EEPLIANT2

Energy Efficiency Compliant Products 2

Grant Agreement 752591

Final Report – A Layman's version

Activities, Results, and Impacts

This project is funded by the European Union

JUNE 2020 AND UPDATED OCTOBER 2020

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Disclaimer

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 752591.

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Abbreviations

AEA	Austrian Energy Agency, Austria
ADCOs	Administrative Cooperation Groups
ANEC	The European consumer voice in standardisation
BE	Belgium
ASAE	Food and Economic Safety Authority, Portugal
BMDW	Austrian Federal Ministry of Science, Research and Economy
BPG	EEPLIANT Best Practice Guidelines
CCP	Commission for Consumer Protection, Bulgaria
CRPC	Consumer Rights Protection Centre, Latvia
DEA	Danish Energy Agency, Denmark
DETEC	The Federal Department of Environment, Transport, Energy and Communications, Switzerland
DK	Denmark
DGCCRF	Direction Générale de la Concurrence de la Consommation et de la Repression des Fraudes, France
DG ENER	Directorate-General for Energy
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
ECOS	European Citizens Environmental Organisation
EEA	European Economic Area
EEI	Energy Efficiency Index
ECOPLIANT	European Ecodesign Compliance Project which ran from April 2012 to March 2015
EEPLIANT1	Energy Efficiency Compliance Products 2014 Action
EEPLIANT2	Energy Efficiency Compliance Products 2 (2016) Action
EEPLIANT3	Energy Efficiency Compliance Products 3 (2018) Concerted Action
EFCEM	European Federation of Catering Equipment Manufacturers
EU	European Union
HD	Heavy-duty
HED	Office of Legal Metrology of the state of Hessen, Germany
ICSMS	Internet-supported information and communication system for the pan-European market surveillance
ILNAS	Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services
ISO	International Organization for Standardization
IT	Information Technology
LT	Lithuania
MCCAA	Malta Competition and Consumer Affairs Authority, Malta
MEPS	Minimum Energy Performance Standards
MIRS	Market Surveillance Inspectorate of Slovenia, Slovenia
MSA/s	Market Surveillance Authority/ies
MS/s	Member State/s
NVWA	Netherlands Food and Safety Authority, the Netherlands
PROSAFE	The Product Safety Forum of Europe
SCHW	Industrial Inspectorate at the Local Government of Swabia, Germany
SCRPA	State Consumer Rights Protection Agency, Lithuania
SAMTS	State Agency for Metrological and Technical Surveillance, Bulgaria
SEAI	The sustainable Energy Authority of Ireland
SWEA – STEM	Swedish Energy Authority
TUKES	Finnish Safety and Chemicals Agency
TWh	Terawatt Hour
WPs	Work Packages

THE PROJECT

EEPLIANT2

Energy Efficiency Compliant Products 2

GENERAL INFORMATION

FUNDING

Total Budget

€2,670,609.31

100% EU-FUNDED

Coordinator

PROSAFE

www.eepliant.eu

DURATION

- **Start Date** SEPT, 2017
- **End date** FEB, 2020
- **Total Months: 30**

CONSORTIUM

17 MSAs OUT OF 19 PARTICIPATING ENTITIES

FROM

15 COUNTRIES OF EEA *(EUROPEAN ECONOMIC AREA)*

The map on the right shows the countries involved coloured in green.

WORK PACKAGES

WP1 Management

WP2 Reinforcing Best Practices

WP3 Data Collection & Storage

WP4 Household Refrigerating Appliances

WP5 Network Standby

WP6 Professional Refrigerating Appliances

WP7 Communication

OBJECTIVE

EEPLIANT2 helped deliver the intended economic and environmental benefits of the Ecodesign Directive 2009/125/EC and the Energy Labelling Regulation (EU)2017/1369 by strengthening market surveillance and increasing compliance.

EEPLIANT2 achieved this by:

- **Implementing systems that coordinate the monitoring, verification and enforcement of ecodesign and energy labelling requirements across the European Single Market**
- **Increasing the adoption of best practice amongst Market Surveillance Authorities**

This project is funded by the European Union

Summary

Market Surveillance Authorities (MSAs) are responsible for ensuring that products in the EU market comply with the relevant EU legislation and thus providing the promised energy savings for consumers and other end users. MSAs can take enforcement actions only in the geographical area of their country. However, a product sold in the territory of one country is most likely to be found in the market of other countries. It is thus crucial to enable cooperation between MSAs from all EU countries to exchange information especially on non-compliant products.

Such collaboration was empowered in the EEPLIANT2, a joint market surveillance action funded by the European Union to help deliver the intended economic and environmental benefit of the Ecodesign Directive 2009/125/EC and the Energy labelling Directive 2010/30/EU (repealed in 2017 and replaced by Regulation (EU) 2017/1369).

The scope of action of Energy Efficiency Compliance Products 2, hereafter EEPLIANT2 was to test and build capacity in the Member States on the three product sectors with regards to efficiency requirements:

- **Domestic refrigeration appliances;**
- **Network standby devices;**
- **Professional refrigeration cabinets**.

The project formally began in September 2017 and finished in the end of February 2020. The 17 MSAs taking part in EEPLIANT2 came from Austria, Bulgaria, Denmark, Finland, France, Germany, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovenia and Sweden. Switzerland joined some activities as an observer.

The results show levels of non-compliance higher than anticipated across the three product sectors that were inspected.

The MSAs notified economic operators and professional stakeholders and acted to remove the non-compliant products from the market.

The project has generated multiple benefits for the environment and the European Union's (EU) consumers. The primary energy loss saved as a result of the project activities on refrigeration have been estimated to average 80 GWh savings per year for the period 2020-2030, which translates into millions of Euros in reduced energy costs. For network standby, estimated lost energy savings in 2020 are approximately 666 GWh. This saving figure is based on estimated numbers of the non-compliant network standby products, tested as part of the activities, being placed on the EU market.

Find more information about the EEPLIANT2 Joint Action and the follow-up EEPLIANT3 Concerted Action at www.eepliant.eu.

What are the EEPLIANT2 key findings?

- Participating MSAs discovered levels of non-compliance higher than anticipated in the respective product groups even tough they targeted seemingly non-compliant products.
- Mathematical modelling developed by EEPLIANT2 has shown that the impact on energy consumption due to the levels of non-compliance established in the project is substantial.
- The value of the potential energy saved through increasing market surveillance joint actions far outweighs the cost of the market surveillance campaigns, e.g. the domestic refrigeration activity alone would by 2030 result in energy savings of 369 GWh counting to €75.6 million. Whereas the costs of repeating this activity on a bi-annual basis for the next 10 years would not exceed €5 million.
- There is a continuing increase in the effectiveness of MSAs to detect non-compliant products.
- There has been visible enforcement of EU product legislation leading to increased confidence of consumers in energy efficient products, but also savings in their energy bills.

