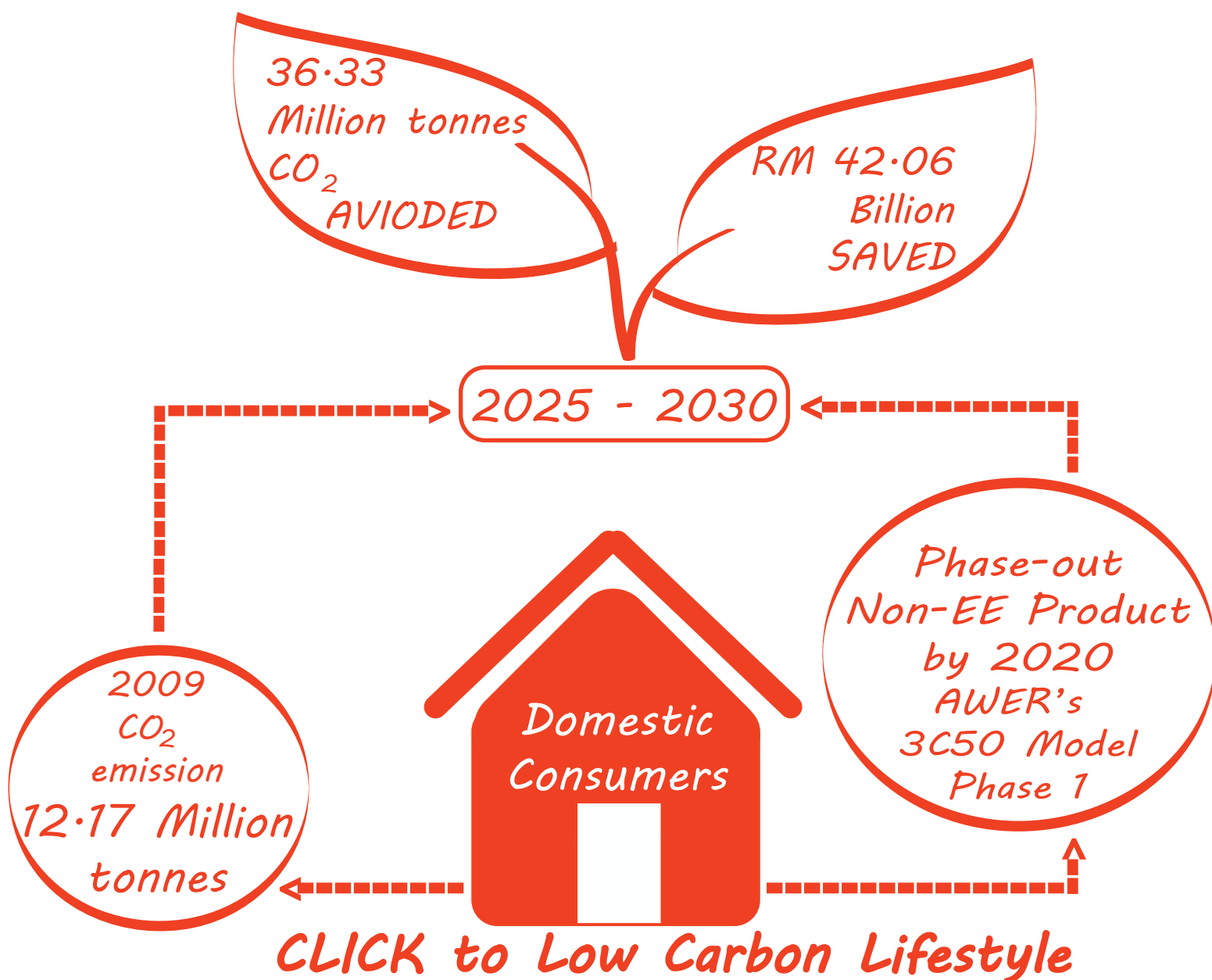


# ENERGY EFFICIENCY IN MALAYSIA

## Sustainable Production and Consumption: Phasing-out Malaysia's Non-Energy Efficient Products



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**Sustainable Production and Consumption: Phasing-out Malaysia's Non-Energy Efficient Products**

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Energy efficiency is one of the key areas of focus in climate change mitigation. We may not be able to stop climate change even if we stop greenhouse gases (GHG) emissions totally. A more workable solution would be practicing Low Carbon Lifestyle which would be able to minimise carbon input into the environment and create a long term strategy to mitigate climate change.

Association of Water and Energy Research Malaysia (AWER) has conducted series of passive, active and interactive consultations on the Low Carbon Lifestyle with various stakeholders. The findings of the studies were carefully researched and matched with short term and long term plans. This implementation model coded **3C50** is a detailed planning developed by AWER to assist Malaysia in achieving Low Carbon Lifestyle strategically. The strategies and solution we will be outlining via our model can also be easily duplicated with minimum changes around the world.

This report is to complement our 3C50 model to outline challenges in phasing-out non-energy efficient products with detailed solutions. This report is part of 'Sustainable Production and Consumption: Phasing out Malaysia's non-energy efficiency products' project which was funded via Prosperity Fund by the UK government.

AWER would like to thank British High Commission, Kuala Lumpur for funding the study and report preparation. We would also like to thank all the stakeholders both locally and internationally who have dedicated their precious time in making this study a great success.

Via the project funded by British High Commission, Kuala Lumpur we have also brought forward an online portal **CLICK to Low Carbon Lifestyle** which gives great deal of information and a **Low CO2 Tool** at **[www.click.org.my](http://www.click.org.my)**. This online tool known as **Click d' Thief** will assist all types of electricity consumers to audit their electricity consumption and determine equivalent carbon footprint with just a CLICK away.

This report gives comprehensive steps to enhance energy efficiency implementation in Malaysia via electrical and electronic products. This report will be forwarded to government agencies, members of Parliament and other key stakeholders.

Let us start the step forward in mitigating climate change.

**Piarapakaran S.**

President

Association of Water and Energy Research Malaysia

## **1.1 ENERGY CONSUMPTION AND CARBON FOOTPRINT**

Energy resources utilisation is a necessity for human civilisation to survive and progress. However, inefficient use of energy or electricity contributes substantially to climate change. In Malaysia, more than 50% of domestic consumers use less than 200 kiloWatt-hour (kWh) of electricity monthly. This number has been steadily decreasing as more electrical and electronic products become cheaper to own. Mass production has contributed to lower price for electrical and electronic products. However, increasing electricity consumption only means we are increasing our cost of living and impact to environment. Life Cycle Assessment (LCA) studies prove that the highest carbon footprint for electrical and electronic products are during its usage phase which means it is directly related to the amount of electricity or energy consumed by equipments. Carbon emission or carbon footprint reduction success will solely lie on reducing electricity usage without jeopardising livelihood of consumers.

Energy efficiency is where we use lesser energy to carry out similar or more work without jeopardising the comfort or actual desired output. For example, the 5 Star energy efficiency labelled products are rated 25% more efficient in energy consumption compared to non-energy efficient products. This means an energy efficient product uses 25% energy lesser than normal product and reduces 25% carbon footprint during its usage period. In Malaysia, every 1 kiloWatt-hour (kWh) of electricity releases about 0.67 kg of CO<sub>2</sub> (carbon dioxide) equivalent at 35% electricity supply efficiency. Based on 2009 Energy Commission (ST) report, a total of 90838 GWh (GigaWatt-hour) of electricity was sold in Malaysia. The domestic sector accounts almost 20% of the overall consumption and emits 12.17 million tonnes of CO<sub>2</sub>. Therefore, a 20% increase in energy efficiency in domestic sector will be able to reduce more than 36.33 million tonnes of CO<sub>2</sub> and save RM 42.06 Billion between year 2025 and 2030 if non-energy efficient products are phased-out completely from Malaysian market by year 2020. This savings does not include the overriding savings from commercial and industrial sectors that uses many products that are used by domestic consumers in their operations namely, air conditioners, multimedia equipments, kettles, refrigerator, etc.

## **1.2 ENERGY EFFICIENCY IN MALAYSIA**

A host of studies and projects were conducted in Malaysia and most of it successfully ended up in reports and policy papers. However, the implementation of energy efficiency policies in Malaysia is marred by office politics between agencies and officers. This has also completely blind-folded the Minister in-charge and the Cabinet into making wrong decisions as well as formation of an agency related to energy recently. Policies are driven by personal interest and it is evident that transparent implementation based on detailed research and consultation is very much lacking.

A Danish International Development Agency (DANIDA) funded project was done to evaluate ST's operation and recommend enhancement in policies and implementation in year 2006. Energy Efficiency was one of the key recommendations from the study including labelling requirements. This was followed by development of National Energy Efficiency Master Plan (NEEMP). This master plan has overlooked many aspects in implementing energy efficiency at the grass root level for both businesses and domestic consumers. NEEMP is now being escalated into formation of Energy Efficiency and Conservation Act. This act is expected to be tabled in parliament between year 2013 and 2014.

Only through single energy agency, better energy and energy efficiency management, coordination as well as implementation can be achieved in Malaysia. Segregation only means more turf fight and bickering while actual technical issues are left unattended. This is exactly why energy efficiency in Malaysia has been growing very slow. Businesses and domestic consumers are the actual losers. This report will focus more on the issues surrounding phase-out of non-energy efficient products that will directly impact domestic consumers and businesses.

## **1.3 HIGH ENERGY CONSUMING EQUIPMENT**

### **1.3.1 Factors that Contribute to High Energy Consumption**

While equipments' energy or electricity consumption is directly related to its Power consumption, there are more factors that derive high energy consuming equipments. AWER conducted 50 energy audits to identify high energy consuming equipments in selected locations. The only conclusion that can be made is there are 3 factors contribute to electricity consumption in any operation.

The first factor is the electricity consumption of the equipment itself. In our site visits, we have observed purchase of second hand equipments and non-energy efficient equipment is normal among some businesses and domestic consumers. The main reason is the initial investment cost for such equipments is very low. Once purchased, the operating cost due to high electricity or energy consumption is going to stick with them throughout the usage period. Cooling, heating and rotating functions are directly involved in high energy consumption.

The second factor is the number of equipment used. The total number of equipment is directly proportionate to the total electricity or energy consumption. This can be easily observed in large set ups such as schools, offices and restaurants. Equipments like motors, fans, lights, computers as well as commercial refrigerators in large quantities give huge impact to electricity consumption.

Finally, the third factor would be the usage duration. Long usage hours are directly proportionate to electricity or energy consumption as well. If a company or domestic consumer purchase non-energy efficient equipments and use it for long hours, you can imagine the increase of their electricity or energy cost.

The combination of these factors determines the culprits in your home or premises. Therefore, we have developed a Low CO2 Tool to identify these thieves for electricity consumption in your home and premises.

### **1.3.2 Assistance to Identify High Electricity Consuming Equipments**

The first Low CO2 Tool developed by AWER is known as Click d' Thief. This tool combines the factors that contribute to high electricity consumption and creates interactive calculation to assist in simple electricity audits. The objectives of Click d' Thief are:

- i. to assist in electricity consumption audit;
- ii. to assist in identification of Carbon Footprint for individual product;
- iii. to identify High Energy Consuming Equipments;
- iv. to assist in making informed decision in practicing Low Carbon Lifestyle;
- v. to create interactive yet fun and easy approach in energy efficiency; and
- vi. to cater all types of consumers in 'Catching their THIEF'.

You can identify electricity consumption based on your products, tariff and different user category. Log on to [www.click.org.my](http://www.click.org.my) to find out more.

## **2.1 OBJECTIVES OF THE CONSULTATION PROCESS**

Based on our review of National Energy Efficiency Master Plan and the on-going consultation process for the formation of Energy Efficiency and Conservation Act, there are a large portion of issues and challenges have been overlooked by the government. These consultation processes do not go into details of actual challenges faced by many sectors and agencies. The Energy Efficiency and Conservation Act will eventually be a basic tool. A lot of time will be needed to derive the regulations, rules and standards under a new act and possibly a "new boss" to take care of this Act. Fortunately, Electricity Supply Act and Energy Commission Act have given the mandate to Energy Commission (ST) to form regulations, rules and standards related to Energy Efficiency. Therefore, do we really need a specific law? Does this mean that the Ministry of Energy, Green Technology and Water (KeTTHA) officers do not understand the available Acts or these officers are merely following whatever other countries are doing?

The objectives of AWER's stakeholder engagement process are:

- i. to engage all key government agencies that are involved in the lifecycle of electrical and electronic products as well as energy consuming products (using direct energy resource);
- ii. to engage various businesses (retailers, manufacturers, small electrical shops and industry organisations);
- iii. to engage selected members of public to cross-check their understanding on issues related to energy efficiency;
- iv. to identify emerging grey areas in energy efficiency implementation;
- v. to compare solutions derived via AWER's 3C50 model with stakeholders; and
- vi. to further research the consultation findings to translate it into suitable solutions.

## **2.2 ROLES PLAYED BY STAKEHOLDERS**

Questions were derived to suit the overall objectives of phasing-out inefficient energy consuming products. However, the questions were suited to the functions of the government agencies as well as businesses during the consultations. All consultations were done with one agency or organisation at a time via guided questions that are revealed only during consultation process. The government stakeholders are categorised based on their functions and impact on the manufacturing or importation of goods, retailing, testing and labelling, national budget and customs policy, enforcement, waste management as well as education. The consultations with businesses were focusing on issues related to manufacturing, research and development, education, retailing, products and public response.

Members of public are chosen from various economic and education background. A guided half day programme was conducted to gather feedback on solutions proposed by AWER. Feedback on their understanding towards processes, labels and functions of products were also monitored. This is the most important part of the consultation process as it helped us to measure the workable policies as well as criteria for energy efficiency. Additional studies were conducted as case studies to further enhance the output of the consultation process into a workable solution.

## **2.3 CONSULTATION FINDINGS**

Findings of all consultation processes are summarised to outline overall concerns and roles played by government agencies and businesses.

