ANTICSS Project Deliverable D15 (D4.2):

Model selection procedure for alternative testing

Project Title	Anti-Circumvention of Standards for better market Surveillance
Deliverable Title	D15 (D4.2) Model selection procedure (PU)
Due Date for Deliverable:	30.11.2019
Actual Submission date:	10.12.2019
Lead Beneficiary	ECOS
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Dissemination level	PU
Keywords	Standards, Circumvention, Market Surveillance, Testing, Europe, Energy, Ecodesign Directive, Energy Labels
Project duration	April 2018 – March 2021

Table of Content

List of Tables

List of Figures

1   About the ANTICSS project

Objective of the research project 'Anti-Circumvention of Standards for better market Surveillance (ANTICSS)' is to assess and clearly define 'circumvention' in relation to EU Ecodesign and Energy labelling legislation and relevant harmonised standards.

The analysis of circumvention will be based on collecting and learning from cases of circumvention by literature research and dedicated expert interviews, as well as analysing existing EU Ecodesign and Energy labelling legislation and standardisation for possible loopholes. Also the potential relation between circumvention and so called 'smart' products with specific embedded software will be addressed by the project. Alternative test procedures to better detect circumvention by testing shall be developed and through testing a certain number of appliances within the ANTICSS project, the impacts 'if' and 'how much' energy consumption and/or functional performance modifications could be ascribed to circumvention will be assessed.

Based on the results, ANTICSS will provide practical capacity building measures for key actors of market surveillance and test laboratories, support communication and collaboration platforms between major stakeholders and provide policy recommendations for policy makers and standardisation bodies to prevent future circumvention under EU Ecodesign and Energy labelling. ANTICSS project is also designed to provide reliability to manufacturers by specifying potentially vague legislation and standards which might be interpreted differently by market actors and some of them taking unfair advantages so far. By overall awareness raising on circumvention among stakeholders, ANTICSS is supporting an effective EU legislation enforcement and thus increasing acceptance and trust of market actors and civil society into the Ecodesign and Energy labelling legislation.
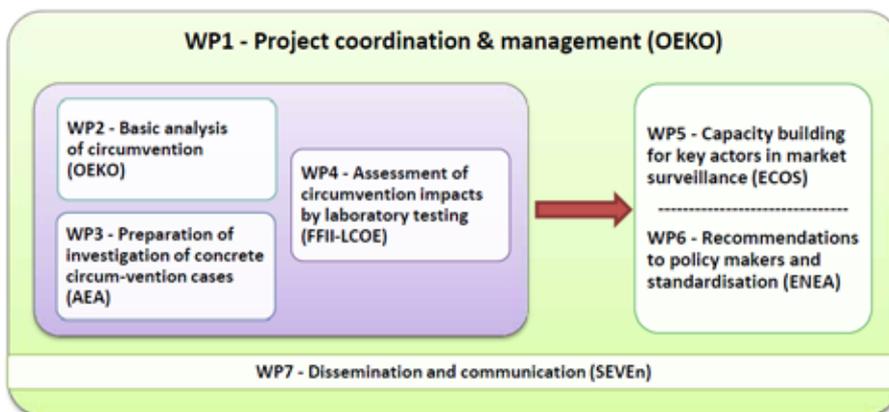

Figure 1:   ANTICSS Work Packages

2 Goal and approach of selecting product models for testing

The objective of work package WP4 ("Assessment of circumvention impacts in laboratory testing") is to analyse and demonstrate the risk or indication as well as assessing the impacts of circumvention by means of **laboratory testing** within the ANTICSS project. For this purpose, for a justified selection of product categories and reported cases of circumvention or jeopardy effects, alternative test procedures were designed which shall be applied in laboratory testing by ANTICSS project partners to unmask circumvention habits in test situations (for details, see separate Deliverable D4.1 „Alternative test methods and approaches to unmask circumvention under EU Ecodesign and Energy labelling" published on www.anti-circumvention.eu.

This subsequent task aims at selecting and purchasing a number of **specific models** that shall be tested in practice. The selection of the three models for each product category will not only be based on specifically identified criteria, taking due account of the particular design features identified in the previous work packages WP2 and WP3 for the reported cases of circumvention and jeopardy effects, but also on the possible application of the alternative measurement methods proposed in work package WP4.