The EEPLIANT2 results at a glance

EEPLIANT2

Energy Efficiency Compliant Products 2

INSPECTION & TESTING RESULTS

For **30** months, project participants reviewed the technical documentation and tested the energy performance of **3** product groups:

This project is funded by the European Union

HOUSEHOLD REFRIGERATING APPLIANCES

Compliance | Non-Compliance

TECHNICAL DOCUMENTATION INSPECTION

172 products inspected — **17%** resulted non-compliant

89 online shops reviewed for energy label and product fiche display. — **80%** resulted non-compliant

PRODUCT TESTING

43 models tested — **40%** resulted non-compliant after contacting suppliers (60% before).

NETWORK STANDBY APPLIANCES

Compliance | Non-Compliance

TECHNICAL DOCUMENTATION INSPECTION

161 products inspected — **74%** had some sort of compliance issue

4 products categories
- Household Appliances
- Information Technology Equipment
- Consumer Equipment
- Leisure Equipment

DATA & PRODUCT TESTING

39 models tested (e.g. coffee machines, routers, Blu-ray players,exercise bikes) — **71.8%** resulted non-compliant

PROFESSIONAL REFRIGERATING STORAGE CABINETS

Compliance | Non-Compliance

TECHNICAL DOCUMENTATION INSPECTION

60 products inspected — **40%** needed remedial action

over **50** parameters taken into account — **90%** failed the review in at least one respect

PRODUCT TESTING

29 models tested — **79%** failed in a significant respect the ecodesign performance test

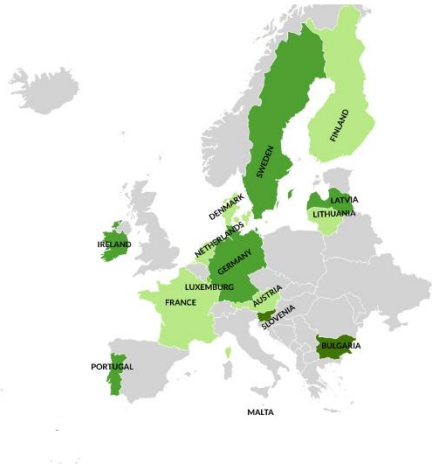
1. Introduction

What is EEPLIANT2 and why is it important?

Coordinated Market Surveillance

19 organisations from 15 EU countries worked jointly for 30 months, investigating non-compliance in 3 product sectors:

Household refrigeration appliances;
Network standby devices;
and Professional refrigerating appliances



"Improving products' compliance on energy labelling and ecodesign is a shared responsibility among the Member States, the industry and the European institutions. This is exactly why projects such as EEPLIANT2 are so important." — Inge Bernaerts, Head of Unit C.4, DG ENER - European Commission, in February 2020.

MSAs are responsible to ensure that products placed on the EU market are compliant with the Energy Labelling Regulation and the Ecodesign Directive. These are two of the main legislative instruments responsible for reducing the carbon dioxide emissions associated with the consumption of electricity and gas in the EU.

Although Member States share the same responsibilities for implementing the Energy Labelling Regulation and Eco-design Directive, they are not obliged to undertake the implementation and enforcement in exactly the same ways. The consequences of this are serious: priorities vary from Member State to Member State, as do budgets, skill levels, and the enforcement activities that are carried out. The scope of their powers is limited within the borders of each country and so the effectiveness of their actions is diminished without some form of centralised coordination.

Efforts are made at EU level to address this, and substantial funding has been made available by the European Commission to support and improve the cooperation between MSAs. One of the instruments used to provide this funding is the EU Research and Innovation programme Horizon 2020.

H2020 offered financial support to a series of market surveillance concrete initiatives which aimed to coordinate the work of MSAs across the EU such as the three pan-EU Energy Efficiency Compliant Products programmes (EEPLIANT 1, 2 and 3, initiated in 2014, 2016 and 2018 respectively).

These energy actions have achieved substantial energy savings, made the market more compliant, increased consumer confidence in energy efficient products and helped businesses that respect the regulation to have a fairer chance at marketing their products in the EU. Furthermore, the actions developed best practices for inspectors and have thus expanded the market surveillance capacity and so further reap the benefits of the energy efficiency and ecodesign policies.

Through harmonisation of the individual market surveillance procedures and development of common tools and checklists for MSAs the projects ensured consistency in data collection and analysis building the ground for more such individual campaigns and thus further policing the EU market.

In the same vein, the development of an IT database for sharing of testing and inspection results and transfer them into European Commission's database – ICSMS ensure that other MSAs can take enforcement actions at no extra costs.

The huge size of the EU market, and the relatively small size of the impact that any single MSA is likely to be able to create, shows the importance of MSAs working together in coordinated ways. This provides for far more leverage - potentially enough to impact the entire EU market.

Furthermore, it creates a level playing field for suppliers, who otherwise face competition from cheaper but non-compliant products. Consequently, non-compliant products are being driven out of the market, contributing to the EU2020 and 2030 energy efficiency objectives.

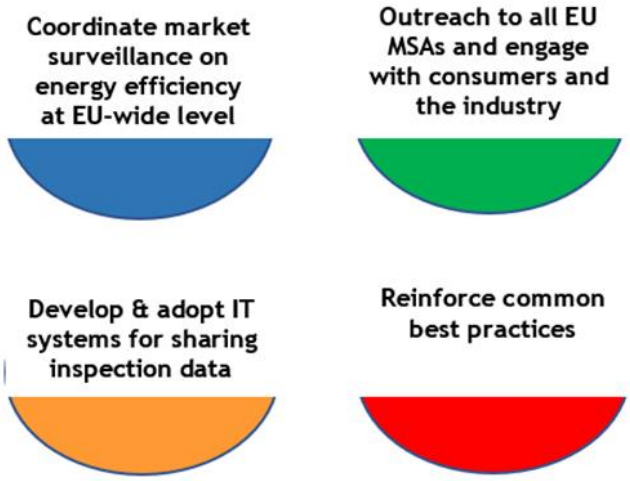
EU political targets on climate change are getting more ambitious in the years ahead. A lot has been already achieved in the area of energy labelling and eco-design. More needs to be done to incentivise more harmonised energy efficiency actions across the EU.

EEPLIANT2

EEPLIANT2 furthered the harmonisation and supported capacity-building by coordinating the monitoring, verification and enforcement activities on energy efficiency across 15 EU Member States.

The products inspected and tested in EEPLIANT2 were selected to provide an opportunity to develop and deliver common market surveillance approaches. This was achieved by working jointly in three different product sectors that included domestic and professional refrigeration and network standby products.

The activities undertaken were structured around 4 targets:



Only in projects such as EEPLIANT2 that are run on behalf of and by MSAs, can coordinated enforcement action take place.

Apart from the product inspection, testing and capacity building activities, the implementation of enforcement measures were also a central part of the project.

Given that MSAs' work is based on legislation both at European and national level, each MSA has its own procedures, own rules, own list and criteria of enforcement actions, etc. Hence the need for such coordinated actions resulting in cost savings and high impacts on the entire EU market.