### **2.3.1 Ministry of Domestic Trade, Cooperatives and Consumerism (KPDNKK)**

- i. Consumer Protection Act is the main legislation that protects the interest of consumers. Via this law, Tribunal for Consumer Claims Malaysia is empowered for redress;



- ii. All actions are only based on complaints received or directive from government; and
- iii. Anti-profiteering Act and Competition Act can ensure reasonable pricing of electrical and electronic products. Competition Act prevents cartel practices in any retailing business. This is seen as a major tool to ensure energy efficient products are not over priced. Actions can be taken based on complaints or policy outlined by government.

### **2.3.2 Ministry of International Trade and Industry (MITI)**

- i. Focuses in attracting Foreign Direct Investment (FDI) and provide incentives to companies;
- ii. Implementation of sales tax and duty exemption are carried out for imported energy efficient products; and
- iii. Plays role in assisting industry and small medium industry / enterprise (SME) to develop focus areas outlined by government.

### **2.3.3 Department of Environment (DOE)**

- i. Climate change policy outlines reduction of carbon emission in Malaysia. There is no direct jurisdiction under DOE to control energy efficiency. Few case studies on Clean Development Mechanism (CDM) have been carried out; and
- ii. More focus is placed in E-waste management. Waste management issues related to non-energy efficient electrical and electronic products will be detailed out in Part 8 of this report.

### **2.3.4 Small and Medium Enterprise Corporation Malaysia (SMECorp)**

- i. Many SME are facing difficulties in reducing energy consumption at their offices or premises. Lack of knowledge is the core obstacle. The SMEs are keen to explore reduction in operational cost such as electricity;
- ii. Developing local manufacturers for energy efficient electrical and electronic products is an uphill task. However, some local SMEs are suppliers for international manufacturing companies; and
- iii. Soft loans are provided to build local SMEs capacity. The Green Technology Fund Scheme (GTFS) is also another platform for funding.

### **2.3.5 Ministry of Energy, Green Technology and Water (KeTTHA)**

- i. Financial source for implementing Energy Efficiency in large scale is difficult to obtain;
- ii. The proposed Energy Efficiency and Conservation Act have mandatory labelling enforcement requirements;
- iii. SAVE rebate programme implemented by the ministry had obstacles and ceiling price was not set by the government;
- iv. The ministry did not study the impact of Energy Efficiency policies that is going to be implemented to electric and electronic products' price; and
- v. Research and development on energy efficiency will be encouraged.

### **2.3.6 Ministry of Finance (MoF)**

- i. Green procurement is in progress. However, proper check and balance mechanism is required to ensure government's procurements on electrical and electronic products are done without errors or problems;
- ii. Policies that can create multiplier impacts are encouraged; and
- iii. Effectiveness of incentives given is not directly measured by MoF. As a coordinating agency, MoF will be overwhelmed by workload if they stock-take all achievements. The ministry or government agency that proposes any incentive must measure the effectiveness themselves.

### **2.3.7 National Solid Waste Management Department (JPSPN)**

- i. Collection mechanism for used electrical and electronic products is not coordinated. There is no direct monitoring. JPSPN and DOE are in discussion to manage waste from this category effectively.



### 2.3.8 Royal Malaysian Customs Department

- i. Control of products at entry point is effective. However, customs officers are not the products' experts. ST plays a vital role in products' certification and approval before it enter the country;
- ii. Specific customs codes to differentiate energy efficient and non-energy efficient product are possible. This will assist customs officers a lot. In addition to that, this process can be implemented via Ministry of Finance; and
- iii. Ensure all electricity or energy consuming products are only brought in via customs tariff codes. This will eliminate counterfeit and fake products.

### 2.3.9 Business Stakeholders

- i. Importance of energy efficiency in Malaysia and role played by businesses
  - a. Major multinational companies carry their parent companies' policies. They have clear indication on their drive towards energy efficiency;
  - b. Local manufacturers, rebranding importers and some multinational companies that newly establish in Malaysia have not ventured much into energy efficiency unless it is required by legislation;
  - c. Multimedia products do not show greater energy efficiency initiative. Some claim that they have niche market (high income group) and energy efficiency does not affect them much. Very small number of them are keen in implementing more policies inclined towards energy efficiency;
  - d. All agreed that energy efficiency is market and legislation driven. Unless there is a strong need, these companies will remain status quo; and
  - e. Property developers are aligning their design to cater environmentally friendly needs. One of the key objectives is to design houses that can reduce electricity consumption for cooling and lighting.
- ii. Future demand forecast for energy efficient products
  - a. Peninsular Malaysia, Sabah and Sarawak have different responses due to economic background. Nothing much is changing in the regulatory framework as well;
  - b. Some companies have sales target for energy efficient products to drive their 'environmentally friendly' status worldwide;
  - c. Some companies will only comply if there are legal requirements;
  - d. Malaysian market needs to catch-up with energy efficiency frameworks of developed nations and some leading developing nations;
  - e. Testing infrastructure is not fully developed and language barrier also exists;
  - f. Lack of transparency of product information from manufacturers and suppliers to retailers. Much of the important information is left out and it affects sales and solutions to increase demand for energy efficient products.
- iii. Obstacles faced by businesses in procedures and implementation framework of energy efficiency in Malaysia
  - a. Basically do not understand what is actually planned by the government;
  - b. The government must be committed to delivery. There should not be flip-flop decisions as businesses need investments and long term planning;
  - c. Smaller market makes it hard to boost investment. Local SME is still doing non-high tech works. Most international manufacturers and assemblers use SMEs from their homeland;
  - d. Global brands with local partners should be the way forward;
  - e. Sometimes Malaysia is left out in Global product launch due to delays in testing;
  - f. Businesses need training on changes in legislation to ensure smooth implementation, not some lavish launch ceremony with no essence;
  - g. Lead time and prerequisite from government must be clear and met. They should not change the goal post periodically;
  - h. Some industries learn to suit the local approval climate. It is a business challenge anywhere; and
  - i. If compare our energy efficiency implementation with Europe, Japan and South Korea, it is like comparing ant with elephant. Malaysia needs to reduce this gap to ensure we can attract more business players to create competition.

- iv. Impact of incentives, tax exemptions and other forms of financial benefits to energy efficient products' price and sales
  - a. Most of the manufacturers and suppliers agreed that it reduces products' cost with direct impact. It's a short term benefit to boost sales;
  - b. Retailers have not seen price drop. They also claim never heard of such incentives are given to reduce products' cost. The savings are not passed on to consumers;
  - c. Some of the financial benefits are only for local manufacturers and government's policies have favouritism to those who manufacture locally. This prevents competitive products from entering Malaysia's market. Consumers are directly being denied their right to choices;
  - d. Reasons given to retailers for not bringing down price are recent Thailand floods, material cost, 'price' for energy efficiency, etc.; and
  - e. Multimedia devices have no tax imposed. Products' cost is driven by market forces.
- v. Impact of non-energy efficient products' phase-out to energy efficient products' cost (an example of scenario was given to stakeholders during consultation)
  - a. Price does not really reduce. It is very much controlled by manufacturers and suppliers;
  - b. The price is based on worldwide pricing and it is linked to operational expenditure, capital expenditure, currency exchange and local demand;
  - c. Manufacturers tend to not to agree on a price drop. However, importers of finished products agree that price can be reduced with long term planning because higher sales of products can recover the cost; and
  - d. Introduce more competitions and a leveled playing field for electrical and electronic market.
- vi. Consumers' response for energy efficient products
  - a. Middle and high income group can afford the price. Youths can accept the need to be energy efficient but cost is still a stumbling block;
  - b. Lack of knowledge as well as attitude of consumers that are linked to price, service and brand conscious;
  - c. Some brands admit that the sales of energy efficient products increase parallel with the awareness level in Malaysia. However, overall awareness is still lacking;
  - d. Maintenance cost and knowledge of a product is also vital in purchasing energy efficient products. Many consumers over look this part.
- vii. Wish list from businesses to improve energy efficient products in Malaysia
  - a. 1 stop centre to speed up approvals for energy efficient products;
  - b. The competition in Malaysian market must allow retailers to reduce prices. Prevent old technologies from Europe to be dumped in Asia;
  - c. Stop second-hand products as the energy consumption of old products are way higher compared to latest products in the market;
  - d. Need good enforcement to assist retailers to identify good products as not all staffs under retailers are fully aware of all the technical terms;
  - e. Tax relief for e-waste management should be given for participating companies;
  - f. Government should lead by example;
  - g. Government must impose proper transition time for any phase-out programmes;
  - h. Random testing must also be done to ensure market stays competitive and consumers have confidence in products;
  - i. Implement non-energy efficient product's phase-out as soon as possible; and
  - j. Ensure communication chain is kept clear and smooth before, during and after implementation of non-energy efficient product phase-out.

### **3.1 PHASING-OUT GLS (INCANDESCENT)**

Due to the nature of its operation, GLS converts electrical energy into light and heat energy. The total energy used in generating light is far lesser compared to generating heat. This makes GLS very inefficient. To justify GLS phase out, Energy Commission (ST) estimates that about 20% of the lamps used in Malaysia are of the incandescent type (GLS) which is 15 million GLS sold annually. They estimated that annual energy savings is about 1,074 GWh and a saving of RM336 million in electricity consumption expenditure by consumers. However, based on statistics AWER obtained from Department of Statistics, annual average of GLS bulbs consumed is only around 2.4 million bulbs between year 2007 and 2011. This is only around 16% of what is claimed by ST. Have the industries duped ST or ST had made a serious miscalculation?

The delay in putting up proper rules and regulations in phasing-out GLS has also allowed many unwanted issues mushrooming quickly in Malaysia. Let us see the challenges in phasing-out GLS.

### **3.2 CHALLENGES IN PHASING-OUT GLS**

#### **3.2.1 Impact to Supply and Demand of Lighting Products**

A phase-out process will remove inefficient products and replace it with suitable and efficient products. Compact Fluorescent Lamp (CFL) has been identified as a suitable candidate to replace GLS. In addition to that, Light Emitting Diode (LED) lights are also slowly taking up market share.

A peak demand occurs due to shift from GLS to other types of lighting products by regulatory needs. Once this demand is met, sales will drop to a much lower value due to long operational life of CFL and LED. However, will mass production really bring down prices of these products as promised by the manufacturers? Only time will tell and differentiate ethical businessmen from others. This also calls for stringent regulations to be put in place in Malaysia to ensure product's quality is also maintained. ***Lower quality of products will increase waste generation which defeats the primary purpose of phase-out programme that is environmental protection.***

#### **3.2.2 Misleading Phase-out Programme Announcement**

In Malaysia, the current phase-out programme announcement did not identify the function of other types of lighting products such as fluorescent tubes, halogen bulbs, and efficient incandescent bulbs (also known as improved halogen bulbs). ***In this phase-out programme, only GLS is being phased-out and not fluorescent tubes.*** The fluorescent tubes are actually better for lighting in many spaces. Currently, this announcement has caused fluorescent tubes to be mistakenly neglected or misunderstood. Halogen bulbs are also being phased-out in developed nations. Due to this, the inefficient versions of halogen bulbs are emerging rapidly in Malaysian market simply because their existence in Malaysia is neither regulated nor blocked. Therefore, communication to the public must be clear and educating. Confusing statements and jargons will leave the public perplexed and not knowing which way to move. This will also cause rejection from them or they will get tired of the so called "new" and "greener" solution policies.

#### **3.2.3 Doubtful Product Information**

Information about a product is mainly published on the packaging of the product or addition leaflet which is placed inside the packaging. Unfortunately, various products have flocked the market and create confusion among users. Based on our product sampling for CFL, some of the problems related to product information are as wrong information, fake energy label, no manufacturer's details, wrong claims and doubtful health claims.

### 3.2.4 Product Quality

Due to peaking demand for CFL worldwide, quality of products that meets the demand will always be an issue. In any production line, normal distribution is applied to ensure product quality is maintained in a preferable 'bell curve' that fits design specifications. In the age of achieving quality via 6-sigma ( $6\sigma$ ), it is expected that low quality of CFL will hit the market internationally if proper regulations are not put in place. In Malaysia, there have been many cases where 'branded' CFL do not even last a year in operation. Now, what guarantee the manufacturers can give to users to ensure quality of product is maintained while meeting the demand?

### 3.2.5 Pricing of CFL is Vague

Retail price of CFL did not see much drop even after Malaysian government announced phase-out programme in year 2010. In this phase-out programme, the government is removing a huge market share of a cheaply priced competitor (GLS) to CFL by 2014. In addition to that, duty exemption benefits were also given for energy efficient lighting. Unfortunately, the price of these products has not reduced. On the other hand, the phase-out programme announcement has also benefitted some CFL products that are sold as low as RM 3.00. The quality of these products is also questionable. Furthermore, some established brands of CFL have higher retail price in supermarket and hypermarket compared to lighting shops which offer almost half of the price. Now, are Malaysians being short-changed?

### 3.2.6 Hazardous Waste Management

The Mercury content in the fluorescent technology is nothing new. The CFL inherit the similar mercury content problem. Under the Environmental Quality Act 1974 (EQA), mercury in products and processes must be disposed safely as it is classified as one of the scheduled waste. Unfortunately, domestic users are not bound by this rule. For example, if a domestic user disposes CFL into waste bin, it will be collected as garbage (solid waste). Once the waste collector collects the CFL from the waste bin, it becomes scheduled waste as business entities are regulated under EQA. Now, will the waste collection companies dispose the CFL via prescribed method or 'close one eye' and leave it to be buried in landfill? The Scheduled Waste (or also known as Hazardous Waste) management is vital to be put in place before full scale phase-out of GLS. ***Without proper waste management mechanism, shifting to CFL is not environmentally friendly as claimed.***

## 3.3 RECOMMENDATIONS

### 3.3.1 Standard, Testing and Labelling

Based on our consultation with ST, the regulations for GLS phase-out and CFL testing are still with the Attorney General's (AG) office. Delay in approving regulations or guidelines will only give serious negative impacts to the implementation of phase-out process which should fully take place by year 2014. All lighting products sold in the market must be labelled uniformly to assist end users to be able to compare product functions easily. Currently, Malaysia does not have any such standard label in place.

