Energy efficiency standards and labelling of household appliances in Algeria – from programme design to implementation

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ABSTRACT

The Algerian National Agency for the Promotion and the Rationalisation of Energy Use (APRUE) has designed a comprehensive programme of energy efficiency standards and labelling for household appliances in Algeria beginning with refrigerators and freezers. This paper reports on the status of this programme and the supporting activities upon which it is based, that have been conducted within the framework of a technical co-operation programme with the European Commission. Thus far the following primary activities have been carried out:

- An analysis of the market of refrigerators and freezers, including a statistical analysis of product energy consumption and efficiency levels enabling the economic, social and environmental impacts of alternative policies for standards and labelling to be assessed
- The development of product categories for labelling purposes
- The establishment of test procedures in accordance with relevant international standards
- Definition of the necessary test installations and procedures
- Proposals for administrative rules governing the evaluation of conformity
- Proposals for a market transformation strategy, taking into consideration various options of labelling, minimum efficiency standards and a legal framework based on the Algerian Energy Efficiency Law and relevant secondary legislation
- A preliminary proposal regarding label design and the development of a national energy efficiency labelling plan.

In addition to the presentation of the main achievements so far, the paper focuses on the following issues:

- The process of creating the basis for co-operation and participation of stakeholders (industry, government institutions, consumers) – including barriers encountered and solutions
- The implementation of the programme: problems to be solved and prospects
- The prospects of regional harmonisation with similar activities occurring in other countries within the Maghreb.

1. CO-OPERATION PROJECT EUROPEAN UNION - APRUE

Between September 2001 and December 2002, the Algerian National Agency for the Promotion and the Rationalisation of Energy (Agence National pour la Promotion et la Rationalisation de l'Utilisation de l'Énergie - APRUE) conducted a study and performed related awareness building activities on the "Regulation of Electric Household Appliances". These activities were carried out in the framework of a co-operation project with the European Union, with the participation of public and private partners and with the support of European experts. The principal tasks realised in the framework of the project were:

1. Review of policies, legislation and regulations related to energy efficiency programmes
2. Orientation of APRUE staff and project partners regarding the international and European state-of-the-art for equipment energy efficiency policy with a mind to the strategic options in Algeria
3. An assessment of the market for refrigerators and freezers in Algeria, based on a statistical analysis of the market
4. Formulation of proposals for equipment energy test procedures
5. Specification of an energy efficiency test laboratory and of a system for energy efficiency conformity evaluation
6. Estimation of the investment and operational cost of such a laboratory
7. Consideration of the most appropriate type of energy efficiency label and orientation of project partners regarding potential consumer research to guide the label design process, and
8. Orientation of project partners regarding a national energy efficiency standardisation and labelling plan for refrigerators and freezers and for other electric household appliances and assistance in the formulation of a work plan for future activities.

Various seminars and technical workshops were realised in order to sensitise the partners and to confirm their co-operation. The purpose of this article is to present the results of this co-operation project, to discuss barriers encountered and to outline the future plans of the Algerian Government and APRUE to implement a full standards and labelling programme for household appliances, focussing in the first place on refrigerators and freezers.

2. POLICIES AND LEGISLATION FOR THE PROMOTION OF ENERGY EFFICIENCY

The elaboration of energy efficiency standards and requirements for appliances is a part of the National Energy Efficiency Programme (Programme National de Maîtrise de l'Énergie - PNME) of the Ministry of Energy and Mines. The Energy Efficiency Law (Loi relative à la Maîtrise de l'Énergie no. 99-09) of July 1999 defines the reference frame for the orientation and management of energy demand and declares energy efficiency to be an activity of public usefulness. Concerning

energy efficiency standards and labelling, the Law requires the mandatory labelling of every new or used appliance to be sold on the national territory. The Draft Executive Decree, which determines the general rules concerning the energy efficiency of appliances operating on electricity, gas and petroleum products (Projet de Décret Exécutif fixant les règles générales relatives à l'efficacité énergétique des appareils fonctionnant à l'électricité, aux gaz et aux produits pétroliers), defines issues like the labelling of appliances and the information of users, the control of energy efficiency and the rules for imported appliances, both new and used. In particular, the draft executive decree requires that the label has to be of a comparative type and ought to classify the appliances according to categories (as is the case for the Australian, European and Korean labels for example). The draft executive decree also stipulates that the energy performance requirements of the appliances will have to be set by Government orders.