Document inspections and testing of products have always been at the core of activities in the EEPLIANT programmes because they can lead to the removal of the non-compliant products and consequently reduce the access energy consumption and carbon emissions.

The three product sectors investigated by EEPLIANT2 are:

Domestic refrigeration appliances – A mature industry that had long been acquainted with energy labelling and ecodesign regulatory frameworks. This large product sector had been subject to an earlier market surveillance project, 'ATLETE1'[1], which was completed in 2011. It was expected that the results and learnings from that project would ensure that suppliers would go on to achieve and maintain a high level of compliance. However, when assessing the priorities for EEPLIANT2 in 2015, the number of non-compliant products showed an increase and therefore required revisiting. This was the subject of the fourth work package (WP4).

Network standby – A rapidly developing product feature impacting a very wide range of products. Any instance of non-compliance here could have a large impact on excessive energy consumption and avoidable carbon emissions. WP5 dealt with this sector.

Professional refrigeration cabinets – An opportunity for MSAs to gain experience of working with commercial products and their supplier communities. This product sector, being the topic of WP6, is smaller and most suppliers were thought to have less experience of energy labelling and ecodesign framework policy implementation, in contrast to the household sector.

EEPLIANT2 was sub-divided into seven activities, termed Work Packages (WPs). The participation of the MSAs in these WPs varied according to their preferences and their national competences.

For example, some authorities were responsible for implementing one, but not both, of the energy labelling and ecodesign regulations, and some authorities were responsible for consumer products, but not for commercial or industrial products. Each WP was led by a representative of an MSA supported by an appointed technical facilitator/expert.

Product testing, whilst vitally important, was not enough in itself. To ensure the sustainability of such actions in the future, successful market surveillance requires the MSAs to have sufficiently skilled and experienced staff capacity to be able to carry out their duties in cost-effective ways.

[1] https://ec.europa.eu/energy/intelligent/projects/en/project-search?search_api_views_fulltext=atlete

To support the continuing development of such skills and to bring the less experienced up to the best possible standard, the three WPs on product inspection and testing were supported by four cross-cutting WPs:

- WP1 on Management and Coordination;
- WP2 on Supporting adoption of Best Practices previously developed in Energy Efficiency Compliant Products 1 initiated in 2014;
- WP3 on Data Collection, Storage and Sharing of information amongst MSAs;
- WP7 on Communication, Outreach and Dissemination.

The market surveillance activities in the three product sectors followed the same general format in which the participating MSAs worked together to agree and adopt common approaches:

A substantial library of further legacy materials including detailed guides and templates - the so-called EEPLIANT Knowledge Base - is now available to continue to support the ongoing use of best possible operational standards.

2. Continuing to Build capacity

Reinforcing Best Practices

"Capacity building": the building of knowledge, skills, competence and experience amongst the staff and management of market surveillance authorities, leading to an increase in capability, confidence and effectiveness.

The first objective was to reinforce and consolidate the adoption of Best Practices developed and implemented during the first EEPLIANT project in 2014.

This was achieved by having all participating MSAs working in partnership based on the use of common methods, protocols and checklists – with an emphasis on the ongoing implementation of the existing Best Practice Guidelines in the project inspection activities.

Before the adoption of the Best Practices, the MSA's level of familiarity was checked in a survey. This included a request to suggest improvements to the Guideline.

The result was that the beneficiaries did not see any immediate need for updating the Guidelines, although they came up with good ideas, such as the need for more practical examples and case studies.

Recent legislative developments required several changes. The Best Practice Guideline was updated to reflect these changes, and Version 4.1 has been published on the EEPLIANT website[2].

The second objective was to further develop the "best practice" Knowledge Base through the deployment and joint adoption of product specific "tool-boxes". These included detailed "how to do it" guidance, enhanced common methods, protocols, templates, spreadsheets and checklists available to all European MSAs from the EEPLIANT website.

In addition to these readily available guidance materials, the MSAs can also access the training items developed in the predecessor project EEPLIANT2014.

[2] www.eepliant.eu

Data collection and storage

The primary objective of this activity was to deliver a single data entry and storage digital tool available to all participating MSAs. This IT tool ensured that all findings from the inspection and testing activities were recorded in a database and transferred to the European Commissions' system, ICSMS — an internet-supported information and communication system for the pan-European market surveillance.

Consequently, the need to record data via pen and paper was eliminated as was the need to re-key data for entry into the systems of individual MSAs and again into ICSMS.

To achieve this goal, EEPLIANT2 developed an IT data collection and storage system, accessed on the internet using the user's preferred browser.

One of the key functionalities of the IT data collection and storage system was the semi-automatic upload of inspection data to ICSMS that increased the efficiency in the MSAs' work and eliminated a source of errors by ensuring that data only has to be entered once.

Learn more about the EEPLIANT2 data collection and storage IT system by visiting the EEPLIANT website

www.eepliant.eu

The input of inspection data into ICSMS for both non-compliant and compliant products is in line with the intentions in the market surveillance regulation (EU) 2019/1020. The reason is that sharing the information on the products checked helps MSAs that did not take part in such activities to use those results and verify their markets without investing again resources.

Apparently, many Member States do not record information about products that are checked and found to be compliant in ICSMS since it is too time consuming to manually input the data. The use of the EEPLIANT2 IT tool has helped overcome this shortcoming.

3. Product inspections and testing

Inspection and Testing of Household refrigerating appliances

The work focussed on the most common refrigerators and freezers and their combinations (no wine coolers, no absorption type). It followed a risk-based approach designed to detect, and then remove, as many non-compliant products as possible. Consequently, the results are not fully representative of the levels of non-compliance in the participating countries.

The participating countries and organisations in this working group were: AEA (Austria), BMDW (Austria), SAMTS (Bulgaria), CCP (Bulgaria), SIK (Denmark), TUKES (Finland), DGCCRF (France), HED (Germany), SCHW (Germany), SEAI (Ireland), NVWA (The Netherlands), MCCAA (Malta), ASAE (Portugal), and SWEA (Sweden – WP Leader).

Online inspections

A total of 275 web pages from 89 on-line retail shops were inspected to check whether they provided the energy label and product information for internet sales as required by the applicable regulations. To select the 89 inspected on-line retailers, participating MSAs applied a multi-criteria approach that varied between them. The two most often quoted reasons were aiming at covering wide retail market shares and targeting economic operators based on their territory.

71 e-shops were assessed as non-compliant and 18 e-shops as compliant. When not compliant, most of the time the e-shop failed to correctly display both the energy label and the product fiche. In 34% of non-compliant cases the information was not displayed at all.

