelling directive (1994/2/EC and 2003/66/EC) for domestic refrigerators and freezers were carried out starting from the second half of 2010.

The available complete results, show that out of the 82 selected models:

- for 12 models test could not be concluded (after Step 1); for 10 of them it was not possible to find three additional units on the market to run Step 2, for two models the three additional purchased units belonged to a different product
- for 70 models the test was completed. For these models:
  - → 30 models resulted fully compliant with the five tested parameters: 26 after Step 1 and 4 after Step 2
  - → 40 show non-compliance to one or more of the tested parameters. Of them:
    - 20 models underwent to a voluntary remedy action by the relevant manufacturer: 18 after Step 1 and 2 after Step 2
    - for the remaining 20 non models no reaction from the relevant supplier.

For the 70 models where the test was completed, 55 (79%) have correct energy class declaration against 15 (21%) that do not have. But when the results of all five tested parameters (freezing capacity, temperature rise time, storage temperature, storage volume and energy consumption) are considered (Figure 8) the compliance decreases to 43% due to the combination of the non-compliances. Especially the 'storage volume' show 27% of non-compliant cases and the 'freezing capacity' up to 30% .

The final results of all tested models can be found on the project website (www.atete.eu).

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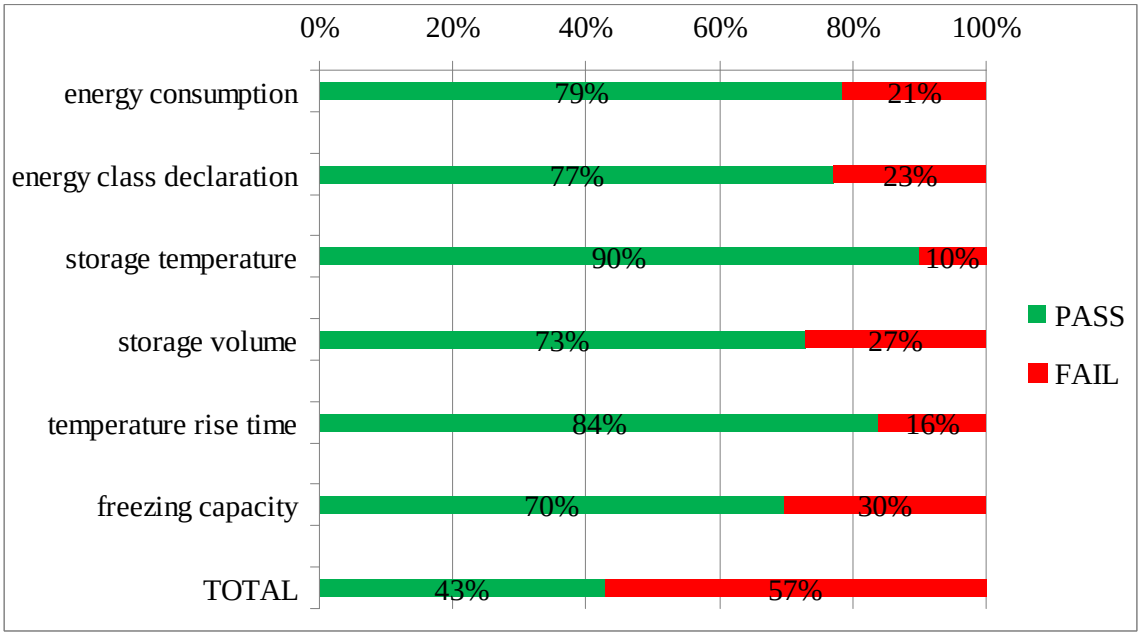
Figure 8: Overall compliance results of the ATLETE project



4.4.2 The SELINA project

The main objective of this project was the market characterization of the standby and off-mode energy consumption of new appliances in the market. This information was collected by measurements in shops and by gathering manufacturers data in each low power mode. The main strategic objective of the project was the market transformation leading to a very substantial reduction of standby and off-mode consumption through:

– increase the share of energy efficient appliances in the market and in the households
– remove inefficient equipment from the market
– help in the design of future new policies that enforce limitations on standby and off-mode equipment consumption
– improve the awareness of retailers in equipment specification
– influence consumer behaviour in the selection and operation of equipment.

