

Lifting the label: evaluating the real impact of energy labelling in Vietnam

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Abstract

In 2007, the Vietnamese Government announced that it would introduce minimum energy performance standards and mandatory energy labelling on some lighting and electrical appliances from 2013. The Australian Government provided support to Vietnam in a range of areas including impact assessment.

This paper will report on the use of contribution analysis to evaluate the national impact of different product policy measures on the Vietnamese market for the first products to be covered by the program; fluorescent lamps and ballasts, fans, air conditioning, rice cookers and washing machines.

Traditionally, the national impact of MEPS and labelling programs is estimated using an end-use impact assessment model. This type of model examines the national stock or ownership levels, sales volumes, lifespan and typical use patterns of products, to estimate national energy consumption and related indicators over a number of years. Importantly, the efficiency distribution of new products sold is used to drive such models, since this is the main focus of labelling and related product policy measures. The most challenging aspect for such impact evaluation models is the attribution of the impact to different policies and other factors that would affect the distribution of the efficiency of products sold.

To overcome the attribution challenge in end-use modelling, research evidence was used (alongside data from the monitoring, verification and enforcement systems) to estimate the scale of the contribution made by the different policy elements to overall energy savings. Research was conducted with consumers, retailers and manufacturers to assess whether the energy labelling policy (from its announcement in 2007) had any effect on:

- Decisions by manufacturers and importers about the products they offered to the Vietnamese market.
- Retailers' policies and their communications with consumers.
- Consumer decision making.

In addition, a survey of 1,380 households has captured data on the use of individual appliances in the home and whether this varies by day of the week or by season. This has enabled more accurate estimates of energy consumption and energy savings to be made.

Contribution analysis of this nature allows policy makers to evaluate whether, and how, individual measures contribute to market transformation. This allows product policy programs to be designed and implemented more effectively.

Background

The Government of Vietnam announced in 2007 that it would introduce Minimum Energy Performance Standards (MEPS) and Energy Labelling for lighting and electrical appliances. Appliance manufacturers and importers would be required to meet the standards for their products and ensure they displayed the mandatory labels.

An endorsement label is used for lighting products that meet a high efficiency standard. A categorical comparison label is used for the other products where the threshold for one star is the MEPS level and increasing stars (up to five stars) signify increasing efficiency of the product on the market. The two labels are displayed below:



Figure 1: Endorsement Label (left) and Categorical Comparison Label (right)

Prior to the introduction of the mandatory regulations a voluntary labelling scheme was established for fluorescent lamps, ballasts and electric fans. This allowed manufacturers to display the endorsement labels for efficient products. This paper considers the consumer products to which MEPS and mandatory labelling applied from 1 July 2013; compact and tubular fluorescent lamps, ballasts, electric fans, air conditioners, rice cookers and top loading washing machines. We also consider televisions and refrigerators, which were included in the regulations from 1 January 2014.

Product	Voluntary label	Mandatory label	MEPS
Compact fluorescent lamps	✓		✓
Tubular fluorescent lamps	✓		✓
Electronic ballasts	✓		✓
Electromagnetic ballasts	✓		✓
Air conditioners		✓	✓
Washing machines		✓	✓
Rice cookers		✓	✓
Electric fans	✓	✓	✓
Televisions		✓	✓
Refrigerators		✓	✓

Table 1: Products subject to MEPS and labelling regulations

The Australian Government commissioned a market survey to assess the level of appliance ownership and use in Vietnam. Face-to-face interviews were conducted in home with 1,380 households in thirteen representative locations. The interviews covered when and how appliances were used, purchase behaviour and attitudes to energy efficiency. Interviewers also inspected the lighting and appliances in the home.

These products covered are estimated¹ to consume around 30,000 GWh p.a. in 2013; this is over two-thirds of the total electricity consumed by Vietnam’s households and costs householders US\$ 2.1 thousand million². The data from the survey has been compared to electricity consumption data from Electricity of Vietnam (EVN) and the International Energy Agency which both give similar figures for domestic energy consumption (IEA 2010).

The estimated breakdown of this expected consumption for key products and projections to 2030 are shown below in Figure 2.