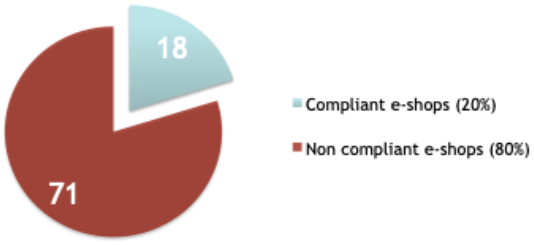


Figure 1: Compliance assessments from online retailers

Document inspections

All market information available from participating MSAs was used to establish a European list of manufacturers and brands that initially identified 190 brands belonging to 70 manufacturing groups. It showed that several brands are owned by different manufacturing groups in different countries, and, more importantly, that same products from the energy labelling and ecodesign point of view can be sold under different brand names in different countries.

As a second step, a European sampling list was developed, serving for both the document inspection and physical test of appliances. They were selected based on different assumptions according to MSAs and national procedures presented hereby in order of importance: most popular appliances, geographical location of the economic operator (i.e., MSA's territory), random selection principles, common brands, lesser known brands.

The overall results from the EEPLIANT2 inspection and testing activities showed high levels of non-compliant products placed on the European market.

Though 61% of cases presented non-compliance issues in the documentation, the overall compliance assessment by the MSAs, which take account of the relative seriousness of any non-compliance, suggests that evidence of compliance was deemed adequate for nearly three quarters of the models and this rate improved after communications between the MSAs and the economic operators (83% compliant cases of the 172).

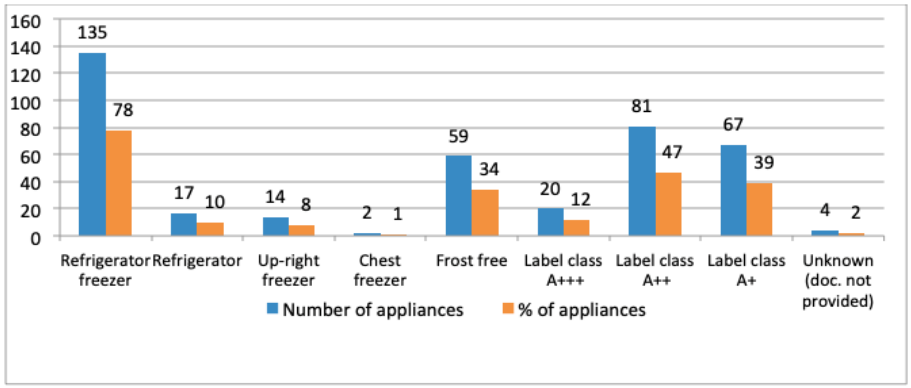


Figure 3: Model of appliances over a total of 172 document inspections

Laboratory tests

In total, **64 products** corresponding to **43 different models** of household refrigerating appliances were delivered to the accredited test laboratory and tested to EN 62552:2013. Of the 43 models, 19 were selected because they had failed the document inspection step above. Some MSAs did not have any failing product in their final assessment of the document inspections, though they may have suggested an appliance to be tested because it had minor non-compliance issues in their first assessment.

Some MSAs decided to test products that did not fail documentation but that seemed either very cheap or on the contrary very good (selection policies varied between MSAs).

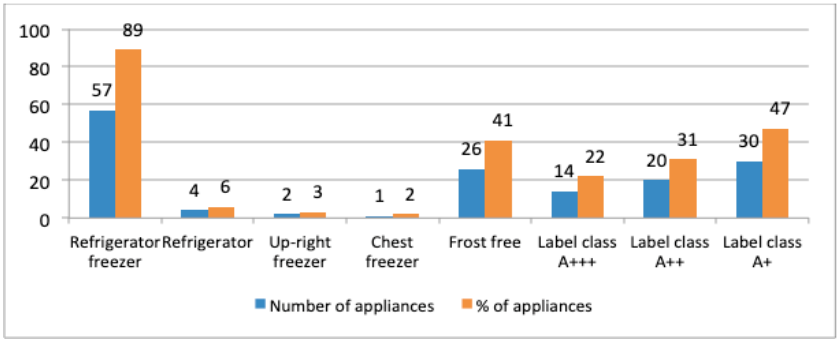


Figure 2: Product type (appliance type) over a total of 64 tested

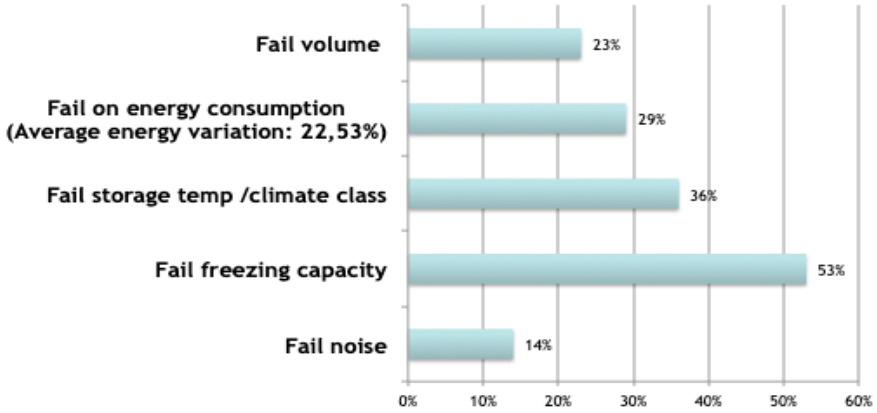


Figure 4 Overall pass/fail results from 64 products tested - Laboratory measurements

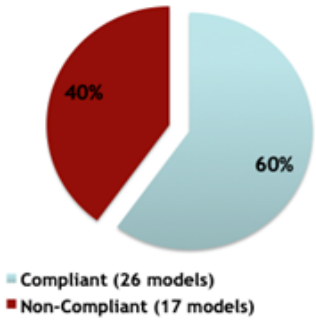


Figure 5: MSA final assessment of test results

17 models were assessed as non-compliant. 7 of those failed on the energy consumption parameter.

After the first tests, MSAs generally had an exchange with suppliers concerning those models judged non-compliant.

- In 12 cases, the models were confirmed as non-compliant;
- In 7 cases, a triple testing was ordered, which resulted in 2 models being finally assessed as compliant, whilst 5 models confirmed as non-compliant;
- In 7 cases, this exchange triggered corrections that were accepted by MSAs;
- In 5 cases, suppliers took voluntary actions that MSAs assessed as satisfactory;
- In 1 case, the supplier visited the test lab and proposed a solution that was accepted by the MSA;
- In 1 case, the supplier proposed to undertake and pay for a triple testing which resulted in compliant results – this was accepted by the MSA.

Enforcement actions

The enforcement actions are presented in the table below and they refer to all the actions taken by MSAs after document inspection, product testing and online retail checks.