Taking into consideration the incidence of electric appliances in households and the distribution of the energy consumption of the residential sector by end-use, refrigerators are the most important appliance, with a penetration rate in households of more than 80%. The energy performance of the products are currently a minor criterion in consumer purchasing decisions and are absent from the preoccupations of retailers. By contrast, several Algerian manufacturers say that they are already aware of the importance of energy efficiency and environmental issues.

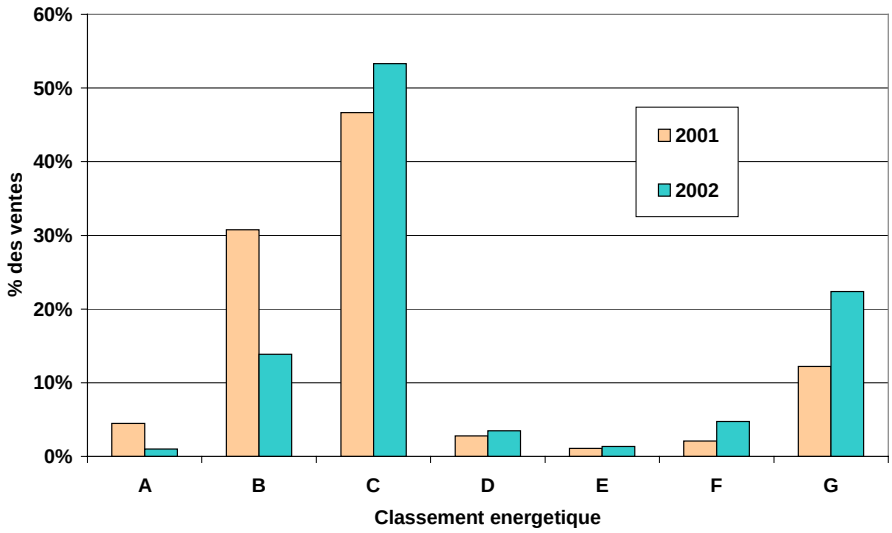
3. ASSESSMENT OF THE ALGERIAN MARKET FOR HOUSEHOLD REFRIGERATORS AND FREEZERS

In order to be able to analyse the market for refrigerators and freezers in Algeria, APRUE organised a survey of the eight principal manufacturers in the country. A questionnaire was circulated, which asked for technical and commercial data of each model manufactured in Algeria, including models that are imported as "kits" and assembled in the country. Taking into consideration the varying degrees of co-operation from the manufacturers, the results of the survey were complemented and partially verified with international market information and data from the National Centre of Statistical Information (Centre National de l'Information Statistique - CNIS) of the General Directorate of Customs (Direction Générale des Douanes). The data received from the manufacturers and from public sources made it possible to build an approximate data base of the market, with regard to: the size of the market (total, per manufacturer and by appliance category), the numbers and percentages of models by energy label class (according to the European system specified in Directive 94/2), the distribution of sales by label class and the distribution of sales by energy efficiency index according to the European system.