### 3.3.2 In-Flow of Halogen Bulbs

Halogen bulbs are in the process of being phased-out by EU. The C class and D class (the class is based on EU energy efficiency labelling) halogen bulbs will be phased-out by year 2016. However, there is a sudden in flow of these bulbs in Malaysian market. In addition to that, the halogen bulbs that are in B class are still having technical problems. Based on AVER's study, we do not see this technology as a potential replacement for GLS as the core technology for emitting light is similar to GLS. ***We urge ST to prevent double phase-out attempts by banning halogen bulbs sales here with immediate effect.***

### 3.3.3 Waste Management

Waste management of CFL is still in dark. The EQA via Environment Quality (Scheduled Waste) Regulation 2005 classify mercury waste as SW109. The disposal of CFL and the fluorescent tubes are not classified as E-Waste (Electronic Waste). They are currently being disposed directly to waste bins. In addition to that, any contamination to other type of normal waste with scheduled waste will need specific disposal. In other word, if a CFL breaks in a waste bin or waste collection lorry, the entire waste needs to be treated as part of scheduled waste. However, this is not practised in Malaysia and such a problem must be rectified before full implementation of GLS phase-out.

### 3.3.4 Assisting Financially Challenged Groups

The low income group are AWER's immediate concern. When they replace a GLS, they do not spend anything above RM 3.00. However, the purchasing cost of a CFL is way too expensive for them to make an immediate replacement. Based on some of our surveys with users that have already opted to CFL, the products they use sometimes do not even last 1 year of operation even though it is a branded product. If such a situation occurs, the replacement cost will deter many middle income groups as well. Therefore, quality of CFL must be addressed by ST immediately. ***A financial assistance mechanism must also be developed to assist this group to switch to CFL or other better lighting products.***

### 3.3.5 Preventing Price Fixing and Profiteering

The phase-out of GLS is to remove high carbon footprint technology and replace it with lower carbon footprint technology such as CFL. Therefore, with reduction in market competition, the CFL price should be reduced. Unfortunately, this does not take place. AWER has purchased a genuine branded product in a location in Negeri Sembilan for RM 8.00 and the similar product is sold in few hypermarkets at a price that is above RM 16.00. Now, are consumers being short-changed?

In addition to that, the purchasing cost of house brands CFL that are carried by local hypermarkets are always cheaper than the branded CFL. Does this mean that the cheaper house brands are of worst quality compared to premium brands? Definitely this would not be the situation. It can only mean that there is element of cartel and profiteering. Therefore, AWER urges Malaysian Competition Commission (MyCC) to carry out an investigation on this matter. ***This would be the first Key Performance Index set by AWER for MyCC and they must release the investigation report for public knowledge.***

### 3.3.6 Continuous Monitoring and Enforcement

Regulations that are supposed to be carried out have been delayed as it is still with the AG's office (information during our meeting in fourth quarter of 2011). We urge ST to increase the speed of preparation of standard, labelling, regulations, guidelines, etc to assist in continuous monitoring and enforcement. AWER will continue to follow up with ST on this matter to ensure our recommendations are implemented properly and the problems are rectified as soon as possible.

## 3.4 STUDY CONCLUSION

In our study on the GLS phase-out programme, Energy Efficiency is the key component. However, it should not be at the expense of human health and environmental safety. Heavy metals are a concern to health and environmental degradation. Beginning in the 1920s, lead (Plumbum - a heavy metal) was added to petrol (gasoline) to improve its combustion. This has caused increase in lead poisoning that affects children the most with many permanent damages. It took humans almost 60 years to realise this. Will we repeat the same mistakes recorded in history?

A report entitled 'Switch It Right' has been published by AWER to highlight the issues surrounding the incandescent bulbs (GLS) phase-out programme in Malaysia. The report is available at [www.awer.org.my](http://www.awer.org.my) and [www.click.org.my](http://www.click.org.my). An extended version of the report is available only at [www.click.org.my](http://www.click.org.my) as ***Special Report***. The Special Report consists of testing result, rating and label of tested CFL specimens. We urge the relevant agencies in Malaysia to take heed of our findings in this report to ensure we SWITCH IT RIGHT from the first time.



## **PART 4 CASE STUDY 2: STANDARD, LABELLING AND TESTING OF ELECTRICAL AND ELECTRONIC PRODUCTS**

### **4.1 ISSUES WITH PRODUCTS' LABELLING**

Products' labels are designed to give summary of important information to the customer about a particular product and its accreditations. More than often, labels always end up as a decorative or secretive element in a product. We have done site visits to find out how easy it is to access labels and the ability to obtain vital information to tabulate a product's electricity consumption. This part of the study was vital in developing AWER's Low CO<sub>2</sub> Tool (Click d' Thief) in CLICK to Low Carbon Lifestyle portal ([www.click.org.my](http://www.click.org.my)). We have summarised the findings into three main issues as following:

- (i) Location of labels;
- (ii) Misleading and confusing information on the labels; and
- (iii) Enforcement.

#### **4.1.1 Location of Labels**

Some of the products' labels are located at the bottom (base) of the product or back of the product. Labels of products such as freezers, microwave oven, washing machine and television are always difficult for consumer's access. Figure 4a shows the example of electrical product arrangement in a shopping complex.

**Figure 4a: Arrangement of products that makes labels difficult to access**



For products such as computer, printers and fax machine, similar situation also happens. In worst case scenario, you only get to see the computer and multimedia product's box if you are not buying it.


Therefore, how would a consumer be able to lift a heavy product or see through the box to get the electricity consumption value?

#### **4.1.2 Misleading and Confusing Information on the Labels**

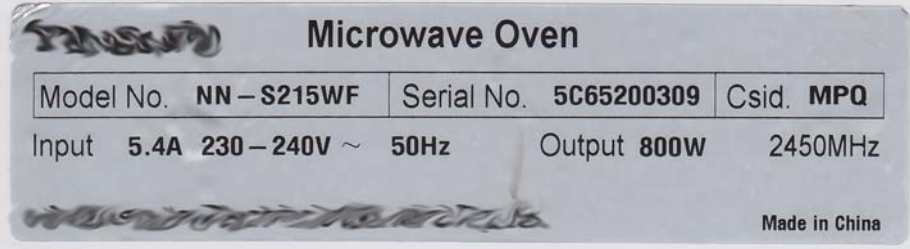
Based on our site visits, reading and understanding labels might need a special skill when it comes to electrical and electronic products. Different types of symbols and information are placed on labels which tend to mislead and confuse consumers. Some might feel that a lot of symbols printed on a label reflect a better quality of equipment. There are also issues of using Output Power value and this value is not the actual electricity consumption of equipment. The Input Power value is always higher than the Output Power value and it is entirely dependent on the efficiency of the equipment.

Usage of false energy efficiency rating labels was also found in some of the lighting products in Malaysian market. Such an attempt is to mislead the consumers into buying 'energy efficient' products. Unfortunately, these products do not reduce electricity consumption and consumers are at the losing end. Based on our discussion with some of the sales personnel only revealed that they are not sure of the products' accreditation and only rely on the assurance given by the suppliers that the products are of good quality and certified.

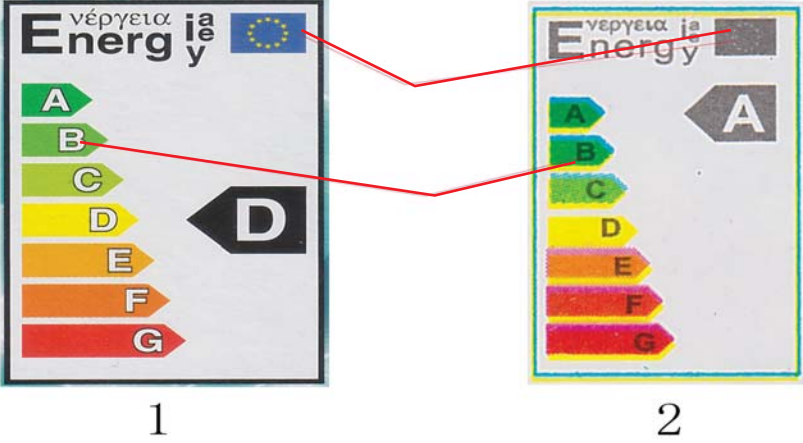
Figure 4b: Samples of labels with identified problems (Company information is removed)



Label displays a lot of symbols but there is no rated Power value printed.



Usage of Output Power value to confuse consumers.



Label 1 is the correct label for European Energy Efficiency label and Label 2 is a fake label. This was found in a lighting product. The red lines show glaring differences.

4.1.3 Enforcement

Enforcement is the key element for proper implementation of rules, regulations, standards and the law itself. The element of 'self-regulation' is mere fantasy in many countries as unscrupulous businesses find new and innovative ways to bend the rules, regulations, standards and law that is imposed. This is made worst when the regulator in-charge does not carry out enforcement properly.

Energy Commission (ST) selectively regulate certain electrical and electronic products while the Energy Commission Act and Electricity Supply Act gives power to the commission to regulate all products that consumes electricity. Currently, the responsibility for the rest of the electrical and electronic products that ST does not regulate falls under the Ministry of Domestic Trade, Cooperatives and Consumerism (KPDNKK). This ministry is overwhelmed with all types and shapes of consumers' products which they need to regulate. They are also hoping that ST will regulate all energy and electricity consuming equipments directly as they are not the field experts.

In addition to that, our site visits and study on the multimedia equipments such as computers, printers, scanners etc. revealed that these products are not regulated except the electrical safety labelling for computer adapters and those related to communication devices. Unfortunately, millions of such products are entering Malaysian market unchecked and the energy consumption of these products is set to increase every year. This means also buying latest multimedia products may not really reflect in energy efficiency.



## 4.2 STAKEHOLDER ENGAGEMENT

In order to get more understanding of the problems and feedback to solution proposed by AWER, our stakeholder engagement involved government agencies (including SIRIM), manufacturers, retailers, and members of public. We are happy to note that in one of the feedback session, we managed to help a stakeholder to reduce its product cost due to being cheated by agent that the SIRIM label cost is almost 20 times its original cost. This proves that misleading starts with lack of information.

### 4.2.1 Government Agencies and SIRIM

- (i) Government Agencies
  - a. Ministry of Energy, Green Technology and Water
    - i. Implementation of Energy Efficiency and Conservation Act between year 2013 and 2014 is seen as a solution in enforcing mandatory labelling; and
    - ii. Mechanism of implementation is not clearly defined yet.
  - b. Ministry of Domestic Trade, Cooperatives and Consumerism
    - i. Trade Description Act 2011 takes action against misleading claims;
    - ii. Consumer Protection Act 1999 protects consumer rights and a Consumer Tribunal is also set up under this act. Low quality products and faulty products that do not carry out functions as stipulated in labels can be referred to the tribunal;
    - iii. Jurisdiction on product information is still unclear as this ministry is not the expert for electrical and electronic products; and
    - iv. The ministry will act upon complaints compared to proactive moves as too many products fall under their jurisdiction.
  - c. Energy Commission
    - i. A DANIDA funded study in 2006 was done and clearly identified the need to promote Energy Efficiency labelling and standard;
    - ii. There should be a transition from voluntary labelling to mandatory labelling;
    - iii. Testing for energy efficiency rating can be done by any laboratory around the world as long as it is recognised by Standards Malaysia. There is no directive that restricts industry players to use SIRIM's service only; and
    - iv. There is a great need for Minimum Energy Performance Standard (MEPS).
- (ii) SIRIM
  - a. Star rating energy efficiency label requirements are set by ST and SIRIM does the testing only based on approved standards;
  - b. There is no clear streamlining between energy efficiency rating labels and the rating values regional or even worldwide;
  - c. SIRIM still depends on government budget to update testing facilities and introduce new facilities. It usually does not have enough labs or staff forces to cater many products testing at a time due to operational expenditure limitation;
  - d. As an independent testing body, SIRIM (the testing arm) does not correct and comment on products that are being tested; and
  - e. There is no standard label requirement set for electrical and electronic products. SIRIM will consider developing it if it is required.

### 4.2.2 Industry Players

- (i) For consignment test / witness test, Standards Malaysia only recognises SIRIM;
- (ii) Lack of manpower in SIRIM delays report. The delay of a SIRIM report may take 1 month to 6 months. Therefore, there is possibility of the industry player missing launching date. Besides this, industry players sometimes need to book 3 months in advance for certain testing;
- (iii) Multimedia industry is not aware of any energy efficiency requirement except television. Currently, some form of labelling is in place but there is no local labelling or testing requirement. They have informed also that there is no information from the government agencies on this matter as well;
- (iv) The 5 star energy efficiency rating gives a better perception for products;
- (v) Web based information system on the labelling schemes are vital for industries as well;

- (vi) Both ST and SIRIM could not give feedback if a particular product's label is genuine or not;
- (vii) Coordination between multiple agencies to get product tested, registered and approved is not conducive;
- (viii) There is always communication barrier. If communication is not good, success of 5 Star energy efficiency rating will be hampered;
- (ix) Energy efficiency testing cost is high for some players which eventually causes higher products' price;
- (x) If there is mandatory labelling going to be put in place, industry players needs proper notice and guidance;
- (xi) Benchmarking must be made with the best products internationally. Malaysia's 5 star rating means nothing in some developed nations as they have superseded us by continuously imposing better energy efficiency rating values. We are getting low end energy efficient products into our market;
- (xii) Current 5 star energy efficiency rating is kept low due to pressure from locally operating electrical products manufacturers. Some importers have better energy efficient products compared to products manufactured in Malaysia. However, there is no economy of scale to bring these products to Malaysian consumers due to this; and
- (xiii) Stringent and a better efficiency rating give a better choice for Malaysian consumers. ST needs to do more in implementing energy efficiency.

#### **4.2.3 Members of Public**

- (i) Could not understand why there is 5 star energy efficiency rating label and endorsement label for a product. Two types of label simply confuse them;
- (ii) Labels' information is tough to understand or even read. Some labels are placed at the bottom or back of the products that is not accessible;
- (iii) There is no reference point to check whether the products were really tested or not. Retailers do not take responsibility as well;
- (iv) Not sure which information printed on a label is important;
- (v) Confused with the values shown on the label that needs to be known and can be used to determine Power consumption and its electricity usage cost;
- (vi) Could not understand the meaning of symbols or signs on the equipment's label;
- (vii) Could not identify the energy efficient and non-energy efficient products as all the products look the same. Currently, there is only 5 star energy efficiency rating label. The public are wondering what happened to the products that have lesser stars;
- (viii) Sometimes sales personnel recommend certain products compared to those with energy efficiency labelling; and
- (ix) Standardise information to be printed on equipments' labels so that consumers can easily identify and compare.