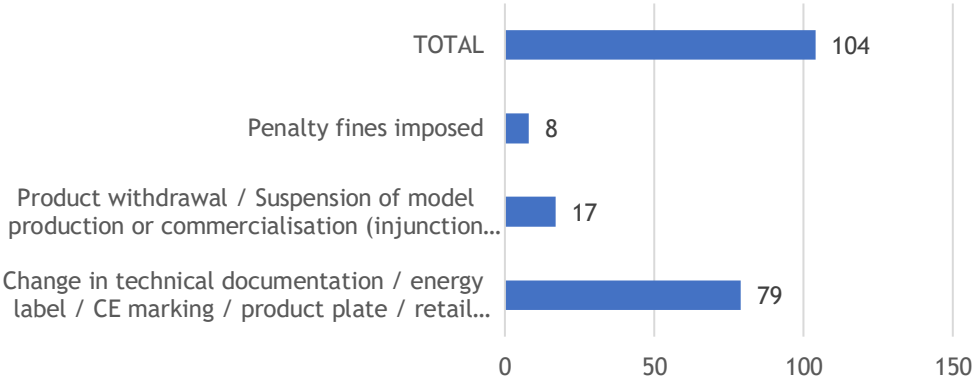


Figure 6 Overview of enforcement actions

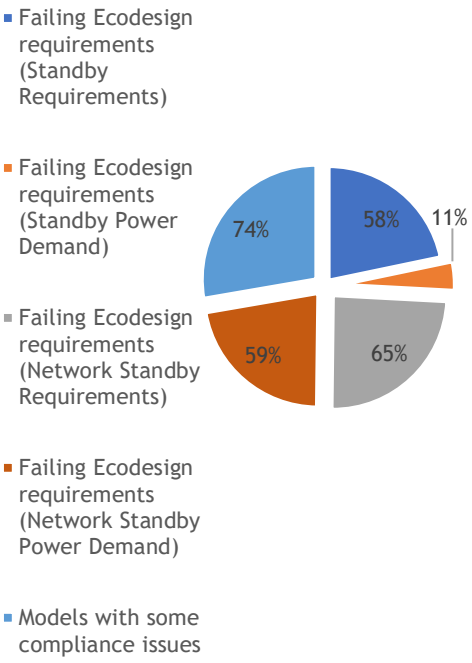
Inspection and Testing of products that feature Network standby

The participating MSAs in this working group were: AEA (Austria), SAMTS (Bulgaria), TUKES (Finland), HED (Germany), SEAI (Ireland – WP Leader), CRPC (Latvia), MIRS (Slovenia), STEM (Sweden), and DETEC (Switzerland, observer).

The Standby Regulation[3] includes a wide range of product types. Prior to the launch, the group developed a shortlist of product types to include in the investigation based on the following factors:

- *What products types are within the scope of the Standby Regulation?* Four main groups: Household appliances; Information technology equipment; Consumer equipment; Toys, leisure and sports equipment.
- *Of the products in scope, which ones are likely to have network connection functionality?*
- *Which of the network connected products are most likely to have potential non-compliances/defeat devices and "work-arounds"?*
- *Which of the network connected products in scope are likely to have the most serious impacts on energy savings as a result of non-compliances?*

Figure 7 Results of technical documentation checks



The final product types selected for documentation checks: 3D Printer, Blu-ray player, CCTV system, Coffee machine, Complex Set Top Box, Digital Video Recorder (DVR), Electric oven, Elliptical Trainer, Exercise bike, Game Console, Home Theatre System, Internet radio, Kettle, Media Streaming Device, Microwave, Network Video Recorder, Notebook Computer, Projector, Robotic Vacuum Cleaner, Router, Rowing Machine, Treadmill, Wi-Fi System, Wireless Speakers, Workstation Computer. From this selection, products were sent for testing.

Document inspections

In total, **161 products** were assessed in terms of their technical documentation. Implicit in the graphical result that 74% had some sort of compliance issue then we can conclude that 26% were judged to be fully compliant for documentary requirements.

[3] *Commission Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment and Amendment Commission Regulation (EU) No 801/2013*

Out of these 39 tested models of network standby equipment, 28 (almost 72%) were found to be non-compliant.

Test Data verification and Test Results - All 39 models		
Pass (Overall)	10	25.6%
Fail (Overall)	28	71.8%
Unclear (Overall)	1	2.6%
Network Standby Requirements		
Pass	19	57.6%
Fail	7	21.2%
Unclear	7	21.2%
Not applicable	6	
Power Management Requirements		
Pass	24	61.5%
Fail	8	20.5%
Unclear	7	17.9%
Standby Power Requirements		
Pass	23	76.7%
Fail	7	23.3%
Not applicable	9	
Off Mode Power Requirements		
Pass	19	86.4%
Fail	3	13.6%
Not applicable	17	
Data Provision Requirements		
Pass	14	45.2%
Fail	17	54.8%
Not applicable	8	

Table 1: Overview of data verification and testing results

N.B. The reason for the difference in totals between the models is that not all requirements were relevant for all models. For example, some models did not have to meet the Network Standby Requirements, or the Data Provision Requirements so there would be no "Yes/No" compliance result.

Laboratory tests

54 products (39 models) of the 161 products were tested (including 5 models that were triple tested). Table 1 shows that some models were non-compliant against more than one requirement. Non-compliance with the networked standby **power demands** (21.2%) and **power management requirements** (20.5%) were significant.

The breakdown of results indicates that the largest single cause for non-compliance was missing data. In total, data needed to support the testing procedure was requested only for 31 models out of which 17 failed on this requirement alone. Looking at the overall number of 28 non-compliant models, the failure of 17 on the data parameter gives a significant non-compliance rate of 61%. In addition, 14 of the 28 non-compliant models (50%) were shown to have excess power demand in at least one of the three power modes.

Identification of 'defeat devices and 'work-arounds'

During the initial stages of testing it became clear that the EU Standby Regulation contain loopholes allowing manufacturers to escape meeting requirements on Network Standby power demand and automatic power management functionality.

The Regulation states:

"Equipment shall, unless inappropriate for the intended use, offer a power management function or a similar function. When equipment is not providing a main function, and other energy-using product(s) are not dependent on its functions, the power management function shall switch equipment after the shortest possible period of time appropriate for the intended use of the equipment, automatically into a condition having networked standby."

The Regulation does not define what technical reasons may be used to justify the "*inappropriate for the intended use*" exemption and, because of this, the wording in the regulation allows manufacturers to claim that power management functionality is not applicable for their product and, as such, the product would not have a Network Standby state.

In conclusion, while after testing there was no direct evidence of products employing defeat devices to circumvent the EU Ecodesign Standby Regulation, the text of the regulation itself provided several opportunities for manufacturers to circumvent requirements, either through disabling network ports or by claiming that requirements were "inappropriate for the intended use." The respective manufacturers then supplied technical documentation explaining when the "inappropriate for the intended use" clause was claimed and the MSAs decided whether to accept the reasoning provided.