Taking into consideration the uncertainties as a consequence of the incomplete data available, the results of the market assessment are only estimates. According to these, however, some 309 000 refrigerators were sold in Algeria in 2002, which

means an increase of 28% from 2001 and of 35% from 2000. In this period (2000-2002) the market was dominated by two principal manufacturers. Nevertheless, the market share of these two companies decreased from 92% in 2000 to 86% in 2002, to the benefit of smaller manufacturers. Regarding the sales by product category, ~ 90% of the sales are of three categories: refrigerator-freezers with 4 stars (category 7), refrigerators with 3 star compartment (category 6) and refrigerators with 2 star compartment (category 5). In terms of energy efficiency, the majority of the models sold on the market would be in the European labelling classes C, B and G (there is only one class A model). Apparently, there is an influence of the European policy on the Algerian market as one can see that the majority of the models and the sales are in conformity with the requirements of the European minimum energy performance standard 96/57/CE. In 2002, 72% of the sales were in conformity with the European requirements, i.e. with classes A, B and C (figure 1). The distribution of sales by the energy efficiency index indicates an important peak linked to class C (figure 2). The average-weighted consumption of the sales was between 481.4 and 484.0 kWh/year in 2002, compared to 364 kWh/year in Europe (1999).

Fig. 1. Percentage of sales of refrigerators and freezers in Algeria in 2001 and 2002 by energy label class according to the European labelling system (preliminary figures)

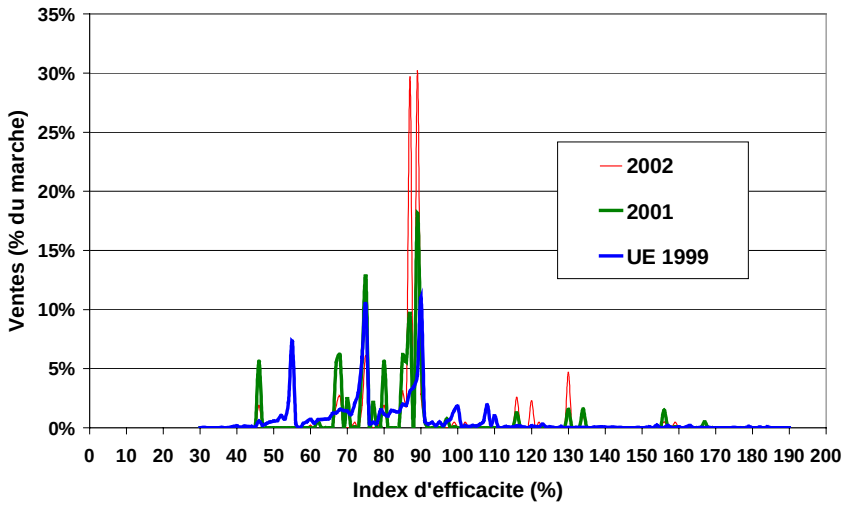


While the analyses of the impacts on the economy, consumers and industry, as well as on the environment - for different standards and labelling policies - will be the subject of future activities of this project, it is possible to make some preliminary remarks. If Algeria were to implement the European requirements for minimum energy consumption standards according to Directive 96/57/CE, the principal effects would be: (i) the elimination of a minimum of 28% of the models from the Algerian market, (ii) the improvement of the average energy efficiency

index of the models on the market from 93% to 84% and of the average-weighted energy efficiency index of the sales to the market from 103% to 86%, (iii) the improvement of the average consumption of the models on the market from 484 kWh/year to 400 kWh/year per appliance and of the average-weighted energy consumption of the sales to the market from 464 kWh/year to 430 kWh/year.

If Algeria would implement the minimum energy performance standards (MEPS) at an energy efficiency index of 55% (as recommended for the European market in the COLD II study (2000)), the principal effects would be: (i) the elimination of at least 98% of the models from the Algerian market, (ii) the improvement of the average energy efficiency index of the models on the market from 93% to 55% and of the average-weighted energy efficiency index of the sales to the market from 103% to 55%, (iii) the improvement of the average consumption of the models on the market from 484 kWh/year to 293 kWh/year per appliance and of the average-weighted energy consumption of the sales to the market from 464 kWh/year to 254 kWh/year.