The project developed a common measurement methodology and created extensive data collection of off-mode and standby input power values for more than 6.000 different products, allowing for the first time, the collection of a large representative sample of low power mode measurements for the EU market of electrical and electronic appliances in 12 countries. The overall results for the off-mode power consumption are shown in Table 6.

The main outcome of the project were:
- 18,5% of the appliances whose off-mode power was measured do not respect the EU regulation threshold of 1W. When the measurements are compared to the 2013 threshold of 0.5 W, the number raises to 41.5%, although products tested in 2009 should not necessarily be compliant with the 2013 requirements;
- the analysis of the measurements accuracy showed an average error of about 12%, while the standard deviation was found to be about 20%. This indicates that the measurement method in the shops needs to be improved.

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Table 6: Results of the SELINA project for the off-mode power consumption

Product group	Number of measurement	Power consumption			Statistics		
		Minimum (W)	Maximum (W)	Average (W)	25 percentile (W)	50 percentile (W)	75 percentile (W)
Personal Care	216	0	2,37	0,25	0	0,05	0,35
Telephony	14	0,09	1,12	0,55	0,15	0,66	0,84
Computer	412	0	8,48	0,86	0,41	0,57	0,83
Set-top-boxes	17	0	0,8	0,1	0	0	0,1
Cooking-cutting	356	0	4,09	0,18	0	0,05	0,11
DVD/VCR	54	0	3,96	0,51	0	0,1	0,82
Major appliances	625	0	7,87	0,33	0,06	0,09	0,2
Audio	181	0	14,87	1,11	0	0,52	1,14
Power	1	1,45	1,45	1,45	1,45	1,45	1,45
Imaging	154	0	8,42	0,52	0,18	0,3	0,48
Cooking	454	0	3,41	0,22	0	0	0,03
EPS	62	0,02	12,87	0,56	0,17	0,22	0,36
Building & infrastructure	31	0	1,07	0,04	0	0	0
HVAC	96	0	2,89	0,33	0	0	0
Lighting	18	0,28	19,73	3,7	0,33	0,94	5,02
Cleaning	119	0	1,24	0,12	0	0	0
Network	3	1,19	15,03	6,06	1,19	1,95	15,03
Display	644	0	7,97	0,46	0,12	0,26	0,5

http://www.selina-project.eu/index.cfm?item=results

4.4.3 The TOP-TEN project

The TOP TEN initiative is an international program to create a dynamic benchmark for the most energy efficient products. It was launched in 2000 in Switzerland and since then sixteen other national sites went online, of which fourteen European sites thanks to the IEE-projects Euro-Topten and Euro-Topten Plus. In addition, Topten China and Topten USA followed in October 2010.

Topten is a consumer-oriented online search tool, which presents the best appliances in various categories of products: the key criteria are energy efficiency, impact on the environment, health and quality. As a communication tool it helps to show what consumers can do personally to reduce the environmental impact of products. The website: www.topten.info serves as a portal to reach the national web sites of participating countries. Apart from consumer information, currently the programme aims also at providing policy recommendations based on its overview on the high efficiency product market and to influence manufacturers.

Initially Topten was concentrating on technical issues in order to raise consumer awareness on potential energy savings, while currently it has established the “Best of Europe” products on the site: www.topten.eu, where the most energy efficient products in Europe are identified, stating also countries where they are marketed. In the below Table 7 the example of the washing machine situation at 17/05/2011 as presented in the Top-Ten website is presented. The name of the manufacturers and the washing machine models have been omitted in the table (although they are present in the original table).