"Thanks to the EEPLIANT2 project, our knowledge and experience on network standby has improved considerably. However, more needs to be done, if we want to recover the significant lost energy in this product sector." — Tim Stokes, Work Package Leader, Sustainable Energy Authority of Ireland

Enforcement actions

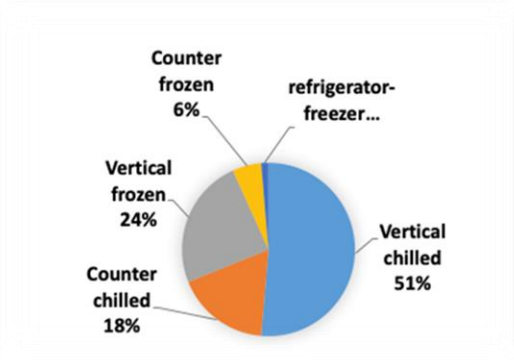
As of October 2020, five products have been withdrawn from the market as a result of the network standby activities with actions on two products still being in progress. An investigation on two products that were triple tested and found to be non-compliant with the requirements of the Network Standby Regulation is ongoing, and these products may be removed from the market in the near term.

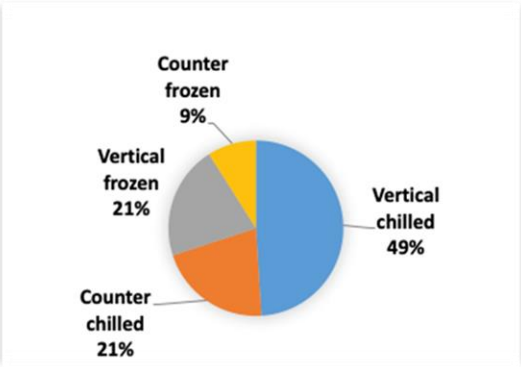
Inspection and Testing of Professional refrigerated storage cabinets

The participating organisations in this working group were: AEA (Austria), DEA (Denmark - withdrew), HED (Germany), MCCAA (Malta), ASAE (Portugal) and SWEA (Sweden).

Professional refrigerated storage cabinets are typically used for storing foodstuffs in non-consumer areas such as in catering establishments, kitchens of restaurants etc.

Figure 8: Proportion of cabinets by configuration of those for which documentation or lab test results were analysed (up) and indicative EU market sales (down)





Document inspections

The cabinets were selected for inspection and testing by the MSAs based on their available market intelligence.

They sought to ensure a spread of claimed performance across the market spectrum as well as across brands and price classes, keeping selection relatively in line with the proportional popularity of cabinets on the market. Some MSAs focussed on higher risk cabinets - if there was evidence on this - whilst others focused on a representative sample for their national market.

Overall, the results of documentation inspection of 60 different models were poor, **with 40% of the cases** requiring remedial action once the seriousness of any weakness had been considered by the MSAs. The final results are not known yet as some of the cases were not fully resolved prior to completion of the project.

Aspect of document inspection	CE-declaration	CE-marking	Fulfilment of ecodesign requirements	Energy label class	Energy label product fiche	Website info check	# cabinets passing all or failing >=1 assessed parameters
PASS	20	29	11	19	24	1	6
FAIL	40	1	48	23	34	14	54
% PASS of those inspected	33%	97%	19%	45%	41%	7%	10%
Total # cabinets inspected	60	30	59	42	58	15	60

Table 2 Documentation inspection results

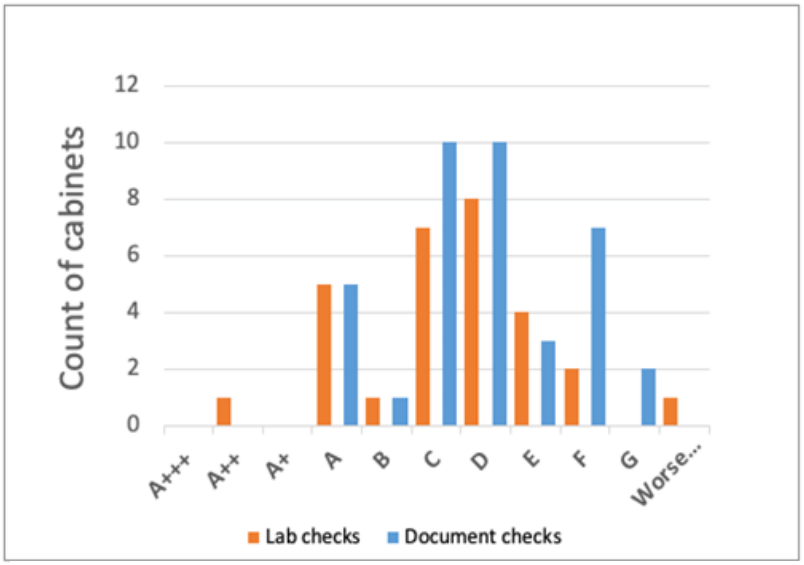


Figure 9: Count of cabinets per energy label class for checks

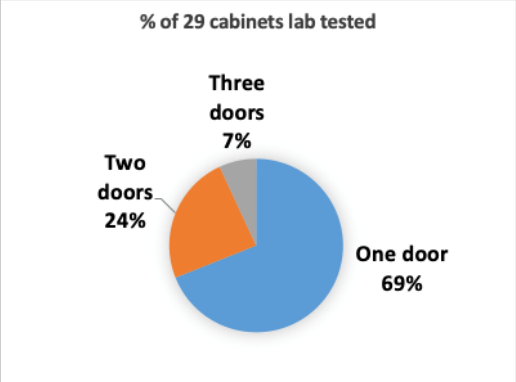
Laboratory tests

A total of 42 tests, on 29 different models, were carried out. For 15 cabinets (52%) the measured energy consumption was higher than that declared by more than the prescribed verification tolerance.

Key conclusions on details of testing results are:

a) Declared net volume was a major cause of failure with nearly 55% of cabinets failing. Available evidence suggests that in many cases this is because the supplier had not deducted the volume under the lowest usable shelf as it is required in the test standard — i.e. a failure to understand (or follow) the detail of the standard.

b) For half of the cabinets, the measured results failed to justify the claimed energy label class, even when all verification tolerances were considered. In many cases this stems from failure of volume measurement, but also due to failure of the temperature test (which invalidates the energy test) and higher than claimed energy consumption.



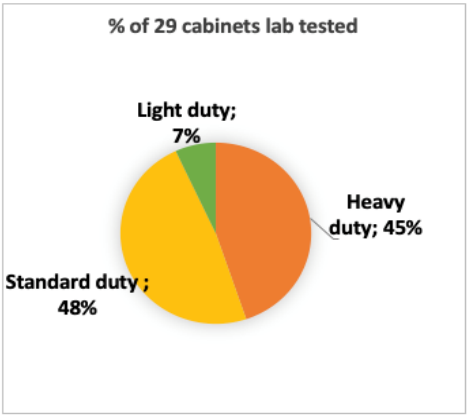


Figure 10: Types of cabinets subject to lab testing (duty statistics are based on declarations in the documentation)

c) Just over one quarter (28%) of cabinets failed to meet the minimum ecodesign energy efficiency requirements when assessed against the duty class confirmed by the temperature test, i.e., cabinets that failed the heavy-duty temperature test but passed the standard duty temperature test are assessed against the standard duty cabinet EEI level 95 at the time that the cabinets were placed on the market). If the cabinet fails the temperature test then it is deemed to also fail the MEPS and energy label class assessments.

d) Four cabinets (14%) failed the standard duty temperature test. This is serious for cabinets that failed temperature tests because it is then not possible to achieve a valid energy test and so the cabinet cannot earn a valid energy label of any class and cannot pass ecodesign requirements. Another serious issue is that because the cabinet may not achieve the temperatures required to keep food safe, it presents a health risk to consumers.

e) Just over half of cabinets (54%) that suppliers claimed as 'heavy duty' type could not achieve the required storage temperature under the specified heavy-duty ambient conditions in laboratory tests, although they passed the efficiency requirement (which is tested at standard operating conditions). The claim to be 'heavy duty' is therefore not necessarily a deliberate attempt to exploit the ecodesign concession but may be to achieve a higher price point through claiming to be heavy duty. This could pose a food safety risk if users trust the cabinet for use in a hot kitchen, with the consequence that food is not kept within safe storage temperature limits.