The present report outlines the decision-making process as agreed and implemented by ANTICSS partners to determine the methodology for model selection.[1]

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[1] The final implementation and results of the model selection methodology are presented in Deliverable D16 (*D4.3) Selection procedure and list of the selected models and where they were purchased [Confidential].*

3 Methodology for the selection of product models for testing

3.1 Rationale for the selection of the methodology

One of the main tasks within ANTICSS is to develop and apply alternative test procedures to allow better detection of circumvention. By analysing and testing product models from the selected categories, the impacts 'if' and 'how much' energy consumption and/or functional performance modifications could be ascribed to circumvention shall be assessed. Those final product categories (see Table 1) have been confirmed by the experience and expertise of testing laboratories and of other project partners in **work package** WP4[2] when designing alternative testing methods.

Table 1:   Final product categories selected for laboratory testing in WP4[3]

Lot	Product category selected for laboratory testing
ENER 1	Space heaters: boilers
	Space heaters: heat pumps
ENER 5	Televisions
ENER 10	Room air conditioning
ENER 13	Domestic freezers, refrigerators-freezers
ENER 14	Domestic dishwashers
ENER 14	Domestic washing machines
ENER 16	Household tumble driers
ENER 22	Domestic ovens

From the selected product categories, each three specific models will be selected for testing. For this purpose, different methods were considered at the beginning of the task:

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[2] See ANTICSS **Deliverable** *D4.1 Alternative test methods and approaches to unmask circumvention under EU Ecodesign and Energy labelling* where the testing laboratories partners in the project (i.e. FFII-LCOE, Re/gent, VDE and IMQ) have analysed in detail the 'circumvention' and 'jeopardy effects' cases in each of the ten product categories previously pre-selected in work package WP3 *ANTICSS D13 (D3.3) List of product groups to be tested*.

[3] Note that the order of the products in the table does not represent any ranking. The order strictly follows the numbering of the "Lot" the different product categories correspond to.

1. A fully random model selection in each of the product categories. While least likely to be challenged, this method is evidently not targeted, which significantly reduces the chances to actually fall on circumventing models when testing.

2. Semi-random selection with choice of random models after a preselection filtered by framework technical/characteristics-based criteria based on the collected cases of 'circumvention' and 'jeopardy effects' identified under previous project tasks. This approach increases the likelihood of finding circumvention cases under testing.

3. Semi-random selection through targeting sub-categories or market segments with highest sales or corresponding to the highest environmental impact, so that circumvention cases with high detrimental impact would be identified. However, this method is evidently not targeted to market segments with a higher probability of circumvention, which significantly reduces the chances to actually fall on circumventing models when testing.

4. Targeted selection, with specific models similar to those already identified in the stakeholder consultation being chosen – and therefore without any randomisation. However, this approach presents a risk that the models identified are no longer sold on the market or are difficult to procure.

Considering that only three models will be tested in each product category, such a small sample makes it impossible to draw any statistically significant conclusion. Therefore, it is implausible to seek any statistical representativeness of the identified market and the main objective should instead be to increase the chances of falling on actual circumventing models within these limited samples – to prove their existence and to better assess their possible impact on energy consumption.

For this reason, **approaches #4 (when possible) and #2 were deemed to be the most suitable and the most robust** to achieve the aforementioned objective. The chosen method is thus a **combination of models identified in cases of 'circumvention' and 'jeopardy effects' reported as part of the project and a semi-random, risk-based selection, which relies on framework technical/characteristics-based criteria in order to maximise the chances of identifying circumvention**.

A number of additional practical aspects are to be considered:

· In order to avoid unnecessary redundancy in such limited samples, it is necessary to ensure that the three models are not too similar (e.g. variations of the same product model within the same brand), or equivalent (e.g. same model sold under different brand/model names);

· The selected models should be sufficiently easy to procure, and accessible via standard delivery within the country in which the testing facilities are based in order to reduce the risks of transport damage and other associated risks. Nationally-based retailers will be

favoured over online platforms, where possible. The countries in question, are Spain (for products that will be tested by FFII-LCOE), the Netherlands (Re/gent), Germany (VDE), and Italy (IMQ);

- The models should be affordable and in line with the budget allocated for the purpose under the project;
- The models should still be available when the purchasing task starts and ideally be relevant after the termination of the project. This means targeting models that are readily available on the market, giving preference to those that have been placed on the market relatively recently (i.e. if possible, no later than in the last year), and targeting no models that are close to discontinuation;
- Models that have a higher energy efficiency class are favoured as part of the exercise, as they are deemed to be more likely to engage in circumventing practices due to higher pressure on the manufacturer to achieve the best possible positioning of those models;
- The suspected circumvention aspects (driving the selection process) should be detectable by the alternative test methodologies defined in task 4.1.