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Table 7: Best washing machines in Europe in May 2011 according to the Top Ten website

Brand link Model	M1	M2	M3	M4	M5	M6	M7	M8
Costs for electricity and water (€/15 years)	787	787	787	787	787	787	880	880
Capacity (kg)	7	7	7	7	7	7	8	8
Energy efficiency class	A+++	A+++	A+++	A+++	A+++	A+++	A+++	A+++
Energy Efficiency Index	41,9	41,9	41,9	41,9	41,9	41,9	42,5	42,5
Spin-drying class	A	A	A	A	A	A	A	A
Energy (kWh/year)	160	160	160	160	160	160	182	182
Energy (kWh/cycle) 60 / $60_{1/2}$ / $40_{1/2}$	0,8 / 0,66 / 0,58	0,8 / 0,66 / 0,58	0,8 / 0,66 / 0,58	0,8 / 0,66 / 0,58	0,8 / 0,66 / 0,58	0,8 / 0,66 / 0,58	0,91 / 0,76 / 0,66	0,91 / 0,76 / 0,66
Water (litre/year)	10.780	10.780	10.780	10.780	10.780	10.780	11.880	11.880
Programme time (min) 60 / $60_{1/2}$ / $40_{1/2}$	179 / 149 / 119	179 / 149 / 119	179 / 149 / 119	179 / 149 / 119	179 / 149 / 119	179 / 149 / 119	179 / 149 / 119	179 / 149 / 119
Left-on/off (W)	0,75 / 0,2	0,75 / 0,35	1,0 / 0,35	1,0 / 0,35	1,0 / 0,35	1,5 / 0,15	1,5 / 0,2	2,25 / 0,15
Max. spin speed (rpm)	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600
20° C for cotton	yes	yes	yes	no	yes	yes	yes	yes
Hot/Rain water supply	no / no	no / no	no / no	no / no	yes/yes	no / no	no / no	no / no
Noise (dB(A)) washing/spinning	49 / 74	49 / 74	49 / 74	49 / 74	49 / 74	48 / 73	48 / 73	48 / 73
Countries available	on demand	on demand	on demand	on demand	on demand	on demand	on demand	on demand

4.5 Experiences in other non-EU countries

Marker assessment and compliance verification to the legislation are common issues for all countries. Several experiences have been developed outside Europe.

The US DOE and EPA have run a pilot programme for testing the compliance of Energy Star appliances until the end of 2010. They were planning to make public the names of the products that failed. In spring 2011 both DOE and EPA proposed to continue the testing programmes. The following documents are available for consultation:

- results of the pilot programme as of August 2010: http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/ns/webinar_energystar_testing_20100824.pdf
- FAQ for pilot programme, December 2010: www1.eere.energy.gov/buildings/appliance_standards/pdfs/faq_final_december-2010.pdf
- proposal for two new verification and testing programmes as of April 2011, open for stakeholder comments until May 9th, 2011:
  - www1.eere.energy.gov/buildings/appliance_standards/energy_star_testing_verification.html
  - www1.eere.energy.gov/buildings/appliance_standards/pdfs/estar_verification_process.pdf

In Australia, the so-called E3 committee (formed by Commonwealth, State and

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Territory representatives) is running a "check-testing" programme since 1991 to ensure compliance with minimum efficiency requirements and labelling legislation. About 100 products are tested every year for different products according to a 2-Stage procedure. The process of validating a manufacturer's claim commences with a "*screentest*" of a single sample of the product. Should that product fail any of the validity criteria during this test it is deemed to have failed the *screentest* and the matter is then referred to the relevant regulator for further action. Following screentesting, suppliers of the products that failed are offered the opportunity to undertake testing of further samples, a process known as "Stage 2 *checktesting*" or can elect to accept the initial test results. The overall procedure, including the applied tolerances is described in the "Administrative guidelines" (downloadable at: www.energyrating.gov.au/admin-guidelines.html) that sets out the procedures and protocols that are normally applied in the administration of the compliance verification programme.
The financing scheme is of interest: the Stage 1 test is financed by the regulatory authority; if the product fails, the supplier finances the following Stage 2, and if it fails Stage 2 also, the supplier finances the whole procedure. The E3 committee also reimburses the costs of tests done commissioned by competitors in accredited laboratories if the product fails. For additional information: www.energyrating.gov.au/checktest.html