	Cabinet results overall	Measured kWh/day matches declared	Determined EEI passes MEPS*	Volume (measured matches declared)	Standard-duty temperature test	Heavy-duty temperature test
Pass	6 / 21%	14 / 48%	21 / 72%	13 / 45%	25 / 86%	6 / 46%
Fail	23 / 79%	15 / 52%	8 / 28%	16 / 55%	4 / 14%	7 / 54%
Total	29 / 100%	29 / 100%	29 / 100%	29 / 100%	29 / 100%	13 / 100%

Table 3 Laboratory testing results

*Based on duty confirmed in temperature test

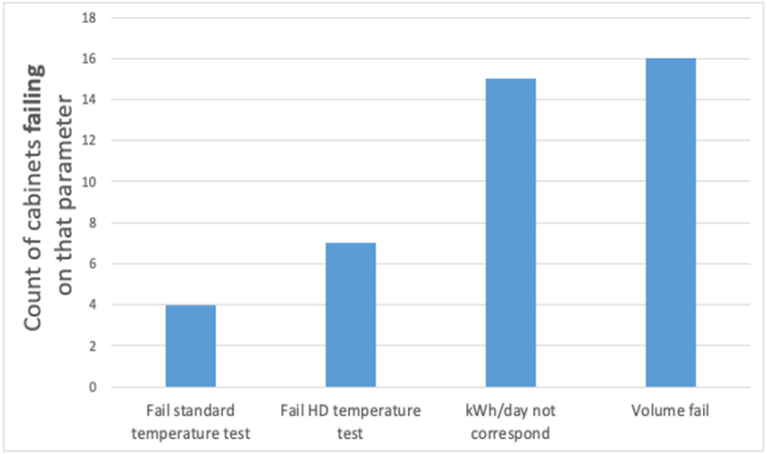


Figure 11: Count of how many cabinets failed on each of main test lab assessment parameters

Additional testing for a direct comparison between ISO 22041 and EN 16825

In July 2019, the standard used for testing professional refrigerated storage cabinets, EN 16825:2016[4], was withdrawn by CEN CENELEC and superseded by EN ISO 22041:2019[5]. This new standard is very similar to EN 16825 but includes some specific changes, for example regarding the wording on how many shelves must be installed during testing, calculation of net volume and applied voltage (dependent on how this is worded on the rating plate). The impact of the differences has not previously been investigated in any known published study. EEPLIANT2 Professional refrigeration assessed this upon the request of the European Commission, DG GROW. Therefore, **6 cabinets** previously tested by group to EN 16825 were also tested to ISO 22041. The main findings are:

- None of the differences between the EN and ISO test results exceeded the regulatory verification tolerances - which is +10% on energy consumption; 3% on volume measurement;
- Five of the six comparative tests returned higher consumption under the ISO test than under the EN test, ranging from 2.4% higher to 9.5% higher;
- The largest difference in average temperature during the energy test was 1.6ºC lower in an ISO test;
- Two comparison tests included a change in the applied voltage (as required under the ISO test), and these led to increases of +2.7% and +9.5% in energy consumption;
- The measured net volume of the cabinets varies between the two test standards because the ISO permits one less shelf to be used for some cabinet configurations. The impact of the volume change on the EEI is less than 1%. Since door opening times are determined using a formula based on net volume, this also increases the door opening time by around 1 second with negligible impact on energy consumption.

In terms of how widespread the impacts of any change could be, none of the changes between EN 16825 and ISO 22041 is projected to result in a systematic change in performance for all types of cabinet. A survey of 29 models showed that just over half of them would end up being tested with a 10V higher input voltage under ISO 22041 and so could end up with 5% higher energy consumption — unless suppliers choose to change the rating plate wording to avoid the need to retest. Models for which the number of shelves is reduced will probably be a minority since they depend not only upon cabinet configuration but also on previous choices made for number of shelves.

[4] EN 16825:2016 Refrigerated storage cabinets and counters for professional use - Classification, requirements and test conditions
[5] ISO 22041:2019 Refrigerated storage cabinets and counters for professional use — Performance and energy consumption

Enforcement actions

As a result of the market surveillance activities, **9 cabinets** have so far been permanently withdrawn from the market, all on a voluntary basis.

Using the assumption of the EEPLIANT2 impacts model, the cumulative energy savings at 2030 - from savings delivered 2020 to 2030 - thanks to EEPLIANT2 Professional refrigeration would be 110 GWh delivered electricity (or 231 GWh primary energy[6]), thus saving € 22 million that European consumers would have spent on excess electricity used by non-compliant professional refrigerated storage cabinets.

Enforcement action taken as reported by MSAs	# Resolved cases
Change in technical documentation, energy label or marking	18
As a result of technical documentation assessment	*14*
As a result of lab testing	*4*
Product permanently withdrawn from production or sale (voluntary)	9
As a result of technical documentation assessment	*5*
As a result of lab testing	*4*
Penalty fines	7
As a result of technical documentation assessment	*7*
As a result of lab testing	*0*

Table 4: Overall enforcement actions taken by MSAs

To summarise the impact of the enforcement actions taken by MSAs in this energy action, please see hereunder the calculated estimations of the value of non-compliant products removed from the market, quantity of energy savings reached by the removals, the financial impact of the extra energy required by the non-compliant products and overall wider energy savings.

If the withdrawn models would have stayed on the market for another 4 years with sales of 200 units per year (across EU), then the value of cabinets excluded would be €18 million

The value of the cabinets averages circa €2,600. If the withdrawn models would have stayed on the market for another 4 years with sales of 200 units per year (across EU), then the value of cabinets excluded would be € 18 million (= € 2,600 x 9 models x 200 sales x 4 years).

From the 12 cabinets that failed energy consumption testing, the average excess energy consumption compared with that declared was 30%. The assumed average annual consumption for these cabinets is 2,500 kWh per year.