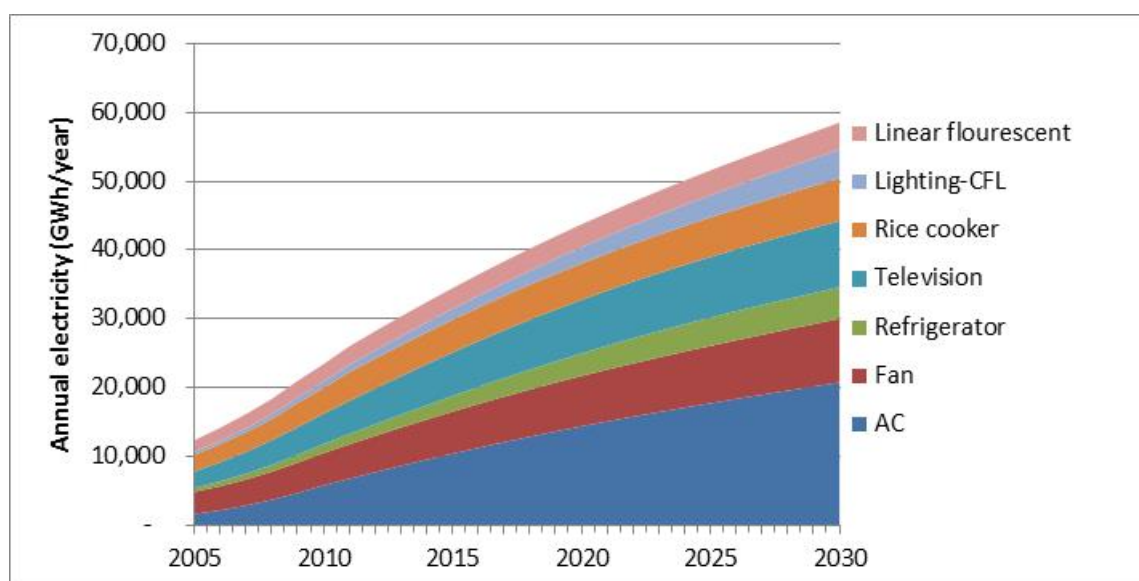


Figure 2: Electricity consumed by selected first wave products (Source: Based on an end-use model developed for this project by the current authors)

The energy consumed by these appliances has trebled in the last ten years (consistent with data from EVN); this growth is expected to continue, and double by 2030 (this growth is consistent with unpublished forecasts produced by the Institute of Energy, Hanoi for EVN). This increase is being driven by increasing numbers of households and levels of appliance ownership; primarily due to increasing wealth in Vietnam and the falling costs of such consumer durables. The average household ownership of each of the products, along with projections to 2030 is shown below:

	2010 ³	2020	2030
Air Conditioner	0.09	0.19	0.25
Electric fan	2.58	3.24	3.50
Refrigerator	0.40	0.85	1.05

¹ VEESL market survey 2012

² All financial figures are given in US\$ for clarity. There current conversion rate is US\$1=VND21,000

³ The data for 2010 are from the VEESL market survey and are consistent with those from the General Statistics Office Living Standards Survey

Washing machine	0.78	0.92	0.95
Television	1.02	1.29	1.35
Rice cooker	0.99	1.05	1.05
CFL	2.01	4.18	6.35

Table 2: Average household ownership of selected products in 2010, projected to 2020 and 2030

Current state of the market

It is a requirement of new products to be placed on the market to be registered with the Vietnamese Government. These registration data can provide an insight into the efficiency of the products being placed onto the Vietnamese market. By March 2014, over 4000 products had been registered in compliance with the mandatory labelling and MEPS programmes. An analysis of the products registered in compliance with the mandatory 1-5 star labelling regulations by March 2014 showed the following distribution of energy efficiency performance by model⁴:

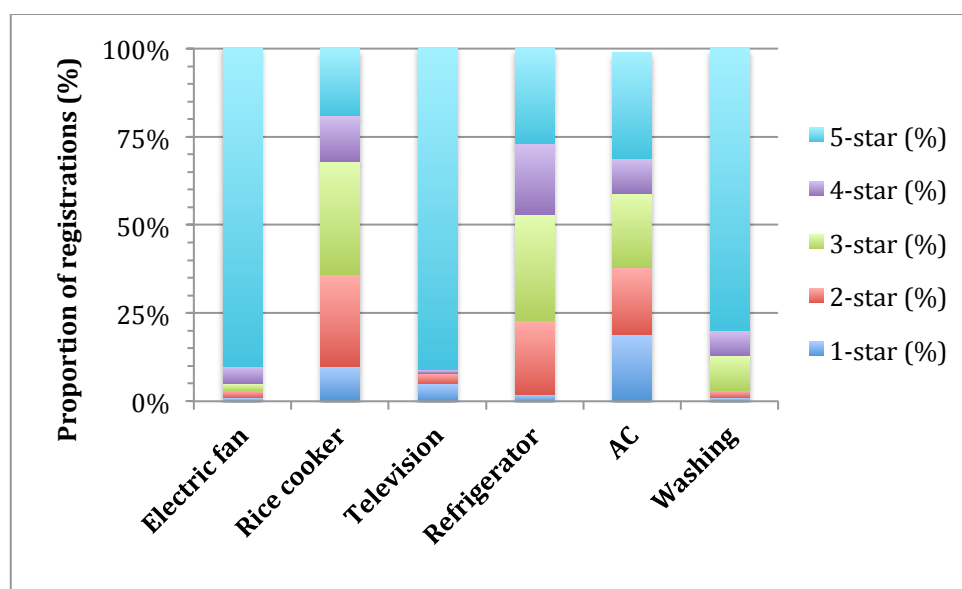


Figure 3: Efficiency performance of products registered by March 2014⁵

It can be seen that almost all the electric fans, televisions and top loading washing machines that are registered with the program meet the five star efficiency requirements. There is a wider distribution of performance for the other products.

Registration of CFLs, linear fluorescent lamps and ballasts is only necessary if suppliers wish to claim the high performance levels and display the endorsement label. As such, we cannot know if there are high performance products available in Vietnam that have not registered to display the label, nor the proportion of lamps and ballasts on the market that are not classified as high efficiency.

Methodology

The approach to estimating the impact of the recent MEPS and labelling regulations is based on two main methodological tools:

⁴ Data are not yet available to analyse energy efficiency by sales volume.

⁵ Ministry of Industry and Trade, Hanoi, Vietnam

- Developing an end-use impact assessment model, with a projection of expected future consumption without any policy intervention.
- Attributing any observed changes in the sales of products to different measures and activities.

The starting point to the analysis is to develop a realistic end-use model, where the key underlying variables and assumptions involved are:

- Change in household numbers.
- Change in ownership and volume of sales of products.
- Expectation of future sales mix without any intervention.
- The typical usage patterns of the products being used.

These variables are populated where possible with the most reliable data, ideally from large government endorsed surveys. These have been interpolated for missing years, and projected into the future to develop a base case scenario. A bespoke end-use model has been developed for Vietnam by the current authors (with outputs as shown in Figure 2). By changing the inputs of the model, the impact of changing assumptions can be understood.

The projection of the efficiency of the future sales mix is a key variable for such models. For the base case a continued increase in the average efficiency of products sold has been assumed based on recent rates of improvements. Policy measures which affect the sales mix are then relative to this base case.

Such models are relatively well understood (e.g. DECADE 1997, Lane 2000), and are increasingly being used as effective policy evaluation tools (e.g. Lane and Harrington, 2010). The expected consumption by the different end-uses and projected consumption of the business as usual case – where no further policy measures are taken into consideration.).

The attribution of any energy savings due to specific efficiency measures is usually more challenging/problematic to identify, especially where there are multiple actions taking place. Usually, the attribution for MEPS and labelling is done based on the following argument:

- The first program measure to be implemented usually ‘takes the credit’ for any observed effect.
- Where multiple policies are in places and overlap, the mandatory regulation takes the credit; e.g. all the energy savings in meeting the MEPS thresholds from removing products that do not meet MEPS are assigned to the MEPS program.
- Consumers would not be able to choose products that are more efficient than MEPS without the information provided by the Energy Label, so any additional benefit beyond MEPS is usually attributed to the Energy Label (in the absence of other measures being in place).