### **4.3 RECOMMENDATION FROM AWER**

#### **4.3.1 Proposed Standard Labelling and Energy Efficiency Labelling for Electrical and Electronic Products**

Electrical and electronic products always come with various information printed on the labels that does not assist consumers to identify right information. Based on our consultations with stakeholders on AWER's model label for electrical and electronic products, we have received a very good response from members of public. While more information can be added in, the basic information that should be printed on a label must be made mandatory and enforced by ST.

**Figure 4c: Sample of label for air conditioner that has energy efficiency star rating and MEPS imposed**

<p><b>XYZ Corporation</b>  Type: <i>single split wall mounted air conditioner</i>  Brand: <b>Sisonic</b>  Model: <b>asd235ac</b>  Power (Watt): <b>950 W</b>  Voltage (Volt): <b>220 - 240 V</b>  Energy Efficiency Ratio (EER): <b>11.8</b></p> <p><b>MEPS</b> ✓  Made in Malaysia</p>	<p>Column for other logos and symbols including warnings and safety information</p>
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**Figure 4d: Sample of star rating label for air conditioner**



Figure 4c is sample label with energy efficiency star rating and MEPS imposed while Figure 4d is sample of energy efficiency star rating label. Information shown in Figure 4c and 4d are important and must be displayed in a product's label. The equipments' Power value will assist consumers to identify and calculate the possible electricity cost of the equipment based on their usage pattern. For equipments with energy efficiency star rating and MEPS, the test result must be printed on the label. For example, the Energy Efficiency Ratio (EER) value is used to determine the energy efficiency of air conditioners and heat pumps. Therefore, printing this value will assist consumers to identify the equipment with highest EER value. As for the colour choices of energy efficiency rating label as shown in Figure 4d, ST should also develop a black and white version that can be easily printed on product packaging and the cost of such labelling can be easily managed. This method is also used in few energy efficiency rating labels such as in Europe and US.

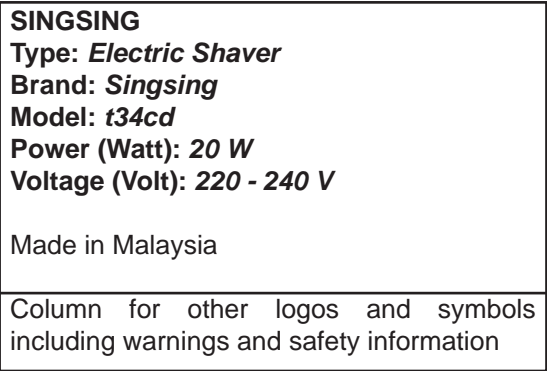
**Figure 4e: Sample label for lighting product that does not require an energy efficiency star rating but MEPS imposed**

<p><b>ABC Pte Ltd</b>  Type: <b>Light Emitting Diode (LED)</b>  Brand: <b>Pulps</b>  Model: <b>aLED34</b>  Power (Watt): <b>7 W</b>  Lumen: <b>430 lm</b>  Voltage (Volt): <b>110 - 230 V</b>  Efficacy: <b>60 lm/W</b></p> <p><b>MEPS</b> ✓  Made in Malaysia</p>	<p>Column for other logos and symbols including warnings and safety information</p>
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Figure 4e is echoing similarity with Figure 4c. However, this type of label is only meant for products that need not to obtain an energy efficiency star rating. In addition to that, the energy efficiency testing result must be published for such products. From the example in Figure 4e, we can see that the efficacy value used in efficiency testing for lighting products is included. Lighting products need MEPS implementation because they are used in larger quantity and longer usage duration even though its power consumption is lower compared to many electrical products.

Figure 4f shows sample label for products without energy efficiency star rating and MEPS requirement. These products are usually not used in large quantity or having low electricity consumption or with short usage duration. However, the Power value of the product must be printed as it is the core value that can be used by consumers to determine cost of electricity.

**Figure 4f: Sample label for equipment that does not require an energy efficiency star rating and MEPS**



### 4.3.2 Stop Usage of Energy Efficiency Endorsement Label

Endorsement label as shown in Figure 4g is seen as confusing logo that has no specific purpose. The star rating (from 1 star to 5 stars) label is already an acceptable and excellent communication tool for consumers to identify energy efficient products. Based on our consultation process with members of public that has different education, economy and knowledge background, the Star Rating Energy Efficiency label is sufficient to pass the message. AWER urges the ST to stop the usage of endorsement label in electrical appliances and improve communication via suggestions given in section 4.3.1.

**Figure 4g: Sample of endorsement label issued by ST**



### 4.3.3 Products' Testing from Accredited Regional Testing Laboratories

While ST informs AWER that product testing can be done via any accredited regional testing laboratories recognised by Standards Malaysia, the manufacturers and retailers do not echo the same information. Based on our consultations with industry players, almost all of them raised constrains that they faced with SIRIM. Therefore, ST must make an official statement on this matter as well as develop and publish a guideline for product testing mechanism.

### 4.3.4 Minimum Energy Performance Standard (MEPS) For More Products

During our stakeholder engagement process, one of the industry stakeholders has pointed out that Malaysia will not be moving up the value chain of electrical and electronic products as there is no proper mechanism or procedures in achieving energy efficiency in many levels. However, AWER did point out to them that their perception of public are lacking awareness on energy efficiency as well as doubting Malaysia's capability to make a paradigm shift on energy efficiency is totally wrong. MEPS would be a good tool to make industry players such as this speechless as well as has to improve and move forward to stay competitive in the market.

AWER suggests MEPS setting process to be carried out as following:

- (i) Public consultation for MEPS setting must be carried out;
- (ii) Conduct international benchmarking of products and its energy efficiency rating to ensure MEPS is not set too low or too high;
- (iii) Once the MEPS setting process is completed, a 6 month notice must be made and announced; and
- (iv) Once a 6 month notice has been served to the industry players, they must not be allowed to import or produce products that are below the MEPS standard and they have to clear all their existing stocks within the 6 months.

Products with mandatory MEPS requirement set must print on their label that they have passed the MEPS requirement. This is mainly because, not all products with MEPS will be imposed voluntary or mandatory energy efficiency star rating labelling. However, products with either voluntary or mandatory energy efficiency star rating labelling must be imposed with mandatory MEPS. In other words, Malaysia can have wider range of products with MEPS requirement set. The sample logo for products which passed MEPS requirement is shown in Figure 4c and 4e.

#### **4.3.5 Mandatory 5 Years Review Period for MEPS**

MEPS needs a mandatory review period of a maximum 5 years. The current energy efficiency star rating labelling criteria for refrigerators and air conditioners were not reviewed for many years. Latest models of the products have better energy efficiency achievement and stagnant regulatory requirement prevent these products from entering the market.

Currently, few Multi National Companies (MNCs) have products range with higher energy efficiency rating compared to labelling requirements. Unfortunately, the low rating level set for energy efficiency star rating in Malaysia make these products incapable of competing in term of pricing. In other words, latest technologies are prevented from entering Malaysian market due to unfair market regulation. These companies have also admitted that some of the locally manufactured international brands stand in the way of improvement in energy efficiency rating levels.

To prevent Malaysia being a dumping ground of obsolete technologies, MEPS review process must be carried out based on the following criteria:

- (i) A maximum of 5 years mandatory review and the review process can be done earlier if necessary;
- (ii) Conduct international benchmarking of products and its energy efficiency rating to ensure MEPS is not set too low or too high;
- (iii) Public consultation of the review process needs to be done 12 months prior to the implementation date. A 6 month notice prior to implementation date must be made and announced; and
- (iv) Once a 6 month notice has been served to the industry players, they must not be allowed to import or produce products that are below the MEPS standard and they have to clear all their existing stocks within the 6 months.

#### **4.3.6 Mandatory and Voluntary Energy Efficiency Star Rating Labelling**

All products that have voluntary energy efficiency star rating labelling implemented now must be upgraded to a mandatory labelling with revised energy efficiency rating requirements and MEPS. This must be implemented by 1 January 2013. For MEPS implementation requirements suggested by AWER, please refer to section 4.3.4 of this report.

Introduction of an energy efficiency star rating labelling scheme for a new product must begin with voluntary labelling. Voluntary labelling must be implemented for a 12 months period. Once the voluntary implementation is done, this product can be upgraded to mandatory labelling. Maximum allowable extension to defer implementation of mandatory labelling should be limited to a period not exceeding 6 months from the actual announcement.

ST can implement this without a specific Energy Efficiency and Conservation law as the commission has the rights to develop and implement new rules and regulation which is in line with the commission's objectives and functions as enshrined in Energy Commission Act 2001 (amended 2010) and Electricity Supply Act 1990 (amended 2001).

#### **4.3.7 Online Database for Approved Products**

One of the major obstacles for internet savvy consumers is lack of reference point to access products' information that has obtained energy efficiency star rating. ST must compile and update an online database for the products that have obtained energy efficiency star ratings for members of public to do a cross reference. This database system should also include all the details for a product's label as suggested in section 4.3.1.

In addition to that, the online system must be able to cater both MEPS and star rating label information. The online database must also keep the details of products that has been disqualified, recalled or banned due to any technical or regulatory reasons. This would assist consumers to identify misleading or fake products. This online database system will be an added advantage for ST to carry out enforcement as well. Public would also be able to launch complaints directly to the commission if there is any irregularities detected.



## **5.1 INTRODUCTION TO HEATING**

Usage of thermal power has been an important element in human civilisation. Heat is the thermal energy contained in an object and it is measured in unit Joule (J). Temperature is a measurement of how hot is an object and it is measured in unit Celsius (°C) or Kelvin (K). Heat energy will transfer from a hot object to a cooler object. When heat energy is transferred to an object, its temperature will increase. The temperature increase depends on the mass and material composition of the object as well as the amount of energy transferred to the object.

Large amount of energy is needed to increase temperature from room temperature to desired temperature for daily activities such as for personal comfort (in colder climate) or for cooking. Some of the energy resources that are being used in Malaysia to produce heat for cooking are wood, gas and electricity. Both gas and electricity are very dominantly used for the past decade.

AWER has conducted a case study that focuses on water boiling process using various methods to determine the heating efficiency and to set a baseline comparison. For this purpose, products with stable market performance and commonly used are chosen.

## **5.2 HEATING EFFICIENCY SAMPLING STUDY FOR BOILING WATER**

The heating efficiency sampling is focused into 3 main studies. These studies are made to establish scientific proof to the actual heating efficiency. The collected data is processed to determine the efficiency from resource utilisation until end product's utilisation. Usage of electricity was determined at only 35% efficiency based on Malaysia's electricity supply system.

### **5.2.1 Comparison between Gas Stove and Induction Cooker**

Two stainless steel pots with diameter 22 cm and 20 cm were used to determine the impact of a pot's size and usage of different heat source to heating efficiency. Gas stove (using Liquid Petroleum Gas - LPG) has a fixed heat power of 4000 Watt (W) and a digital power meter was used to record the electricity consumption in kiloWatt-hour (kWh) for the induction cooker. The heating efficiency of boiling 1 litre of water was measured and compared.

### **5.2.2 Comparison Among 5 Main Types of Electric Kettles**

Different types of heating element for electric kettles were studied. A digital power meter was used to record the electricity consumption in kiloWatt-hour (kWh) for the kettles. The heating efficiency of boiling 1 litre of water was measured and compared. The large capacity kettle (refer to specimen 5) used 2 litres of water for boiling due to the need to submerge the coils under water and it does not impact the study result because the comparison study is based on heating efficiency.

The samples used for the study are shown in Figure 5a:

- a. Kettle with small coil heating element (Specimen 1);
- b. Kettle with longer coil heating element (Specimen 2);
- c. Metal kettle with flat heating element (Specimen 3);
- d. Polymer kettle with flat heating element (Specimen 4); and
- e. Large capacity kettle with coil heating element (Specimen 5).



Figure 5a: Tested Kettle Specimens



5.2.3 Comparison between Metal and Polymer Kettle for Flat Heating Element

Kettle with flat heating element was tested for its efficiency in boiling 1 cup of water to 5 cups of water. A digital power meter was used to record the electricity consumption in kiloWatt-hour (kWh) for the kettles. This functionality test is to verify claim that this type of kettle saves almost 66 % of electricity consumption. The tests also include heating efficiency comparison between polymer type of kettle and metal type of kettle.

5.3 RESULTS AND DISCUSSION

5.3.1 Comparison between Gas Stove and Induction Cooker

Based on the test results, gas stove's heating efficiency is higher than the induction cooker as shown in Table 5a. Gas stove is an open combustion system where heat is released directly to heat up an object. Based on AWER's projection, induction cooker will be able to match the gas stove's efficiency if the electricity supply efficiency reaches 40% and above. However, induction cooker heats up the wiring system badly. This can be seen as a major contributor to its inefficiency. In addition to that, heating the wiring system for a long duration is also a safety hazard.

Besides this, use of smaller pot (20 cm) with larger fire is inefficient for a gas stove. It has caused more heat loss from the gas stove. Therefore, cooking with right sized utensils is vital to optimise heat energy utilisation. Based on the heating efficiency comparison, using a gas stove also causes lesser carbon emission compared to induction cooker. AWER chose a normal gas stove in this study as it is generally available in the market. There are gas stoves with higher heating efficiency but these products are not directly accessible to general public.

Table 5a: Average Heating Efficiency for Gas Stove and Induction Cooker

Item	Gas Stove		Induction Cooker (at 35% electricity supply efficiency)	
	Average Input Energy (kJ)	Average Heating Efficiency (%)	Average Input Energy (kJ)	Average Heating Efficiency (%)
Steel pot (22 cm diameter)	1046	28.08	1244.57	23.68
Steel pot (20 cm diameter)	1094	26.84	1203.43	24.50

### 5.3.2 Comparison Among 5 Main Types of Electric Kettles

Based on test results as shown in Table 5b, we have also noticed that the coil based kettles have slightly better heating efficiency compared to the kettles with flat heating element. The only disadvantage of the coil based kettles is they cannot boil very small amount of water as the coils must be submerged to enable boiling. Easy boiling of small amount of water was perfected by kettles with flat heating element. However, we did notice that Specimen 3 (a metal kettle with flat heating element) emitted a lot of heat and the surface temperature of the kettle was also very high.