Fig. 2. Distribution of sales of refrigerators and freezers in Algeria in 2001 and 2002 by energy efficiency index according to the European labelling system (preliminary figures)



4. ENERGY EFFICIENCY TEST PROCEDURES, INSTALLATIONS AND INFRASTRUCTURE FOR TESTING AND CONTROL AND SYSTEM FOR CONFORMITY EVALUATION

A precondition for the development of a system of energy efficiency labelling and standards is to establish energy test procedures for the products, which will be subject to labelling or to energy performance standards. In accordance with the

legislation and regulation in force, the test procedures have to be homologated as mandatory Algerian standards. For this purpose, a pre-standardisation task was conducted by a working group set up at APRUE and composed of the representatives of Government entities, the Algerian Standardisation Institute (Institut Algérien de la Normalisation - IANOR), the Algerian Centre for Quality Control (Centre Algérien du Contrôle de la Qualité et de l'Emballage - CACQUE) and industry. This resulted in the agreement by the working group to adopt the relevant ISO test standards for refrigerators and freezers : ISO 8187 :1991, ISO 5155 : 1995, ISO 7371 : 1995 and ISO 8561 :1995, as well as the European standard EN 153 (methods of measuring the electricity consumption and associated characteristics) and the standard ISO 8960 :1991 (measurement of airborne noise emissions). The standard ISO 8187 was already adopted as Algerian standard NA 9765, without modifications. The adoption of the European standard EN 153 implies the application of a uniform ambient test temperature of 25^{o} C for all climate classes (SN, N, NT, T) of cold appliances. The study realised by APRUE confirmed that the climatic conditions and the characteristics of the built environment and of the utilisation of appliances in Algeria justify this choice of temperature.

Test laboratories in Algeria are classified into one of three categories: laboratories for self-control (category 1), service laboratories (category 2) and licensed laboratories for the repression of fraud (category 3). A laboratory is licensed by Government order following the examination of the request by CACQUE. At this moment, the only laboratory that is equipped to realise energy efficiency tests is the self-control laboratory of one of the principal manufacturers of electric household appliances. Despite the existence of this laboratory, there is a consensus among the members of the working group that the establishment of an independent licensed laboratory should be a priority. This laboratory should be capable of testing four appliances simultaneously in accordance with international standards like EN 153. The investment costs have been estimated at between €138000 and €189000 (excluding the building). The operational costs should be covered by testing fees. A programme for training and technical assistance to the personnel of the laboratory should accompany the implementation of the laboratory. Notwithstanding the existence of legal provisions concerning the homologation of standards and the licensing of laboratories for quality analysis, the next step should be the creation of a system for the accreditation of laboratories in conformity with international rules, including the accreditation of organisations for conformity evaluation, and the development of international co-operation, notably concerning the mutual recognition of tests and the conformity certification of products. In the absence of a system of accreditation of laboratories - and of accredited laboratories in the country - transitory rules for the recognition of results should be established.

5. DESIGN OF THE ENERGY EFFICIENCY LABEL

Taking into consideration legal and regulatory provisions and other aspects, in particular commercial (the privileged commercial relations between the European Union and Algeria), practical (the adoption of the principal aspects of the presentation of the European label implies that it would not be necessary to develop and test experimentally new concepts for energy classification labels in Algeria) and of confidence (the success of the European programme of energy classification in the transformation of the market of household refrigerators and freezers could be repeated in Algeria), the working group has expressed its preference to adopt the principal aspects of the presentation of the European energy efficiency label for its utilisation in the Algerian context.

Notwithstanding this decision, certain variations on the design level compared with the European label should be tested among the principal Algerian actors, notably the consumers, but also the manufacturers, the retailers and the public administration: (i) the energy efficiency scale including the orientation of the arrows, (ii) the language(s) of the label, (iii) the inclusion of information on the operational costs, (iv) the inclusion of supplementary information, e.g. the noise level, and (v) the inclusion of an official symbol, e.g. the Algerian flag. When evaluating the different options, it will be imperative to examine the possibility to transpose the suggested elements to the labels for other products than household refrigerators, such as air conditioners, washing machines, dishwashers, etc. Following the endorsement of these parameters by the working group, a precise set of tests should be elaborated, in collaboration with a marketing research agency and a graphic designer, in order to allow the maximum information to be gathered on the implications of the various labelling options. Potential variants for the label should be developed and tested, related to the parameters mentioned. It is foreseen that APRUE will organise quantitative and qualitative consumer research, such as surveys and focus groups, in order to determine the most effective appearance of the label. It will be necessary to ensure that the participants in the research are sufficiently representative of the entire appliance purchasing population to allow safe conclusions to be drawn from the research.