This ‘traditional’ approach may not always attribute the savings appropriately. Specifically, this final assumption is flawed in two respects; first, other factors influence how consumers select products including other government policies and manufacturers’ promotional activities and second, if there were no energy label, consumers would still be able to obtain information about products’ energy consumption (albeit with additional effort). In order to address this challenge, research was conducted with manufacturers, retailers and consumers to improve our understanding of the contribution made by the policy to energy efficiency. The research involved:

- Qualitative interviews with manufacturers and importers of the first wave products; suppliers with a combined market share of more than 50% took part in the research for each product. These interviews explored whether the supplier:

- Had a deliberate policy relating to the energy efficiency of their products and, if so, whether that policy had been influenced by the introduction of the energy label
- Had increased the energy efficiency of any of their products since the introduction of the regulations and, if so, whether that decision had been influenced by the energy label
- Used the energy label in their advertising or other communications with customers
- Qualitative interviews with retailers covering independent, specialist retailers and electrical supermarkets that would sell a wide range of appliances. The research covered six of the top ten chains in Vietnam as well as a range of independents. The interviews explored:
 - Whether the star rating of a product influenced the retailers' willingness to stock it
 - How the retailer answered customer queries about energy efficiency and running costs and whether that changed following the introduction of the label
 - The retailer's opinion of customer priorities and whether they used the label to assist them to select products
- Focus groups with consumers to explore how they made decisions about the purchase of electrical appliances and whether energy efficiency was an element of their decision making. Where energy efficiency was important we explored the role of the label in supporting their decision making. Although the focus groups do not provide a statistical insight they provide a detailed understanding of how the label might influence consumers to purchase energy efficient products.
- A quantitative survey of 1,380 consumers that established the extent to which factors are important to them when they purchase particular products.
- A review of manufacturers point of sale and other promotional material to identify energy saving claims being made for products.

Contribution of the energy label to energy efficiency

Using the information from the various elements of research we have assigned a value for the contribution to energy savings made by each of the three elements of the policy:

- The introduction of voluntary endorsement labels in advance of the mandatory schemes.
- MEPS.
- The mandatory comparison label.

For each of the products covered by this study a value has been assigned according to whether the label was found to have been:

- The only factor influencing energy savings; in this case 100% of the savings above the MEPS level were attributed to the label.
- The most important factor influencing energy savings; 50% of savings.
- One of a number of factors with some influence on energy savings; 25% of savings.
- Not influential; no savings were attributed to the label.

Some general findings from the research were useful in assessing this contribution:

- Consumers do not have a good understanding of the label; where they are aware of it they tend to see the label as an indicator of quality rather than energy efficiency.

- Consumers value energy efficiency for air conditioning. However, they do not see other products as consuming significant quantities of electricity and so place a lower priority on energy efficiency in their purchase decision-making.
- Many consumers assume that a product from a reputable brand will be energy efficient.

Lighting

Lighting products were covered by the voluntary label; from interviews with manufacturers we know that:

- The largest manufacturer said the voluntary label had a big impact on them and prompted them to work towards more efficient compact fluorescent lamps and ballasts in advance of the minimum energy performance standards. They have also established an LED programme as they expect regulations to become more demanding in future.
- One major importer has stopped importing low efficiency lamps and ballasts into Vietnam since the introduction of the voluntary label

However, there is low consumer awareness of the label and it seems unlikely to be influencing purchase decision-making. Therefore, the main contribution of the policy to date seems to be in its impact on the behaviour of manufacturers and importers who are now offering more energy efficient products as a result; accordingly the label was assigned 100% of lighting savings in excess of MEPS in the model.

Electric Fans

Almost all electric fans that have been registered with the program, and on the market, have achieved five stars. Clearly, this means that the label cannot be influencing consumers' choices.

From interviews with manufacturers we know that they responded to the introduction of the voluntary label and the prospect of mandatory labelling by increasing the energy efficiency of products. They also report that because almost all products now have a five star label, fans with fewer stars would be at a significant disadvantage in the market. However, some manufacturers have found that producing to the five star level is not challenging and consider that they are likely to have moved towards that level in due course without legislation.

We know from independent testing of fans to verify manufacturers' efficiency claims that many fans on the market are performing at significantly higher efficiencies than the current five star level. Without a re-rating of the label, consumers cannot easily identify these products.

Vietnamese firms that have significant export businesses sell some of the high performance fans on the market. In these cases their efficiency is partly driven by energy efficiency standards in other countries.

Although some manufacturers may have improved efficiency in time; the label was clearly an important prompt for a significant improvement in the performance of electric fans (from discussions with the main manufacturers). For the base case, an annual increase in efficiency of 1% per annum was assumed, and the savings in excess of this were assigned to the legislation. The greatest contribution (80%) being made by the voluntary label backed up by the expectation of a mandatory label (20%).