According to the results in Table 5a and 5b, electric kettles use lesser energy compared to gas stove and induction cooker in boiling water. This means also improvement in gas stove's efficiency is vital because it is widely used for cooking in Malaysia.

**Table 5b: Average Heating Efficiency for Selected 5 Types of Kettles**

Kettle	Average Input Energy (kJ)	Average Heating Efficiency (%) <i>at 35% electricity supply efficiency</i>
Specimen 1	905.14	32.34
Specimen 2	894.86	32.83
Specimen 3	1002.86	29.33
Specimen 4	920.57	32.04
Specimen 5 (for 2 litres)	1774.29	33.19

### 5.3.3 Comparison between Metal and Polymer Kettle for Flat Heating Element

Based on Table 5c, the polymer kettle has a better heating efficiency in boiling water compared to the metal kettle. In addition to that, we have also noticed that boiling small amount of water (1 cup) achieve very low heating efficiency. This is also due to high heat loss in the kettle itself as huge void area inside the kettle exists at lowest water level. As water level increases (and the void area reduces), the heating efficiency also increases. However, the overall efficiency of the polymer kettle is still higher than the metal kettle.

If we continue to boil a cup of water very often in a day, then the water boiling process using flat heating element becomes very inefficient. In this case, usage of thermal flask would be encouraged. Therefore, consumers still have the choices to be energy efficient.

**Table 5c: Average Heating Efficiency Comparison between metal and polymer kettle for Flat Heating Element**

Water volume (1 Cup = 227.30 millilitre)	Average Input Energy (kJ)		Average Heating Efficiency (%) <i>at 35% electricity supply efficiency</i>	
	Metal Kettle	Polymer Kettle	Metal Kettle	Polymer Kettle
1 Cup	390.86	288.00	17.15	23.18
2 Cup	565.71	462.86	23.55	28.81
3 Cup	730.29	663.43	27.37	30.15
4 Cup	930.86	858.86	28.60	31.05
5 Cup	1121.14	1038.86	29.72	32.12

## 5.4 RECOMMENDATIONS

### 5.4.1 Introduce MEPS and 5 Star Energy Labelling for Gas Stove, Electric Cookers and Electric Kettles

AWER has used a normal gas stove and induction cooker as well as 5 types of kettles to conduct the baseline study. These products are widely used in Malaysia. Based on the heating efficiency test results, it is evident that boiling water with gas stove and induction cooker use more energy compared to electric kettles. AWER has estimated that boiling 1 litre of water with gas will cost up to 4.5 cents and 2.6 cents with induction cooker. Comparatively, the electric kettles cost around 1.9 cents. However, when we include the element of subsidy (both LPG and electricity generation), these cost are actually way higher. Furthermore, this estimated cost is ONLY for 1 session of boiling 1 litre of water. How many times we have been boiling water for the past 5 years?

**AWER urges Energy Commission (ST) to study the feasibility of introducing MEPS and 5 Star Energy Labelling for Gas stoves, other electrical cookers and electric kettles.** This will indirectly reduce energy resources utilisation, carbon emission and subsidy expenditure substantially. This is mainly because high amount of energy is used for cooking by using both electricity and LPG. Based on our study on selected Asia Pacific and ASEAN countries, China, Hong Kong, India, Japan, South Korea and Thailand have introduced labelling mechanism for these types of products to increase efficiency in utilisation of LPG and electricity. Simple equipments like this are widely used and the impact of ensuring them to be energy efficient is far greater with immediate results.

#### **5.4.2 Using Coil Based Kettles to Boil Large Volume of Water Reduces Electricity Consumption**

We have also found that the kettles with flat heating element have slightly lower heating efficiency and the purchasing cost is few times higher than a coil based kettle. If you are boiling large amount of water daily, ***it is advisable that you use a coil based kettle as the efficiency is almost similar and it can be purchased for a much cheaper price.***

#### **5.4.3 Usage of Thermal Flask is Encouraged**

Making a hot beverage to drink does not need water with 100°C. ***You can keep hot water in a thermal flask to enable quick access to hot water when you need it.*** This is a long forgotten practice by many of us. Remember, using kettles with flat heating element like Specimen 3 and 4 to boil 1 cup or 2 cups of water wastes energy and repeating this few times a day simply will cost you more in your electricity bill.

## **6.1 INTRODUCTION TO SAVE REBATE PROGRAMME**

The SAVE Rebate Programme (SAVE) is one of the initiatives undertaken as part of the National Key Economic Area (NKEA) for Oil, Gas and Energy through Entry Point Project 9 (EPP9) to improve energy efficiency in the country. This rebate program started on 7th July 2011 and extended from end of year 2011 (original schedule) until all rebates are taken in year 2012. With SAVE project, the government via Ministry of Energy, Green Technology and Water (KeTTHA) is investing RM50 million to generate an estimated Gross National Income (GNI) of RM5.1 billion by year 2020 and it targets to save 127.3GWh (GigaWatt-hour) of energy in the same period of time. There are currently 12 brands participating in the rebate programme for domestic consumers. The total quantities of home appliances that qualify for rebate under this programme are 100,000 units of refrigerators and 65,000 units of air conditioners.

The latest eligibility criteria set for domestic users are as following:

- (i) Refrigerator  
Peninsular Malaysia – domestic consumers using an average of 6 months electricity consumption between 200 to 400 kWh (kiloWatt-hour) per month;  
Sabah and Sarawak - open to all domestic consumers.
- (ii) Air conditioners – open to all domestic consumers in Peninsular Malaysia, Sabah and Sarawak.

Towards end of year 2011, the SAVE project was placed under the supervision of Sustainable Energy Development Authority (SEDA) which does not have any jurisdiction over energy efficiency implementation. However, the arm wrestling between Energy Commission (ST) which has jurisdiction over energy efficiency and SEDA is making Malaysia's progress in Energy Efficiency hampered. This is made worst by interference from the policy makers in KeTTHA. Let us dissect the problems of the project to determine its effectiveness.

## **6.2 INPUTS FROM STAKEHOLDERS**

Based on stakeholder engagement with industry, government and members of public, AWER has assessed the SAVE project that is aimed to promote sales of energy efficient equipments via rebate system. Such a rebate system is said to reduce the cost of the products and increase usage of energy efficient equipments. To qualify for the rebate, the initial eligibility criteria set for domestic consumers is monthly electricity consumption between 200 - 400 kWh. Due to poor response, this initial eligibility criterion was abolished for air conditioners to encourage all level of consumers to participate. Now, let us review what the stakeholders say about the SAVE project.

### **6.2.1 Participating Industry Players**

AWER has conducted a series of consultation with few industry players in the SAVE project. In addition to that, we have also carried out similar consultations with 2 major hypermarkets and few electrical shops (which asked to be kept as anonymous). The summarised inputs from the consultations are clustered as following:

- (i) Planning of the SAVE project
  - a. Notice for participation and preparation was too short; and
  - b. Mechanism to implement the project is complicated.

- (ii) Implementation of the SAVE project
  - a. The SAVE project's website was not ready fully even after the launch;
  - b. Implementation is lousy in terms of support to dealers. Some of the road shows were scheduled way later after the launch and closer towards the end of the project period in year 2011; and
  - c. Based on sales target and projected response rate, the allocated units should have been sold in 2 months but in reality, it does not materialise and have to extend the implementation to year 2012.
- (iii) Impact to participating industry players
  - a. Retailers have to prepare computers with internet access as well as staff monitoring (due to misuse of internet). This causes more investment eventually;
  - b. There are not many enquiries and response over the project is bad. The situation is worst in outskirts;
  - c. If lost the coupons or mistakenly received fake coupons, retailers have to take full liability. This is business risk many dealers are afraid of;
  - d. Those brands that newly applied to join the SAVE project need to apply for 5 Star energy efficiency labelling. This has caused them to incur additional cost and with poor response for the project, they did not even meet break even; and
  - e. Consumers are not aware of the procedures of the SAVE project and go straight to dealers. Dealers also feel no guarantee of getting the money back from the government due to delay in approval and payment.
- (iv) Other reasons
  - a. Some participating brands spent hundreds of thousands to promote the SAVE project. However, with poor response, it caused losses to the companies. This is basically due to bad planning and implementation of SAVE project; and
  - b. Requirements for energy efficiency label and endorsement label were not followed. Some brands printed bigger labels to attract buyers. This violates label guidelines. Several complaints were made but there was no action taken against errant brands. This is also deemed unfair for some brands which follow suit the rules and regulations.

## 6.2.2 KeTTHA and ST

ST has informed AWER that the SAVE project suppose to be implemented by them based on their planning to implement Energy Efficiency. However, the policy makers (KeTTHA) have pulled the implementation to the ministry and eventually pass it to SEDA. SEDA is an entity that has no legal obligation or jurisdiction in implementation of Energy Efficiency. The Energy Efficiency implementation has been on a turf fight between head of a sector in KeTTHA and ST. Since this senior officer from KeTTHA was promoted to lead SEDA, the tug of war in implementing Energy Efficiency has also changed its position to between SEDA and ST now.

Some of the issues raised by KeTTHA during our consultation process are:

- (i) This project was designed to prepare the market to help the implementation of Energy Efficiency and Conservation Act (EE&C Act) that is scheduled to take place between year 2013 and 2014;
- (ii) Response from public is low in the early stage and the officers took some time to adjust themselves and stabilise the online system;
- (iii) Dealers that did not attend the training (roadshows) might face more problems during implementation as they do not understand the procedures;
- (iv) Utility companies are also facing obstacles to streamline information to their staffs over the project;
- (v) Admitted that there was no ceiling price set for products and brands that are participating in the SAVE project; and
- (vi) Admitted that no study and comparison of pricing was done throughout the implementation of SAVE project to prevent misuse of rebate mechanism.



6.3 COMMENTS FROM AWER

(i) Scope of SAVE project

KeTTTHA has failed to inform or justify how the target group specification was derived. In addition to that, the changes in eligibility requirements set for air conditioners only indicate that this project is an ad-hoc attempt. Therefore, the scope of the project and its targeted output are vague and probably the target groups are chosen based on 'cubicle' assumptions.

(ii) Timeline and coordination with businesses

There are serious flaws in the communication and implementation phases of this project. The preparation for the project also lack of consultation on public's needs. Therefore, set backs are common in this project.

(iii) Selection of product

Air conditioner is not a must in daily life for many. Furthermore, wrongly using 'inverter' type of air conditioners may spike the electricity bills. 'Inverter' type of air conditioners can easily obtain 5 star rating labels due to its high Energy Efficiency Ratio (EER) value. However, these products need to be installed in closed and suitable areas to achieve maximum savings in electricity consumption. Open areas such as living hall or under sized (based on air conditioner's horse power) will lead to higher electricity consumption due to its 'inverter' functions. Based on our consultations with public and retailers, most of the sales personnel do not share this information with consumers as they have no knowledge about it as well.

(iv) Level playing field

AWER's field study shows that the labelling requirements were not followed (Figure 6a). Some brands used energy efficiency label that are printed on a normal A4 paper and stick it using a tape on top of the product that is displayed. The colour codes of the labels are far different from the specified colour codes that are stipulated in the regulation. In addition to that, some brands had the energy efficiency label printed way bigger than stipulated size in the regulation to attract buyers' attention. This becomes a disadvantage and unfair to other brands which complies with the regulation. Complaints made were also left unattended.

Figure 6a: Samples of Energy Efficiency Labels that did not comply with prescribed size and colour code

	
A 5 Star label for an air conditioner was printed using inkjet printer on normal paper and does not follow prescribed colour codes.	Energy efficiency endorsement label printed larger than prescribed size and displayed in a hypermarket.

**(v) Creating jobs and moving economy**

This SAVE project might not have achieved these goals and the extension of the implementation period is a solid proof. Based on our consultation with the businesses, they will optimise the human resource and will not recruit new staffs to cater the needs of such project as the impact of this project to individual stores is very small. Some have also indicated that there are additional cost and liability by participating in this project.

**(vi) Pricing of products are not monitored**

One of the core objectives of this project is to reduce the cost of purchasing an energy efficient product. Unfortunately, the implementation of SAVE project did not monitor the actual pricing set at the market. This is admitted by KeTTHA during our consultation with the officials. How would one know if the price offered is the best price? What happens if the businessmen raise the price and rebate based on SAVE project's rebates? AWER is not putting the businessmen's behaviours in bad faith but in business world, profit making is always the priority. Therefore, this is a major factor that makes SAVE project a questionable one.

**(vii) SAVE project promotes to increase electricity consumption**

When this project was launched, it targeted buyers with electricity consumption within 200 to 400 kWh. Consumers that fall within this electricity consumption range are possibly a family that already have 1 air conditioner, a fridge with all the other basic electrical items at home. If a new air conditioner is purchased, the overall electricity consumption of this family will increase. For family that has no air conditioner, their electricity consumption is always lower. Now, their electricity consumption will definitely increase if they purchase a new air conditioner. Besides this, SAVE project is not a replacement programme for old and inefficient products that are already in use. It is a sales oriented project. Therefore, the project indirectly has increased the overall electricity consumption for domestic sector in Malaysia which defeats its objective to reduce electricity consumption. This is a classic example of failure in decision making without detailed study by the policy makers.

## **6.4 RECOMMENDATION AND CONCLUSION**

Overall, this project could have been implemented with high impacts and benefits to the people and businesses if planned in detail. Unfortunately, office politics within KeTTHA and its agencies as well as ad-hoc implementation has caused SAVE project a failure and basically did not make much change in improving understanding of energy efficiency.

AWER recommends the following to be carried out:

(i) **Auditor General should audit the entire project and its actual achievements.** There should also be a cost benefit analysis and the overall cost of the project including human resource, website, roadshows and other 'promotional' expenditures versus project's outcome. There should be clear measurement of achievements and the report should be made public.