The UNDP is developing a programme for testing the compliance of appliances with EU ecodesign and labelling regulations for Turkey, including a proposal for the expected amount of products to be tested and for organisational and financial arrangements, taking into account the existing test capacities. Main actors will be the Ministry of Industry and Trade and the Turkish Standards Institute, supported by some testing laboratories.
For additional information: http://unjobs.org/vacancies/1304141657448

In the Philippines, DOE is running the Fuels and Appliance Testing Laboratory (FATL) for product energy efficiency testing. For additional information: http://www.unescap.org/esd/publications/energy/compend/ceccpart3chapter3.htm

5. CONCLUSIONS

Unfortunately in the last decade market surveillance activities have been developed only in some Member States and in most cases in a discontinue way. Starting 2009, the European Commission has supported some pan-EU actions through the financing of specific projects within the Intelligent Energy Europe Programme. The specific ADCO (Administrative Cooperation) Group on Ecodesign has been also set as foreseen by Regulation 765/2008/EC.

The importance and need of a strong verification action is evident from all the presented good practices: in a uncontrolled market the economic and competition pressure leads to (relatively) poorly performing products in order to maintain the market share by the manufacturers/importers.

However, to ensure a level playing field for all actors and no distortion of the market the verification actions shall follow a clear, transparent and precise procedure, that should be established either in the legislation itself (like in the EU) or in accompanying

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procedures (such as the so called Australian “administrative guidelines”) and should be available to all stakeholders. In this respect it is worth noting that in some of the described good practices, a part from the Danish example and the ATLETE project, the followed verification procedure has encompassed only the first Step, due to claimed lack of time and resources. In addition, at least in some cases the compliance verification has been limited to part of the parameters, although to those considered the most important from the energy efficiency point of view. Moreover, a part from the IEE-funded projects, the non-compliant products have not been made publicly available. Among the actions promoted by national Market Surveillance Authorities only in Australia the tested models and their supplier are publicly disclosed.

The recent results of the ATLETE project have proven that the two Step verification procedure foreseen by the EU (labelling) legislation is not only valid, but also technically feasible and economically affordable and that non-compliance can lay in less evident parameters: in the case of refrigerator and freezers in the “temperature rise time” and “freezing capacity” that have been very rarely checked.

In conclusion, a set of recommendations can be drawn for the definition and implementation of an effective verification procedure for the EU legislation on household appliances:

- set a clear, transparent and precise procedure, to be largely publicised t all market actors and thoroughly followed by the national Market Surveillance Authority. This should include (the list is not exhaustive):
  - the use of an appropriate measurement method and test conditions
  - the feasibility to run the 2 Steps of the verification procedure as set by the relevant EU labelling/ecodesign measures
  - the verification of all parameters requested by the legislation provisions: all parameters have the same importance when products compliance is considered
  - in case of failure of Step 1, the supplier should be given the possibility either to accept the results and go for an immediate remedy action or to ask for the development of the second Step
  - in case of failure of Step 1, the possibility of a defective or damaged sample;
- foresee and support the discussion with the supplier about the possible reasons for non-compliance: the understanding of the non-compliance causes is as important as the identification of non-compliant products. It may lead to the modification of ambiguous test conditions, or to the detection of a problem in a production line or in a product component, or to the test laboratory instrumentation;
- define staged and timely corrective actions to be applied by the national Market Surveillance Authority: such actions should always follow the identification of a non-compliant product and should possibly include an initial approach to the product supplier for the correction of the product declaration(s), followed by – if and when considered necessary - the application of penalties or sanctions (effective, proportionate and dissuasive) down to the obligation to remove the non-compliant product(s) from the market;
- set a “working plan” for the market verification, to be announced to all market actors, to publicise the concept that no products will be forgotten and that market verification is a routine action and not an exception.

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More information about the ‘Come On Labels’ project activities and the achieved results are published on:

www.come-on-labels.eu