Air conditioners

MEPS are likely to have had an impact on the air conditioner market; there are a significant number of 1 star products which implies that some manufacturers may have re-engineered their products to meet the minimum performance level (however, we have no evidence to support or refute this possibility).

Consumers consider the energy efficiency of air conditioners when they make their purchases; retailers report that this is a major factor in consumer decision-making and that the label has assisted them to guide consumers appropriately.

One manufacturer reported that they had a deliberate strategy to produce products at two star ratings; 3 star for their standard range and 5 star for their premium range. In both cases this has involved re-engineering to improve the efficiency of the products. Two other major manufacturers of air conditioners (LG and Daikin) use the mandatory label in their TV commercials. However, other manufacturers have reported that they do not believe the label will make a difference to the market and they do not intend to take action to improve their products until they experience commercial pressures.

Thus the label appears to be contributing to energy efficiency in the air conditioning market by providing information that consumers recognise they need at the point of purchase with greater clarity and authority than prior to the introduction of the label. However, if the label had not been introduced, consumers would nevertheless have sought out more efficient products.

For the base case, we assumed the efficiency from market pressure, independent of any label impact, would increase the efficiency of products sold by 1% per annum. Due to this the contribution to the energy savings to the label over and above MEPS in the air conditioning market will decline over time.

Rice cookers

Consumers do not see energy efficiency as an important factor in their choice of rice cookers and there is no evidence that the label is influencing their purchase decisions. Manufacturers seem to recognise this and do not promote their products on the basis of energy efficiency. One manufacturer reported that the label would not make any difference to the products they produce.

There appears to have been an impact resulting from the introduction of MEPS as there are a number of 1 star products on the market, this implies that some manufacturers may have re-engineered products to meet the minimum standard. Therefore a small saving has been attributed to MEPS but no saving has been attributed to labelling.

Top loading washing machines

Almost all top loading washing machines on the market are 5 star so there is unlikely to be any influence from the policy on consumer decision-making. There is also no evidence from interviews with manufacturers that they improved their products in advance of the introduction of MEPS and labelling. Therefore the policy does not seem to have contributed to future energy savings.

Televisions

Almost all TVs on the market are 5 star so there is unlikely to be any influence from the policy on consumer decision-making. Most manufacturers serving the Vietnamese markets are offering their products throughout South East Asia and are unlikely to have designed specific products for Vietnam, or changed their efficiency mix of products, to meet the regulations. This effect has been observed in many markets, and is also explained by the recent rapid increase in efficiency of technologies with the introduction of new technology.

Future energy savings

The contribution to annual and cumulative electricity savings that will be made by the current levels of MEPS and energy labels have been estimated using the impact model and the contribution approach, both described above. The chart below estimates of the contribution made by the policy to future energy savings from 2013 to 2030 (Figure 4). By 2030 the contribution to annual energy savings by the policy for all products is estimated to be around 6,000 GWh/year. The cumulative energy savings by 2030 are expected to be over 70 TWh.