3.2   Description of the methodology

The project team has implemented a combined targeted and semi-random product selection approach for the selection of the final models for laboratory testing. All the product categories have been checked against the framework criteria in order to narrow down the list to three models for each product category. The implementation of the specific approach, be it targeted or semi-random is applied on a case-by-case basis, depending mainly on the background information and expert analysis available. In general, the following overarching principles apply:

a. A targeted selection will be implemented in those cases where brands and/or models have been identified as part of the ANTICSS consultation,

b. Alternatively, when no brand/model has been referred to in the 'circumvention' or 'jeopardy effect' case, a semi-random selection will be applied where the main search focus will be on the technical features or peculiarities derived from the assessment conducted by the testing laboratories.

c. Lastly, should the previous approaches still not delimit the necessary shortlist, other selection criteria based on expert judgement and if necessary, full randomization will be utilised.

The sequence for the three final models selection is implemented through the following steps, taking into account the considerations outlined above:
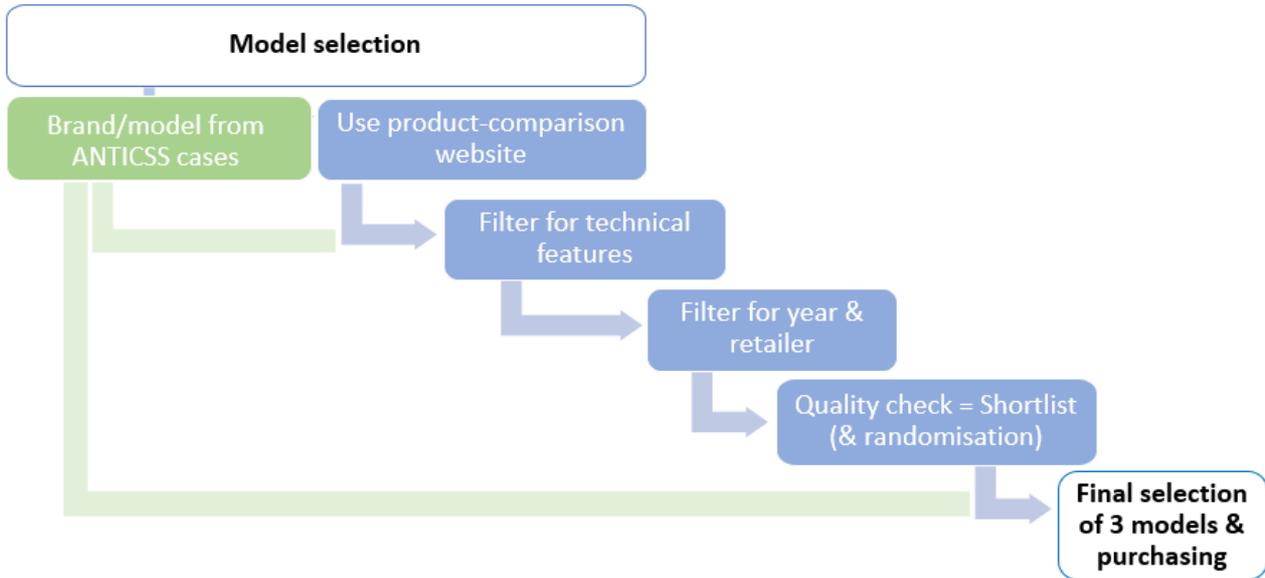
Figure 2:   Methodology for the selection of the models to be tested in ANTICSS

3.2.1   Identification of framework criteria for the model selection

The project team discussed and agreed on the most valid and relevant criteria to be used for the purpose of model selection, as demonstrated in the following table:

Table 2: Criteria included in the model selection

Criteria	Justification for inclusion in the model selection
Brands and/or models identified in ANTICSS-reported cases (see section 3.2.2)	Project knowledge on hints of circumvention.
Presence of technical features and/or functionalities identified as risks for circumvention in ANTICSS cases[4,5]	Such features are likely to increase the risk of circumvention devices or techniques. The assessment of the ANTICSS cases by the testing laboratory partners in the project (i.e. FFII-LCOE, Re/gent, VDE and IMQ) identified key technical features and/or functionalities as possible hints for circumvention.
Presence of components that increase the risks of circumvention potentialities (e.g. electronics, smartness, sensors, etc.)[4]	Such components are likely to increase the risk of circumvention devices or techniques.
Presence of suspicious programmes, modes, and/or settings[4]	Certain programmes or modes might be used as cover up for circumvention or jeopardy strategies.
Models at high energy performance claims (e.g. energy class)	It is assumed that circumvention is more likely to occur in products that claim high performance than for models at the bottom end of the market, as the race for the top classes often remains fierce between manufacturers. Furthermore, products in the highest classes are frequently more sophisticated (with more controls, electronics, etc.) which increases the risks of circumventing features. For the low end products, meanwhile, the cost of including a circumventing system is likely not to be recovered via the purchasing price.
Models put on the market recently[6]	Due to their potential to remain on the market for a longer period as compared to older models and thus to have relevance after the termination of the project.
Geographical coverage: models sold in the country where test labs are located	For this exercise in particular, products will be bought within the countries where the testing labs are located in order to avoid possible issues due to the shipment, namely: Spain (FFII-LCOE), The Netherlands (Regent), Germany (VDE), and Italy (IMQ).

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[4] In the ideal case, the researched feature/mode can be filtered through the online product platforms. When this is not the case, the feature/mode/programme may be indicated in the technical product fiche. Lastly, in those cases where the sought feature/mode/programme is not indicated in the technical fiche neither filterable online, then a case-by-case detailed manual check of all the product-related information available online is applied.

[5] See *D4.1 Alternative test methods and approaches to unmask circumvention under EU Ecodesign and Energy labelling* where testing laboratories partners in the project have analysed in detail all the 'circumvention' and 'jeopardy effects' cases in each of the product categories to facilitate the model selection.

[6] There are some indications that can help identifying this: sometimes online shops provide the date of introduction of the model or there are filters for catalogues of different years. Furthermore, the price might be an indication: if the model seems to be sold at a particularly cheap price on several online shops, then it is probably close to discontinuation. Also, if the model is only found on one online shop and nowhere else, it may be an indication of end of commercial life.

In addition, the following criteria were also considered by the project team but not taken into account for the final model selection:

Table 3:   Criteria excluded from the model selection

Criteria	Justification for exclusion from the model selection
Brands with history of fraud or high level of non-compliance	The criterion was deemed too uncertain for the purposes of the project. It might also be the case that due to the identified history brands already took action. The goal of ANTICSS is to focus on technical criteria rather than on bad reputation.
Brands and/or models with high market share, i.e. because of their greater potential to impact on energy usage as compared to models with low sales volumes and due to the exposure to consumers too	It is not feasible to incorporate this kind of data in the overall selection methodology.
Brands and models at high price segments	It is not relevant to target only a specific price segment, because prices depend on many aspects and not only efficiency. In general, high efficiency/performance models are also in a high segment of the market, although not necessarily the highest.
Brands and models at low price segments	It is not relevant to target only a specific price segment, because prices depend on many aspects and not only efficiency. Moreover, the cost of introducing a circumvention system will not be recovered via the lower purchasing price, which limits the economic benefit from cheating specifically through circumvention.
Brands and models at low energy performance claims (e.g. energy class)	Circumvention at low energy classes is unlikely, as the benefit from cheating specifically through circumvention is limited. The current levels of minimum ecodesign and energy labelling requirements are relatively easy to reach for most products (they have been in force for several years now and the market shows a lot of products in the upper efficiency classes).

3.2.2 Identification and selection of specific brands/models reported in the ANTICSS consultation

Specific brands and/or models reported as part of the stakeholder input that the ANTICSS project collected through the consultations in the previous work packages WP2 and WP3 will be targeted when possible[7].

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[7] Note that only few cases reported in WP2 and WP3 and classified by ANTICSS partners as 'circumvention' or 'jeopardy effects' referred to a specific brand/model.