(ii) **The implementation of Energy Efficiency must be carried out by ST** as stipulated in Energy Commission Act 2001 in section 14 (1) (a), (b), (d), (e), (g), (i) and Electricity Supply Act in section 14 (l), 14(la), 23A, 23B and 23C. The policy maker (KeTTHA) or unauthorised agencies (SEDA or others) should not interfere in the implementation of energy efficiency. The minister of KeTTHA must step in to prevent failure of energy efficiency implementation in Malaysia. **Act now before it enters the point of no return.**

(iii) **Implement Minimum Energy Performance Standards (MEPS) for both refrigerators and air conditioners immediately.** ST has the power to implement MEPS anytime. MEPS is the most effective way to remove inefficient energy consuming products from the market and it is easier to be implemented for a wide range of products in a short period of time. Many countries in Asia Pacific have already implemented it; Malaysia is way behind Thailand and Singapore in MEPS implementation.



(iv) **Enforcement of labelling is vital.** The government must provide level playing field to all industry players of energy efficient product to ensure the energy efficient products' market grows. Unfair treatment will deter the growth of energy efficient products market.

Part (ii) of the recommendations will allow regulator (ST) to implement energy efficiency works without being affected by policy makers (KeTTHA) or any other unauthorised entity. Part (iii) and (iv) of the recommendations will increase the utilisation of energy efficient products in the market and boost energy efficiency sector.

Failure to implement these steps will keep Malaysia performing badly in energy efficiency. The most important task for the Minister of KeTTHA is to ensure no policy maker or unauthorised agencies interfere with the functions of ST. We urge also ST, PEMANDU and Ministry of Finance (MoF) to adopt the recommendations in this study to improve the deliverables and increase the potential impacts to people and the country. SAVE project is a good initiative but the current implementation is a total failure.

## PART 7 CASE STUDY 5: REVIEW OF ENERGY EFFICIENCY IMPLEMENTATION IN SELECTED ASIA PACIFIC AND ASEAN COUNTRIES

### 7.1 ENERGY EFFICIENCY IMPLEMENTATION STATUS IN SELECTED ASIA PACIFIC AND ASEAN COUNTRIES

Energy efficiency implementation across the world is limited due to many factors. However, growing demand for energy resources has been the ultimate reason behind this. In addition to that, being energy efficient also reduces operational cost and adds the 'green' perspective to businesses. Some countries have even introduced carbon emission tax regime to add value and speed up the improvement in energy efficiency.

AWER has selected few major economies in Asia Pacific (Australia, China, Hong Kong, India, Japan, South Korea, and New Zealand) and all ASEAN members for the purpose of data collection and tabulation to outline a baseline status on energy efficiency implementations across these countries.

### 7.2 ENERGY USE AND CARBON EMISSION

Table 7a shows the energy use and carbon emission indicators for selected Asia Pacific and ASEAN countries. Energy use is directly proportionate to carbon dioxide (CO<sub>2</sub>) emission. From Table 7a we can observe that, a country's energy use and carbon emission is tied closely with its income level and development status. Developed nations and high income nations use more energy and electricity which in result causes higher carbon emission.

**Table 7a: Energy Use and Carbon Emission Indicators for Selected Asia Pacific and ASEAN Countries**

No.	Country	Current income status <sup>[1]</sup>	Energy use for 2009 (kg of oil equivalent per capita) <sup>[1]</sup>	CO <sub>2</sub> emissions (metric tons per capita) <sup>[1]</sup>		Electric power consumption for 2009 (kWh per capita) <sup>[1]</sup>
				2007.	2008	
1	Australia	HI	5,971	18.1	18.6	11,113
2	Brunei	HI	7,971	25.3	27.5	8,662
3	Cambodia	LI	371	0.3	0.3	131
4	China	UMI	1,695	5.2	5.3	2,631
5	Hong Kong	HI	2,133	5.8	5.5	5,925
6	India	LMI	585	1.4	1.5	597
7	Indonesia	LMI	851	1.6	1.7	590
8	Japan	HI	3,700	9.8	9.5	7,819
9	South Korea	HI	4,701	10.3	10.5	8,980
10	Laos	LMI	n.a.	0.3	0.3	n.a.
11	Malaysia	UMI	2,391	7.2	7.6	3,614
12	Myanmar	LI	316	0.3	0.3	104
13	New Zealand	HI	4,032	7.8	7.8	9,346
14	Philippines	LMI	424	0.9	0.9	593
15	Singapore	HI	3,704	7.8	6.7	7,949
16	Thailand	UMI	1,504	4.2	4.2	2,045
17	Vietnam	LMI	745	1.3	1.5	918

*n.a.*: Not Available, *HI*: High income, *UMI*: Upper middle income, *LMI*: Lower middle income, *LI*: Lower income

Electricity consumption is directly related to availability of electricity supply to every part of a country. Therefore, developed nations or high income economies tend to have higher electricity consumption compared to least developed and developing nations. Due to this difference, a careful energy efficiency policy and legislation implementation is needed as not all developed nation's energy efficiency solutions can be directly applied with fast rate in return of investment (ROI) in the developing and least developed nations.

### 7.3 ENERGY EFFICIENCY LEGAL FRAMEWORK

Table 7b shows the energy efficiency policies and laws available in selected Asia Pacific and ASEAN countries. Brunei, Cambodia and Laos are in the midst of developing laws relating to energy efficiency and conservation. Myanmar has no law relating to this field. The developed nations have larger legal framework via various policies and laws. In directly, the developing nations which usually become manufacturing hubs of various industries from developed nations have also adopted many policies and laws to enhance the energy efficiency implementation locally.

As an example, the Top Runner programme by Japan has improved energy efficiency performance for wide range products domestically and has introduced a new range of products to the world in competitive pricing. This is a leading example how local programmes influence world market. The impacts of such programme will also be felt by countries like Thailand, Malaysia, Vietnam and China where electrical and electronic manufacturing hubs are focused. However, it is entirely up to a country's administration to follow suit global changes such as this.

**Table 7b: Available Energy Efficiency Legal Framework for Selected Asia Pacific and ASEAN Countries**

No.	Country	Available Energy Efficiency Legal Framework	
		Policy	Law
1	Australia	<b>1994</b> - Equipment Energy Efficiency Programme <b>1998</b> - Energy Efficiency Best Practises <b>2009</b> - National Strategy on Energy Efficiency <b>2012*</b> - Clean Energy Future	<b>2006</b> - Energy Efficiency Opportunities Act
2	Brunei	<b>2009</b> - Energy Efficiency and Conservation Strategic Plan	<b>2012*</b> - Energy Efficiency and Conservation Act
3	Cambodia	<b>2012*</b> - National Energy Master Plan	<b>2012*</b> - Energy Efficiency and Conservation Law
4	China	<b>1996</b> - Policy Outlines of Energy Conservation Technologies of China <b>2004</b> - China Medium- and Long-term for Energy Conservation Plan <b>2006</b> - Top 1000 Enterprise Energy Efficiency Action Plan <b>2008</b> - National Energy Conservation Strategy of China	<b>1998</b> - Energy Conservation Law of The People's Republic of China <b>2005</b> - Regulation on Energy-Efficiency Labelling Administration
5	Hong Kong	-	<b>1995</b> - The Building (Energy Efficiency) Regulation <b>2008</b> - The Energy Efficiency (Labelling of Product) Ordinance
6	India	<b>2006</b> - Integrated Energy Policy <b>2007</b> - Energy Conservation Policy	<b>2001</b> - Energy Conservation Act
7	Indonesia	<b>1995</b> - National Master Plan of Energy Conservation (revised 2005) <b>2005</b> - Blueprint of National Energy Management (2005-2025) <b>2006</b> - National Energy Policy (Presidential Decree)	<b>2007</b> - The Energy Law
8	Japan	<b>1999</b> - Top Runner Program <b>2006</b> - National Energy Strategy	<b>1979</b> - Energy Conservation Law
9	South Korea	<b>1992</b> - Energy Efficiency Label and Standard Program <b>1996</b> - High Efficiency Appliance Certification Program <b>1999</b> - e-standby Program	<b>1979</b> - Rational Energy Utilization Act <b>1992</b> - Regulation on Energy Efficiency Labelling and Standards <b>1996</b> - Regulation on Promotion and Dissemination of High Efficiency Appliances <b>1999</b> - e-standby Program Application Regulation

**Table 7b (continued)**

No.	Country	Available Energy Efficiency Legal Framework	
		Policy	Law
10	Laos	n.a.	<b>Drafting</b> - Decree on Energy Efficiency and Conservation
11	Malaysia	<b>1991</b> - Energy Efficiency Programme <b>2006</b> - Ninth Malaysia Plan <b>2011</b> - Tenth Malaysia Plan <b>2011*</b> - National Energy Efficiency Master Plan	<b>1990</b> - Electricity Supply Act (amended 2001) <b>2001</b> - Energy Commission Act <b>2014*</b> - Energy Efficiency and Conservation Act
12	Myanmar	<b>Under development</b> - Energy Efficiency and Conservation Master Plan	n.a.
13	New Zealand	<b>2007</b> - New Zealand Energy Efficiency and Conservation Strategy	<b>1991</b> - The Resource Management Act <b>2000</b> - Energy Efficient and Conservation Act
14	Philippines	<b>2009</b> - Implementing Guidelines for the Performance and Energy Labelling Requirements on Self-Ballast Lamps for General Lighting Services (No. 09-01), Double-Capped Fluorescent Lamps (No. 09-02) Single-capped Fluorescent Lamps (No. 09-03), Ballast for Tubular Fluorescent Lamps (No. 09-04) and AC Supplied Electronic Ballast for Tubular Fluorescent Lamps (No. 09-05)	<b>1964</b> - Republic Act 4109 (Bureau of Product Standards) <b>1992</b> - Republic Act 7638 (Department of Energy)
15	Singapore	<b>2009</b> - Sustainable Singapore Blueprint	<b>1989</b> - Building Control Act (revised 1999) <b>1999</b> - Environment Protection and Management Act (revised 2002)
16	Thailand	<b>1997</b> - Thai Energy Development Plan <b>2011</b> - Policy Statement of the Council of Ministers	<b>1992</b> - Energy Conservation Promotion Act (revised 2007) <b>1995</b> - Royal Decree on Designated Buildings
17	Vietnam	<b>1997</b> - National Conservation Master Plan Program <b>2006</b> - National Strategic Program on Energy Saving and Effective Use	<b>2003</b> - Decree on Energy Conservation and Energy Efficiency <b>2005</b> - Electricity Law <b>2005</b> - Vietnam Energy Efficiency Building Codes

\*are implementations that are pending approvals

n.a. - Not Available

## 7.4 STANDARD AND LABELLING FOR ENERGY EFFICIENCY

Standard and labelling would be priority in establishing energy efficiency achievement for products, processes and services. Failure in implementing both standard and labelling will result in dubious claims and mislead the end users (including business entities).

Based on Table 7c, we can have an overview of energy efficiency labelling for equipments in selected Asia Pasific and ASEAN countries. Based on the detailed reports and case studies reviewed by AWER, we conclude that a combination of mandatory and voluntary labelling coupled with Minimum Energy Performance Standard (MEPS) is vital to remove inefficient products from the market.

MEPS is usually set for a large pool of products. This eliminates inefficient energy consuming products from entering a market. Based on Table 7c, only 8 out of 17 countries we reviewed have implemented MEPS. South Korea and China are leading economies in MEPS implementation.

Mandatory labelling will be imposed to the equipments with high energy consumption or likely to be consumed in large quantities or with long hours of usage duration. These are three major components that lead to high electricity or energy consumption. South Korea is a leading country in mandatory labelling implementation to assist end users to choose the right products. Indirectly, this allows products' technology and human capital development. Products that are subjected to MEPS but not under mandatory labelling can be allowed to have a voluntary labelling. Most of energy efficient products' manufacturers and retailers will support this mechanism as it can be a good catalyst to improve visibility of energy efficient products and create path to implement more mandatory labelling.