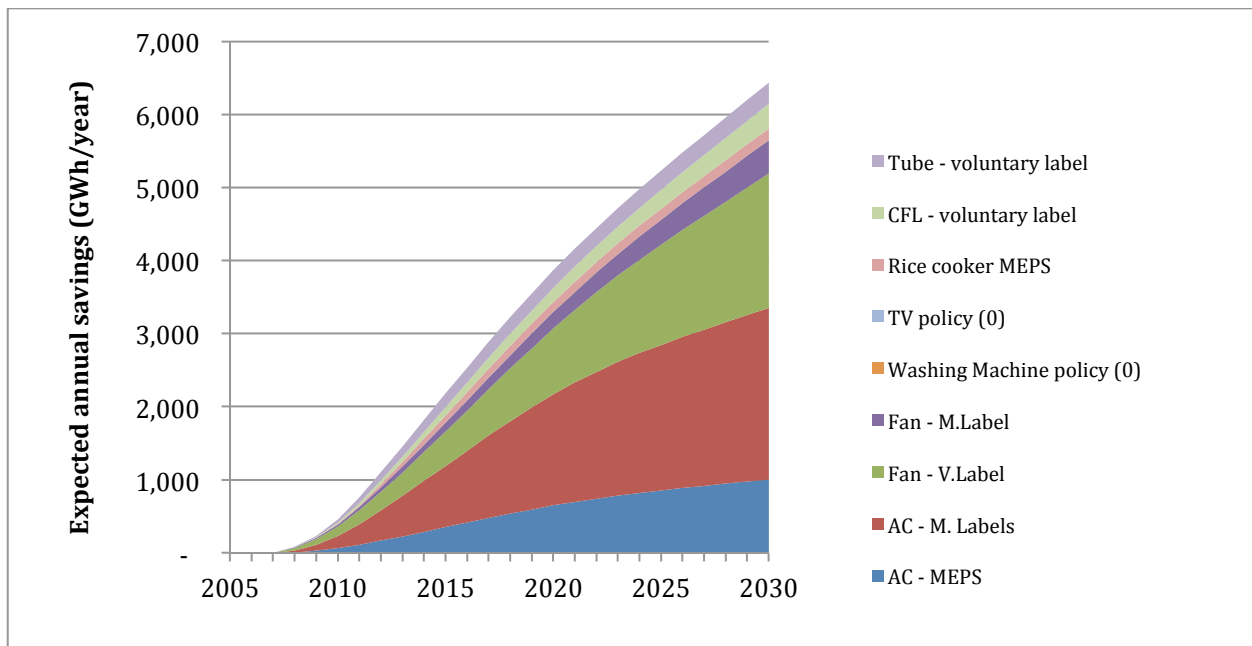


Figure 4: Estimated total annual electricity savings for selected products to 2030

These energy reductions represent a financial saving of over VND 9 million million to Vietnamese householders. This is equivalent to over \$440 million, around \$13 for every household in 2030.

Conclusions

The introduction of MEPS and Energy Labelling in Vietnam will make a significant difference to the energy consumed by lighting and electrical appliances in the country. It will reduce energy bills and cut carbon emissions.

The contribution analysis employed here provides a fuller understanding of the mechanisms by which the policy has influenced manufacturers and consumers and contributed to energy savings.

The findings of this study suggest that there is a risk that traditional approaches (as described in the methodology section above) would have over-estimated energy savings resulting from the policy in two ways:

- The introduction of MEPS is unlikely to have made any difference to markets where all products are much more efficient than the minimum standard – specifically, electric fans, top loading washing machines and televisions.
- The label has been an important factor in some markets but cannot influence consumers in markets where all products perform at the same 5star rating.

The introduction of voluntary labelling as a precursor to mandatory schemes seems to have been an important influence on manufacturers, prompting them to improve their products in advance of the introduction of the policy. Without discussion with manufacturers and suppliers – as part of the contribution analysis - there is a risk that traditional approaches would not have identified this contribution.

There are some limitations to this evaluation, which should be born in mind:

- This paper does not consider the effect of non-compliance with the regulations as data on compliance rates are not yet available.
- The findings in this paper are based on research in 2012-13 although the policy was announced in 2007. It would have been valuable to have research data from before the policy announcement or while manufacturers were developing their strategies in response to the policy, and help develop a more robust counterfactual scenario.
- The contribution analysis uses data from the market survey which covered 1,380 households; however, the manufacturer sample was small and only one representative was interviewed from each firm. The findings from manufacturers should, therefore, be treated with caution.
- The policy is in its infancy at present, consumer awareness and understanding can be expected to increase over the 15 year forecasting horizon. This should increase the contribution of the policy to energy savings.
- The energy savings achieved by the policy are based on modelled projections of the number of products sold. As part of the regulations manufacturers and importers are required to report sales data to the Government of Vietnam. When these data become available the accuracy of the energy savings projections can be improved.

Future evaluations

Evaluations like this support future policy development as well as helping to estimate the benefits of MEPS and labelling. The Vietnamese Ministry of Industry and Trade (MOIT) recognises the importance of robust evaluation and intends to continue to evaluate this policy once the support from the Government of Australia is completed. To facilitate this, the Australian consultants will be

working with MOIT to provide training and capacity building in evaluation skills. The approach described here will be developed to include:

- Continued improvement and use of the registration database and integration of sales data once this becomes available.
- Integration of findings from compliance activities such as check testing and label display surveys.
- Improving the understanding of the changing use of appliances as the Vietnamese economy develops through future surveys.
- The incorporation of new products as the regulations are extended.
- Future surveys of manufacturers to explore the impacts of changes in the regulations (e.g. label re-grading).

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