Therefore, avoided excess consumption by the withdrawal of those 9 models is: (2,500 kWh/year x 30% excess x 9 models x 200-unit sales x (1+2+3+4 sets/year added extra[7]) = 13 GWh (27.3 GWh primary energy). The avoided cumulative excess consumption of 13 GWh would be worth €2.6 Million (assuming € 0.2 per kWh, Eurostat).

[6] Using a 2.1 primary energy factor as advised in https://ec.europa.eu/energy/en/topics/energy-efficiency/targets-directive-and-rules/energyefficiency-directive.

[7] One set of 200-unit sales running after first year; two sets (2*200) of annual sales after 2 years; three sets (3*200) running after 3 years, etc. it is assumed that 4 years is the period from point of detection that the models would have otherwise stayed on the market before being replaced by newer models.
30% is the average excess (above declared values) consumption of the 12 cabinets that failed tests.

4. Communication, Outreach and Dissemination

EEPLIANT2 produced more than 110 original communication, dissemination and promotional materials

Follow us on Twitter - @EEPLIANT for news and updates, and visit www.eepliant.eu.

The work undertaken under EEPLIANT2 was communicated to the public through various means and channels. A communication strategic programme ensured early and ongoing stakeholder engagement at EU and national level.

Due to its presence on new media (Twitter and LinkedIn) with **over 200** unique posts, the web portal and knowledge hub, the appearance at and organisation of **26** international and national promotional events and conferences, the hosting of webinars, and the production of **more than 110** communication and promotional materials (including newsletters, press releases, video clips, news articles, infographics, posters, booklets and guidelines, technical or other reports), EEPLIANT2 achieved a remarkable outreach and public exposure.

During its lifetime, at the most conservative estimate, the project reached out to more than **345,000 people**, sharing the results of the inspection and testing activities with industry and EU policy makers, informing the public and the EU consumer on the detriments caused by non-compliant products, and communicating the significant tangible environmental and economic benefits of such cross-border projects generously funded by the EU.

The message is clear: energy is at the heart of the European agenda and economy. A lot has been already achieved, but more work is ahead for all actors involved, if we are to meet the ambitious EU energy and climate targets.

5. What are the impacts?

Attention needs to be drawn to the so-called "primary" efficiency, where savings are made at the source, when electricity is first produced.

Looking to the future

The primary energy savings triggered by the project under the refrigeration activities have been estimated to average **80 GWh per year** for the period 2020-2030. This assessment assumes that the overall rate of compliance in just the domestic and professional refrigeration sectors alone improves by a very conservative 1% due to the enforcement actions in this project.

The cumulative energy savings by 2030 thanks to EEPLIANT2 domestic refrigeration alone would be **369 GWh** and **€75.6 million** that European citizens would have spent on excess electricity consumed by non-compliant appliances. This clearly demonstrates that active market surveillance, expensive for MS to support alone, is remarkably effective. The cost of repeating these activities on a bi-annual basis for the next 10 years would not exceed €5 million yet is conservatively projected to save €76 million in lost energy costs.

Additionally, the estimated levels of lost energy savings in 2020 for network standby are around 666 GWh due to all the non-compliant products still being placed in the EU market. This value amounts to approximately 25% of the annual energy produced by the largest wind farm in the EU. The energy savings **are expected to exceed 1000 GWh/yr** following enforcement actions currently being taken by the MSAs.

Capacity has been built in many Member States: less experienced MSA officers have developed new skills and gained new knowledge through direct cooperation with other more experienced colleagues; best practice guidelines have been reinforced and used, whilst many standardised template toolkit components have been developed and available across the EU.

"The persistent and consistent nature of failures identified suggests that further action should be taken to significantly improve compliance rates on the market." — Emma Olsson, Work Package Leader, Swedish Energy Agency

Moreover, MSAs have now expanded their scope by undertaking inspection and testing into new sectors, thus creating a significant added value for their markets and consumers.

The visibility of this project is expected to deliver also indirect impacts, since with on-going surveillance and appropriate enforcement action, product manufacturers and suppliers are more likely to ensure their products are compliant.

Even though EEPLIANT2 has focussed on a sub-set of EU-27 countries, the insights are relevant to all Member States, as it is likely that non-compliance is an issue in all or at least in most national markets. Consequently, results have been shared with all EU MSAs through the ADCO and via ICSMS.

In spite of the fact that many of the MSAs sampled products that had a higher likelihood to be non-compliant, the results unveiled levels of non-compliance higher than anticipated across the three product groups. The impact modelling demonstrated that these levels of non-compliance are responsible for the loss of very substantial levels of energy, at a huge environmental and financial cost to society.

The work in EEPLIANT2 provided unique, constructive and unbiased feedback to assist policy makers to revise EU regulations.

A brainstorming workshop co-organised with the European Commission at the end of EEPLIANT2 provided a further opportunity for the MSAs to explore the underlying causes of the identified non-compliances and to discuss possible remedies. One of the strongest conclusions was that, whilst increasing levels of coordinated market surveillance can deliver cost effective improvements, a fully compliant marketplace will never be achieved through market surveillance alone. Ultimately, it is the responsibility of the supply-side to take action and ensure that their products are compliant.

Achieving this will require the MSAs, the policy makers and the suppliers to work in ever closer cooperation. Several initiatives, such as the EEPLIANT3 Concerted Action (see below), the upcoming EU product Compliance Network, and the recently adopted Communication from the European Commission "Long term action plan for better implementation and enforcement of single market rules"[8] will contribute to that aim.

Finally, the work performed provides a plethora of policy feedback to help policy makers take informed decision in the further development of EU legislation, such as the Energy Labelling Framework Regulation (EU)2017/1369 and Ecodesign Directive (2009/125/EC) overall. Significant policy recommendations were made to the EU Network Standby Regulation[3] by concluding that the text of the regulation enables manufactures to bypass the requirements due to contained loopholes. Substantial policy feedback was also provided by the Professional refrigeration activity comparing the testing under EN 16825:2016[4] and ISO 22041:2019[5]. The differences are in a detail described on page 25, but as a conclusion half of the tested models would result in 5% higher energy consumption.

Achieving a fully compliant marketplace will require the MSAs, the policy makers and the suppliers to work in ever closer cooperation.

EEPLIANT3 carries further the torch

For the years to come, the ongoing EEPLIANT3 Concerted Action will build upon the results of its predecessors and try to find ways to incentivise an EU-wide further dialogue with all key stakeholders, more guidance and solutions, IT tools delivering digital integration, improved integration with Customs, development of Centres of Excellence and an even more harmonised approach across the 21 participating countries (20 EU Member States and Turkey). The goal is to capture more of energy efficiency's potential.

EEPLIANT3 is the largest to date pan-European market surveillance Concerted Action on ecodesign and energy labelling, with a lifecycle from June 2019 to November 2023. It receives European funds from the H2020 Programme and PROSAFE is the lead Project Coordinator.

[8] Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of The Regions, https://ec.europa.eu/info/sites/info/files/communication-enforcement-implementation-single-market-rules_en_0.pdf

This project is funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 752591.