**Table 7c: Energy Efficiency Standard and Labelling Status for Selected Asia Pacific and ASEAN Countries**

No	Country	Energy Efficiency Standard and Labelling			
		Label type*	Equipment(s) under Mandatory Label	MEPS	Equipment(s) under MEPS or Voluntary Label
1	Australia	M	Air conditioner, clothes dryer, clothes washer, dishwasher, refrigerator, freezer and television (TV)	YES (upgrading to Green House and Energy Minimum Standard)	Air conditioner, ballast, chillers, close control air conditioner, commercial refrigerators, compact fluorescent lamp (CFL), distribution transformer, electric motor, hot water heater (gas / electric), incandescent lamp (GLS), linear fluorescent lamp (tube), set top boxes
2	Brunei	V	-	NO	Air conditioner
3	Cambodia	Nil	-	NO	-
4	China	M / V	Air conditioner, house-hold refrigerator, clothes washer, unitary air conditioner	YES	Flat panel TV, air conditioner, fan ,power transformer, refrigerator, air compressor, AC contactor, AC electric fan, auto-electric cooker, photocopier, computer monitor, home use electromagnetism, stove, electric storing water heater, multi-connected air conditioner (heat pump), household instantaneous gas water heater, gas fired heating & hot water boiler, water chillers, small & medium motor, high pressure vapour lamp, self ballast fluorescent lamp, washing machine
5	Hong Kong	M / V	Air Conditioner, CFL, Washing Machine, Dehumidifier, Refrigerator	NO	Storage water heater, photocopier, multifunction devices, electric cooker, water cooler, TV, LCD monitor, ballast, clothes dryer, electronic ballast, computer, fax machines, flat screens, water heater, LED lamps, domestic gas instantaneous water heater
6	India	M / V	Refrigerators (frost free), Air Conditioners, Distribution Transformers, Tubular Fluorescent Lights	YES	Direct cool refrigerators, 3-phase induction motors, agricultural pump sets, ceiling fans, LPG stoves, hot water geysers, colour TV, washing machines, computers
7	Indonesia	Nil	-	NO	-
8	Japan	V	-	YES	Passenger vehicle, freight vehicle, air conditioner, TV, video cassette recorders, fluorescent lights, copiers, computers, magnetic disk unit, electric refrigerators, electric freezers, space heaters, gas cooking appliances, gas water heaters, oil water heaters, electric toilet seats, vending machines, transformers, electric rice cookers, microwaves, DVD recorder

**Table 7c (continued)**

No	Country	Energy Efficiency Standard and Labelling			
		Label type*	Equipment(s) under Mandatory Label	MEPS	Equipment(s) under MEPS or Voluntary Label
9	South Korea	M / V	Refrigerators, freezers, kimchi refrigerators, air conditioners, washing machines, drum washing machines, dish washers, dish dryers, hot and cold water dispensers, rice cookers, vacuum cleaners, electric fans, air cleaners, incandescent lamps, fluorescent lamps, CFL, domestic gas boilers, electric cooling and heating equipment, industrial electric refrigerators, gas water heaters, TV, window sets, VRF multi-split heat pumps, dehumidifiers, tyres, automobiles	YES	Refrigerators, freezers, kimchi refrigerators, air conditioners, washing machines, drum washing machines, dish washers, dish dryers, hot and cold water dispensers, rice cookers, vacuum cleaners, electric fans, air cleaners, incandescent lamps, fluorescent lamps, ballasts for fluorescent lamps, CFL, 3-phase electric motors, domestic gas boilers, external power supplies, electric cooling and heating equipment, industrial electric refrigerators, gas water heaters, TV, window sets, transformers, electric fan heaters, electric stoves, VRF multi-split heat pumps, dehumidifiers
10	Laos	Nil	-	NO	-
11	Malaysia	V	-	NO	Refrigerators, domestic electric fans, TV, air conditioner (split), lamps, insulation materials, high efficiency motor
12	Myanmar	Nil	-	NO	-
13	New Zealand	M	Refrigerator, freezer, clothes washer, clothes dryer, dish washer, air conditioner, TV	YES	Refrigerator, freezer, electric storage water heater, 3-phase electric motor, single & 3 phase air conditioner, linear fluorescent lamps and ballast, distribution transformers, commercial refrigerators, CFL, external power supplies, set top boxes, TV, commercial building chillers, close control air conditioners, gas water heaters
14	Philippines	M	Air conditioners, refrigerator, lamps, ballast	NO	-
15	Singapore	M	Refrigerator, air conditioner, clothes dryer	YES	Refrigerator, air conditioner, clothes dryer
16	Thailand	V	-	YES (coupled with High Energy Performance Standard - HEPS)	Refrigerator, freezer, fluorescent lamps, air conditioner, CFL, ballast, water heaters, rice cookers, AC electric fan, chillers, kettle, glazing
17	Vietnam	V	-	NO	Refrigerators, fans, water heaters, CFL, fluorescent tubes, electronic ballast, air conditioner, 3-phase electric motor

\*M = Mandatory, V = Voluntary

MEPS = Minimum Energy Performance Standard



## 7.5 ENERGY EFFICIENCY IMPLEMENTATION FOCUS AND MEASURABLE TARGETS

Based on Table 7d, there are 5 main focus areas for energy efficiency implementations identified in this study. They are industry, transport, commercial, residential and power sector. India has also placed a special focus in agricultural activities. The table also outlines various indicators placed by each country with their respective goal setting. Most of the countries use energy intensity which is a ratio between Total Primary Energy Supply (TPES) and Gross Domestic Product (GDP) as an indicator for energy efficiency measurement.

Internationally, there should be a uniform indicator to ensure measurable energy efficiency targets among countries. This can also assist in creating positive competition regionally and internationally. Most of the countries we reviewed have pledged specific goals to be achieved in Energy Efficiency except to countries like Lao, Malaysia, Philippines and Vietnam.

**Table 7d: Energy Efficiency Implementation Focus and Measurable Targets for Selected Asia Pacific and ASEAN Countries**

No	Country	Energy Efficiency Implementation Focus	Measurable Energy Efficiency Targets [2]	
			Indicator	Goals
1	Australia	Industry, transport, commercial and residential	Carbon pollution	5% reduction below 2000 levels by 2020
2	Brunei	Industry, commercial, residential and power	Energy intensity TPES/GDP	25% improvement by 2030 from 2005 level
3	Cambodia	Industry, transport, commercial and residential	Final energy demand	10% reduction from BAU by 2030
4	China	Industry, commercial and residential	Energy intensity TPES/GDP	16% improvement during 12th 5-year plan (2011 - 2015)
5	Hong Kong	Commercial and residential	Refer to China	Refer to China
6	India	Agriculture, industry, commercial and residential	n.a.	n.a.
7	Indonesia	Industry, transport and residential	Energy intensity TPES/GDP	Reducing 1%/year until 2025
8	Japan	Industry, transport, commercial, residential and power	Energy intensity TPES/GDP	30% improvement by 2030 from 2003 level
9	South Korea	Industry, transport, commercial and residential	Energy intensity TPES/GDP	46.7% reduction by 2030 from 2006 level
10	Laos	Industry, transport, commercial, residential and power	Final energy demand	10% reduction from BAU by 2030
11	Malaysia	Industry, commercial and residential	Final energy demand	8.6% reduction from BAU by 2020
12	Myanmar	Industry, transport and residential	TPES	5% by 2020 from 2005 10% by 2030 from 2005
13	New Zealand	Industry, transport, commercial, residential and power	Energy intensity TPES/GDP	40% improvement by 2025 from 1995 level
14	Philippines	Industry, transport, commercial, residential and power	Final energy demand	10% savings from BAU by 2030
15	Singapore	Industry, transport, commercial, residential and power	Energy intensity TPES/GDP	20% by 2020 from 2005 level 35% by 2030 from 2005 level
16	Thailand	Industry, transport, commercial and residential	Energy intensity TPES/GDP	15% by 2020 from 2005 level 25% by 2030 from 2005 level
17	Vietnam	Industry, transport, commercial, residential and power	Energy intensity TPES/GDP	3 - 5% saving from BAU (2010) 5 - 8% saving from BAU (2015)

TPES - Total Primary Energy Supply; GDP - Gross Domestic Product; BAU - Business as usual;  
n.a. - not available



## 7.6 CONCLUSION

This comparative study reveals the implementation's gaps and status within the selected Asia Pacific and ASEAN countries. Knowledge and best practices sharing can assist to speed up the Energy Efficiency implementation in ASEAN countries. Some of the areas that need immediate actions are:

- (i) **Reducing gap between equipments that are with and without energy efficiency labelling and MEPS within a region.** This is vital to prevent inefficient products being dumped to countries that have not implemented their MEPS and labelling.
- (ii) There should be a **Global Minimum Energy Performance Standard (MEPS) developed as a basic benchmark.** Each country can adopt this basic benchmark and can implement a stricter MEPS for their country. MEPS is the most effective way of removing inefficient energy consuming products from the market and it is easier to be implemented for a wide range of products in a short period of time.
- (iii) Very few countries have specific programme for stand-by electricity consumption. In the Information Technology (IT) and computerised world, stand-by electricity consumption is surging. Therefore, more focus should also be emphasised for this group of products and their development.
- (iv) **Indicators for energy efficiency measurement should also be made uniform internationally.** This is to ensure all countries can participate and actively compete to achieve a better environmental performance. Different indicators will not give harmony in reporting and it will confuse the public and businesses in practicing energy efficiency.
- (v) **The developing economies must focus in optimising energy utilisation to prevent increasing energy use in tandem with GDP growth.** Optimisation via energy efficiency can assist developing economies to achieve higher GDP with minimum increase in energy use. Such a move must be part of the development process. ASEAN countries should not start to optimise energy use only at the peak of their economy development.

Based on global green house gas (GHG) abatement cost curve, energy efficiency falls under no investment or less investment sector. Many energy audits and studies have given similar trends. This means investment into energy efficiency has an immediate return and will not be wasteful. For businesses, the risk of investing into energy efficiency is relatively low. Convincing the receiving ends (members of public and businesses) on the cost saving and environmental benefit of energy efficiency needs a whole new advanced method. AWER has begun the process in Malaysia via **Click d' Thief** an online **Low CO<sub>2</sub> Tool** to assist residential, commercial, industrial and other sectors to conduct simple energy audit. This energy audit is focused on electricity consumption to outline cost and equivalent carbon footprint. It is available for free at [www.click.org.my](http://www.click.org.my).

**References for review study:**

[1] -The World Bank, [www.data.worldbank.org](http://www.data.worldbank.org)

[2] - 5th East Asia Summit Energy Ministers Meeting, September 2011

No.	Country	Compilation reference
1	Australia	Energy Conservation Centre, Japan (ECCJ); Department of Climate Change & Energy Efficiency, Australia
2	Brunei	Energy Efficiency and Conservation Unit, Energy Division, Prime Minister's Office, Brunei
3	Cambodia	Department of Energy Technique, Cambodia; Ministry of Industry, Mines and Energy, Cambodia
4	China	ECCJ; China National Institute of Standardisation; Lawrence Berkeley National Laboratory (US Department of Energy)
5	Hong Kong	Electrical and Mechanical Services Department, Hong Kong
6	India	ECCJ; Bureau of Energy Efficiency, India (BEE)
7	Indonesia	ECCJ; Ministry of Energy & Mineral Resources, Republic of Indonesia
8	Japan	ECCJ; Asia-Pacific Economic Cooperation (APEC); Agency for Natural Resources & Energy, Japan
9	South Korea	Korean Energy Management Corporation (KEMCO)
10	Laos	Ministry of Energy & Mines, Lao
11	Malaysia	Energy Commission, Malaysia; 9th & 10th Malaysia Plan
12	Myanmar	ECCJ; Ministry of Industry, Myanmar
13	New Zealand	Energy Efficiency and Conservation Authority (EECA), New Zealand
14	Philippines	Department of Energy, Philippines
15	Singapore	Singapore Energy Efficiency Programme Office
16	Thailand	ECCJ; APEC
17	Vietnam	ECCJ; APEC

## 8.1 INTRODUCTION TO E-WASTE AND SCHEDULED WASTE SW109

E-waste is defined as waste from the assembly of electrical or electronic appliances that consist of components such as accumulators, mercury-switches, glass from cathode-ray tubes and other activated glass or polychlorinated biphenyl-capacitors, or contaminated with cadmium, mercury, lead, nickel, chromium, copper, lithium, silver, manganese or polychlorinated biphenyl. E-waste is categorised as SW110 according to Environment Quality (Scheduled Waste) Regulation 2005 under Environment Quality Act 1974 (EQA). The disposal of mercury containing wastes such as fluorescent tube and compact fluorescent lamp (CFL) are not classified as e-waste (SW110). Mercury waste is categorised as scheduled waste SW109 due to the nature of the mercury containing wastes.

The EQA requires all scheduled waste to be handled and disposed according to the regulations set. EQA's scheduled waste requirement is applied to the waste handlers and businesses. Domestic consumers are not bound by this regulation. However, when a waste collection company or a recycling company collects this waste from domestic consumers, they are bound by EQA. Based on Department of Environment's report, generation of e-waste in 2008 was about 688,000 metric tonnes and forecasted to be 1.11 million metric tonnes in 2020. However, waste generated from the introduction of non-energy efficient product's phase-out programme was not part of the estimation.

## 8.2 STAKEHOLDER ENGAGEMENT

### 8.2.1 Members of Public

During the consultation process with members of public, they were given examples of e-waste and scheduled waste (with mercury). We asked them how they deal with it. The responses are as below:

- (i) Fluorescent tubes and CFLs are usually disposed in the waste basket to be collected by waste collectors;
- (ii) Even if the fluorescent tubes and CFLs are separated from the other waste, the waste collection company will dump everything straight into the waste collection lorry. They do not segregate the waste during collection;
- (iii) Most of the consumers are not aware of what happens if their e-waste or scheduled waste is collected by certain parties. They are told it is for recycling purpose;
- (iv) When they purchase new product, the retailer refuses to take back the old or spoilt product. The waste collection company also refuses to collect such products. Therefore, they resort to dump it somewhere or keep it;
- (v) There is no clear guideline or agency that gives assistance on this matter;
- (vi) When asked on the accusation by certain parties that they are not willing to pay to dispose the e-waste or scheduled waste (with mercury), the respondents gave mixed responses:
  - a. Some felt that the materials have a financial return for the companies and that is why they are taking it back. So, the respondents are also seeking something in return;
  - b. Some have admitted that they pay the retailers' contractors who transport the new product to their home to dispose the old product. They are not sure how the contractor is going to dispose it; and
  - c. Some have given support to AWER's suggestion of cost sharing to achieve a win-win situation.
- (vii) Transportation for community based waste collection only gets support from waste collection companies with large volume of recyclables; and
- (viii) Recycle for Charity is something trendy now, but people are also wondering if there is proper recycling, storage and disposal mechanism.

### 8.2.2 Government Agencies

Department of Environment (DOE) and National Solid Waste Management Department (JPSPN) are the main agencies involved in management of e-waste and scheduled waste (with mercury). We have also referred to Ministry of Energy, Green Technology and Water (KeTTHA) to find out if they have included waste management in their National Energy Efficiency Master Plan.

- (i) KeTTHA did not include waste generation in phase-out programmes as part of their National Energy Efficiency Master Plan.
- (ii) DOE
  - a. Encourages reuse and reduce. DOE have not done any direct study on impact of phase-out of non-energy efficient equipment to e-waste and scheduled waste (with mercury) generation;
  - b. Two types of processes are involved which are partial recovery and full recovery. Any final residual waste left will still have to be disposed via Kualiti Alam (a scheduled waste management concessionaire);
  - c. There are some take back programmes within the industry and waste collectors. The results of the programmes are not encouraging; and
  - d. DOE agreed that there should be a more workable solution to e-waste and scheduled waste (with mercury) management.
- (iii) JPSPN
  - a. A new waste collection system will be introduced periodically from year 2012 to 2014 covering states that subscribe to waste collection mechanism developed by JPSPN. JPSPN is introducing 2 + 1 mechanism, which is 2 times organic waste and 1 time dry waste collection in a week (including electrical and electronic products). This is the most important separation process to ensure better recovery of materials from waste;
  - b. Processing the e-waste and scheduled waste (with mercury) will be determined based on volume of such materials collected; and
  - c. Knowledge among waste collectors and their contractors must also be improved to ensure better result.