6. A NATIONAL PLAN FOR ENERGY EFFICIENCY STANDARDISATION AND LABELLING FOR REFRIGERATORS AND FREEZERS AND OTHER ELECTRIC HOUSEHOLD APPLIANCES

The objective of every standards and labelling programme should be the transformation of the market of the appliances concerned. In general, various options exist to attain this objective: (i) “market pull” measures, like energy efficiency labels, and (ii) “market push” measures, like mandatory minimum energy performance standards or corresponding voluntary agreements. The strategy for market transformation in Algeria should be based upon - in accordance with the legislation and regulation in force and proposed respectively -

two principal instruments: (i) the mandatory labelling of the target appliances selected and (ii) the introduction of mandatory minimum energy performance standards. The selection of target appliances to be included in the labelling and standards programme should be based upon an analysis of the importance of the different appliances, with regard to their contribution to the final energy consumption of the residential sector and the economic and environmental benefits which can be realised by replacing existing appliances by more efficient ones. A labelling support programme should define the responsibilities of the partners, awareness building activities and a programme for follow-up and evaluation.

The Draft Executive Decree which determines the general rules concerning the energy efficiency of appliances operating on electricity, gas and petroleum products, foresees various joint / inter-ministerial orders to define the requirements and specific rules concerning: (i) the appliances and the categories of appliances submitted to the provisions of the decree, (ii) the national requirements in terms of energy performance of the appliances, (iii) the energy efficiency classification of the appliances, (iv) the system of labelling by appliance categories and (v) the modalities of the organisation and the exercise of the control of the energy efficiency.

7. FUTURE ACTIVITIES

The activities realised in the framework of this project have provided important elements for the realisation of an integral programme for standardisation and labelling of electric household appliances in Algeria. It is therefore the intention of APRUE to continue these efforts via the following activities:

1. To put into force the “Draft Executive Decree which determines the general rules concerning the energy efficiency of appliances operating on electricity, gas and petroleum products” and to develop the necessary implementing regulations
2. To elaborate a detailed study of the Algerian market of household refrigerators and freezers, based on the assessment realised
3. To evaluate the impacts, notably the costs and benefits for consumers and manufacturers and the impacts on the environment, of different policies concerning energy efficiency standards and labelling
4. To homologate the ISO and EN standards mentioned as Algerian Standards
5. To implement an energy efficiency test laboratory, including training personnel
6. To assist Algerian manufacturers to develop their capability to design and manufacture efficient appliances
7. To design and implement campaigns for the information and awareness raising of the consumers concerning the benefits of efficient appliances, including lifecycle costs
8. To train retailers and salespersons

9. To develop a system of energy efficiency conformity evaluation in conformity with international rules, including a system for the accreditation of laboratories and of mutual recognition of test results
10. The final conception and design of the energy efficiency label, based upon research among consumers, manufacturers, retailers and the public administration
11. To elaborate and implement a national market transformation strategy, for refrigerators and freezers and other electric household appliances, based on mandatory labelling and mandatory minimum energy performance standards.

The project of the European Commission and APRUE has established the foundations needed to realise this ambitious programme, nevertheless, various barriers still have to be overcome. In particular in the areas of: the adhesion of all manufacturers to the programme, the awareness of the consumers and the perfection of the legal and institutional frameworks. Among the future options is also the potential harmonisation of the Algerian standards and labelling programme with neighbouring countries in the Maghreb.

8. REFERENCES

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