Although the sample of the questionnaires received is limited to the context of the project, ANTICSS partners decided to prioritise those product brands and/or models for which specific cases had been reported and categorised as 'circumvention' or 'jeopardy effect' to increase the likelihood of finding circumventing appliances when tested. If such potential models are continued to be suspected of possible circumvention, there is an added value from further investigation. Therefore, if those models (or variants from the same brand) are still available on the market, they are selected for further testing as part of the three models in the given product group. In case less than 3 models are identified as part of the reported cases, the remainder of the shortlist will be designed on the basis of the following framework criteria.

3.2.3 Selection of models on the basis of framework criteria

Once the framework criteria are decided upon and deemed fit for the purpose of this task (in case no specific brand/model had been identified by stakeholders in the cases in relation to the specific product group), the most convenient approach for proposing a list of five to a maximum of ten models was set. The following are the generic steps for the shortlisting process:

- Step #1: Using product comparison websites present and operating in several EU countries (e.g. Idealo in the cases of Spain and Germany) for displaying products in the country where the testing laboratory is located. These wide online product comparison websites include readily available filters to facilitate product selection.
- Step #2: Filtering for technical features or information requirements as identified by the testing laboratories as possible hints for circumvention. The experience and expertise of test labs and other project partners in WP4 when designing the alternative testing methods not only concluded on the final product categories to be tested, but also drew key conclusions on the specificities of the products to facilitate the model selection. In this sense, the laboratories identified – when possible – key technical features or particular information requirements to focus on for the specific model selection based on the 'circumvention' and 'jeopardy cases' recorded. Furthermore, models with presence of components that increase the risk of circumvention potentialities (e.g. electronics, smartness, sensors), and models at high energy performance claims (e.g. A+++) are favoured.
- Step #3: Filtering for the availability of the product in the market, considering the date of placing on the market (i.e. favouring products that are introduced on the market in 2019 or 2018) and availability for purchase from a retailer located in the country where the testing laboratory is to ensure minimal transport delays and damage risks.
- Step #4: Quality check. Manual validation to ensure, among others, that the shortlisted models are not simple variations of the same model, check of mandatory documents/information to make sure that the filters applied in steps #1 and #2 are correct, that models are in stock, etc.

3.2.4 Selection of models from the shortlist (when appropriate)

In those cases where the resulting filtered selection includes more than three models, a further manual selection is carried out based on the following criteria:

- At least three different brands and manufacturers (if possible);
- Model prices within reasonable boundaries[8];
- Expert assessment on circumvention potential (based on the product declaration, energy class, features, comparison with other similar products, other relevant aspects).

Should the resulting shortlist still comprise a large amount of models, the final selection of the three models will then be randomised.

3.2.5 Purchase of the three models for testing

Selected models will be purchased by the project coordinator OEKO and delivered to the laboratories directly. Three models will be selected for each product category (1 unit x 3 models x 9 product categories[9]), the maximum of 27 appliances will be purchased for testing in total.
In case one of the selected product models is not available at the moment of purchase, it will be replaced by another one randomly picked from the previous list of 5 to 10 identified products.

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[8] An average of 1.500 € per unit comprising purchasing costs including logistics as noted in the Grant Agreement
[9] While the finally selected categories are eight, the detailed assessment of the cases 'Heaters 1' and 'Heaters 2' concluded that each case corresponded to a different product type: condensing boilers and air-to-water heat pumps, accordingly. Therefore, it was decided to split the category "space heaters" into two sub-categories and to select and purchase three models of condensing boilers and three models of air-to-water heat pumps for alternative testing.

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Austria: BMDW - Bundesministerium für Digitalisierung und Wirtschaftsstandort

Belgium: ECOS - European Environmental Citizens Organisation for Standardisation

Belgium: BHTC - Service public federal sante publique, securite de la chaine alimentaire et environnement

Czech Republic: SEVEn - SEVEn, the Energy Efficiency Center, z.u.

Czech Republic: SEIA - Státní energetická inspekce

Germany: OEKO - Oeko-Institut e.V., Institute for Applied Ecology

Germany: GRS - Regierung von Schwaben – Gewerbeaufsichtsamt

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Italy: IMQ - Istituto Italiano del Marchio di Qualità S.p.A.

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