### 8.2.3 Industry Players

We have met industry players of both home appliances and multimedia appliances to obtain the feedbacks over e-waste and scheduled waste (with mercury). After the consultation, one group shows that they are not interested to manage wastes and the other group is keen to explore the possibility. The responses from them are as follows:

- (i) Market maturity is low and the Take Back system is not complete. Some said that Malaysia is not ready yet;
- (ii) One of the stakeholder have tried Take Back policy with product replacement at 50% pricing for new models targeted at commercial and industrial sectors. However, the take up rate is low due to reluctance to reinvest in new models;
- (iii) Many local retailers and manufacturers are just following orders from their parent company. If it is not required by law or the parent company's policy, they will not carry it out in Malaysia;
- (iv) Some are worried of additional cost and storage facility in handling the e-waste and scheduled waste (with mercury);
- (v) Almost half of the stakeholders are willing to participate in the take back system suggested by AWER due to consumers' confidence in service. Another group will wait and see the progress and a small number of stakeholders stated that they are not going to participate;
- (vi) Policies are not friendly and comprehensive. Too many 'grey areas' within the current system that prevents public and industry from participating. The cost structure of managing the e-waste and scheduled waste (with mercury) is also not clear;
- (vii) Almost all respondents agreed that the license to manage the e-waste and scheduled waste (with mercury) must be limited. Too many partial and full recovery plants will reduce competitiveness and cause the recycling industry to collapse. However, there should also be policy to address monopoly and escalated cost issues;

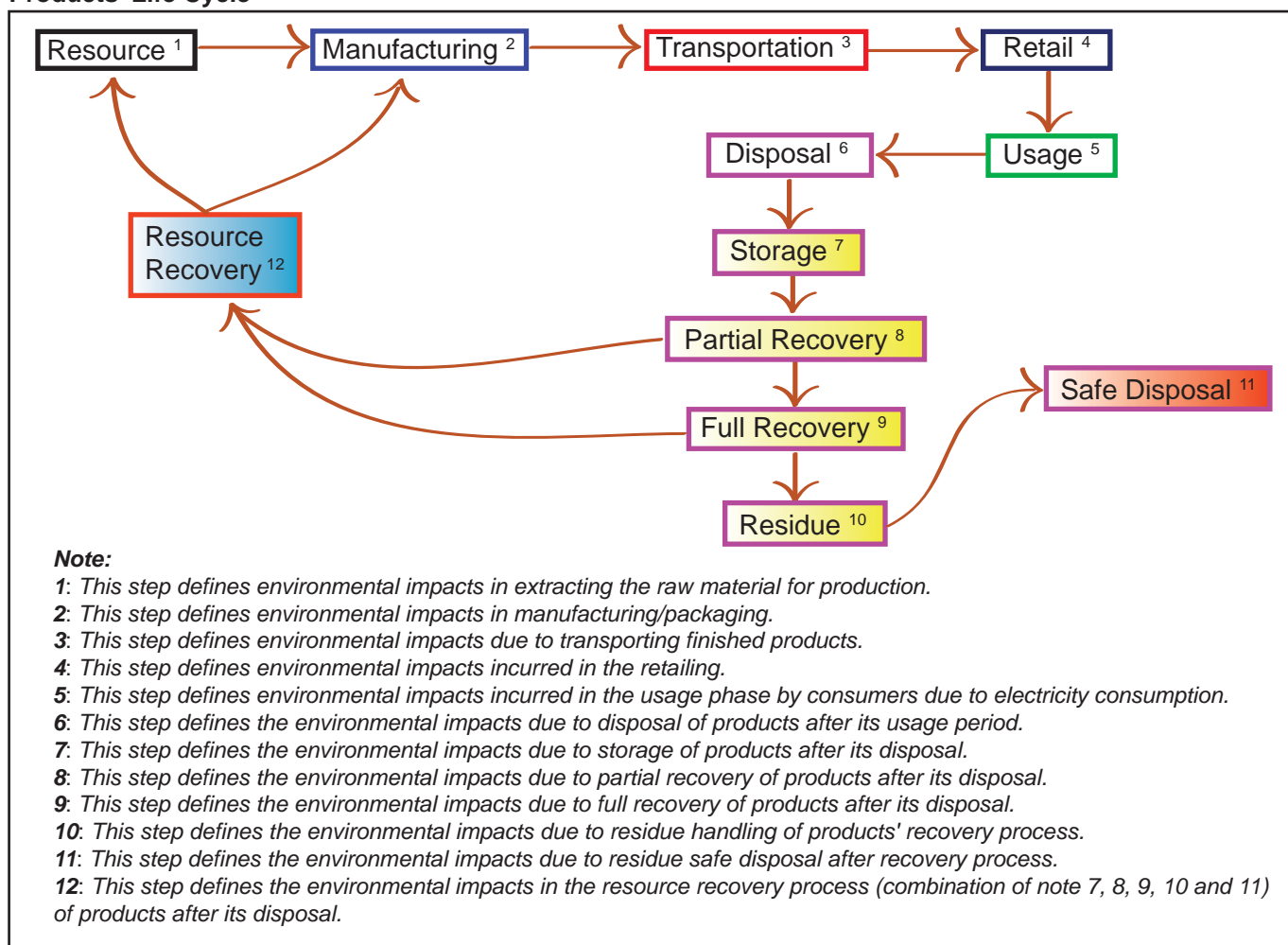
- (viii) Some industries pass the old equipments to be handled by waste collectors and ensured that they have necessary licence to manage e-waste and scheduled waste (with mercury). However, they did not follow through the actual disposal by the waste handlers. The responsibility ends after transferring the waste out of their storage facility;
- (ix) There is also market demand for second-hand electrical and electronic products. However, there are also waste collectors which disassemble the necessary parts only and the fate of the remaining waste is unknown; and
- (x) Logistics and storage of the waste materials must be licensed and regulated properly to avoid pollution, leaching and illegal dumping.

### 8.3 RECOMMENDATION BY AWER ON E-WASTE AND SCHEDULED WASTE (WITH MERCURY) MANAGEMENT

#### 8.3.1 'Cradle to Cradle' Approach in Solving E-Waste and Scheduled Waste (with Mercury)

Establishing electrical and electronic products life cycle is vital in solving the waste management issue. Diagram 8a shows a detailed 'Cradle to Cradle' approach on life cycle for electrical and electronic products. Currently, 'Cradle to Grave' approach which is from Step 1 to 6 is prominent. We need to change it to reach to Step 12, the Resource Recovery process. This will 'pump back' resources into the manufacturing and create a cycle.

**Diagram 8a: Detailed 'Cradle to Cradle' Approach Outline Developed by AWER For Electrical and Electronic Products' Life Cycle**



We need to move away from linear consumption models like 'Cradle to Grave' approach as it depletes resources. It is one way process and increases environmental burden of new Electrical and Electronic products. A cyclic process (cradle to cradle) is much desired to achieve sustainability and indirectly improve the environmental performance.

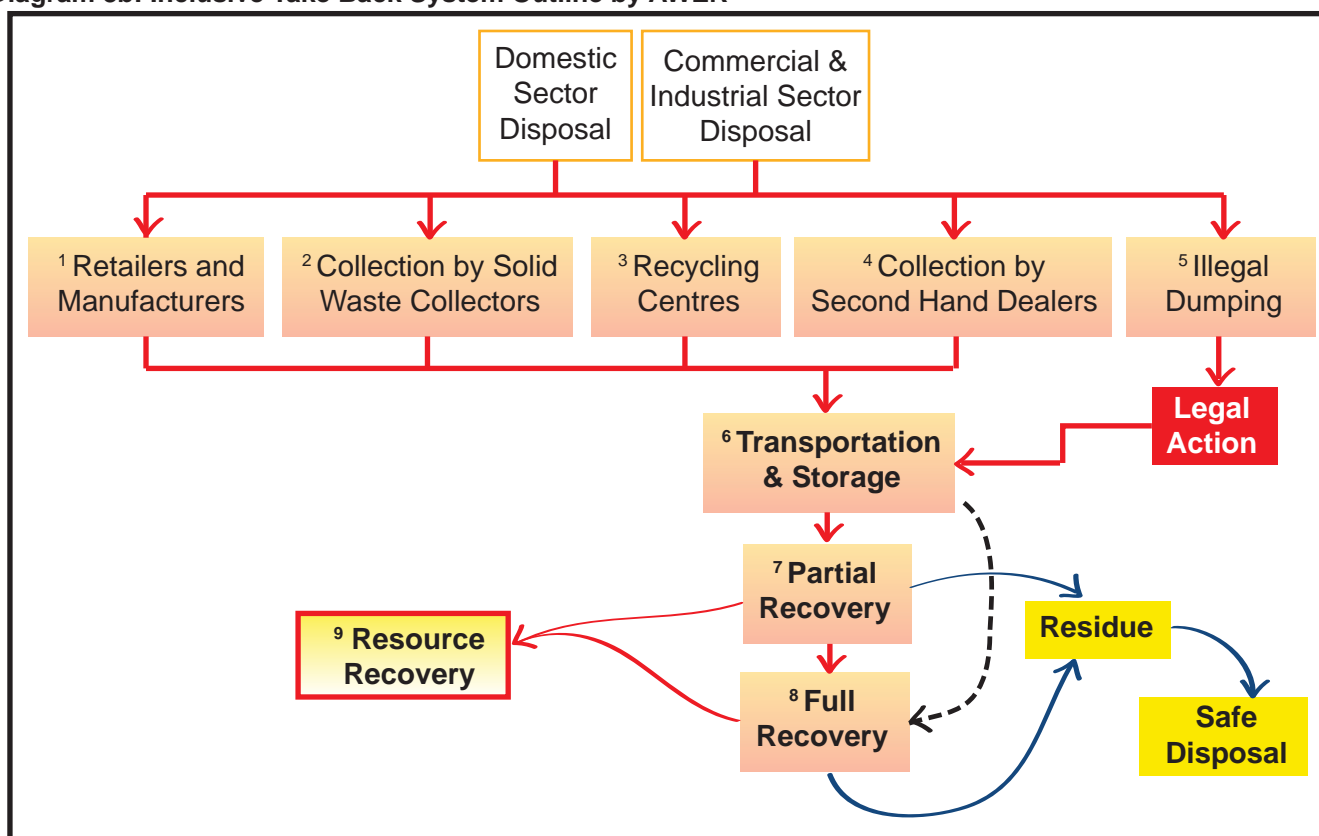


Via 'Cradle to Cradle' approach, we can conduct Life Cycle Assessment (LCA) to further enhance the data collection of materials that are passed through a particular product's life cycle. This will further assist in the cost and operational planning as the phase-out programme will be carried out with few types of product periodically. In short, 'Cradle to Cradle' approach will assist Malaysia to make strategic management system to manage e-waste and scheduled waste (with mercury). LCA approach will also assist in identification of cost option as well as various available technologies.

### 8.3.2 Inclusive TAKE BACK System Must Be Introduced

Take Back System must be implemented to include all types of waste in-flow. However, the partial and full recovery processes must be controlled to encourage cost effectiveness and stabilising the resource recovery industry. Diagram 8b shows the inclusive Take Back System outline developed by AWER for all categories of users.

**Diagram 8b: Inclusive Take Back System Outline by AWER**



The following are explanation for numerical notes in Diagram 8b:

1. Retailers and manufacturers can introduce rebate system to customers that return old product to buy new product. This can assist to capture large volume of e-waste and scheduled waste (with mercury). Many industry players have given a positive feedback to this solution during our consultation with them.
2. Solid waste collectors that are regulated under JPSPN will be collecting e-waste and scheduled waste (with mercury) periodically. This new collection scheme is known as 2 + 1 system, where 2 days of wet waste collection followed by 1 day of dry waste collection. Such a mechanism is important to capture the e-waste and scheduled waste (with mercury). It will also prevent the wastes from contaminating landfills or end up in illegal dumping sites. JPSPN will implement this scheme by phase from year 2012 to 2014. However, few states in Peninsular Malaysia do not follow this scheme. In addition to that, Sabah and Sarawak are not part of National Solid Waste Management and Public Cleansing Act 2007. This is where the participation of retailers and manufacturers becomes vital to ensure success in e-waste and scheduled waste (with Mercury) collection.

3. Recycling centres will play a role too. However, the storage capacity would be a limiting factor when it comes to large sized e-waste. Providing technical knowledge to recycling centres can assist them with necessary skills to prevent contamination while handling wastes involving electrical and electronic products.
4. Second-hand products dealers are another waste in-flow input. The details about them will be discussed further in section 8.3.5.
5. Illegal dumping is bound to take place in any country. Therefore, legal actions must be taken against illegal dumping activities. Some of the heavy metals contained in e-waste and scheduled waste (with mercury) pose high health risks. The recovered waste should be handled accordingly to be plugged-in back into the Take Back System.
6. Transportation and storage play a vital role in ensuring continuous flow of e-waste and scheduled waste (with mercury) to ensure a sustainable resource recovery activity. Trained personnel are needed to ensure proper management of these wastes.
7. Partial recovery plants will process selected materials within their premises. There might be residues which could not be recovered further generated during the recovery process. These residues need to be disposed safely.
8. Full recovery plants may process wastes directly or by-products of partial recovery plants. Again, there might be residues which could not be recovered further generated during the recovery process. These residues need to be disposed safely.
9. Once resource recovery is achieved, the resources will be channelled back to manufacturing process and reducing the need to mine more resources from nature. This completes the 'Cradle to Cradle' approach.

AWER believes that connecting the industry players into a consolidated structure helps in managing the e-waste and scheduled waste (with mercury). The cost structure plays an important role in ensuring the success of the proposed Take Back system. The cost structure development suggestions will be discussed in the section 8.3.3.

### **8.3.3 TAKE BACK System Costing Structure Must Be Developed**

The costing of managing e-waste and scheduled waste (with mercury) must be managed jointly by industry, government and public. The following elements should be considered in determining a costing structure:

- (i) The partial recovery and full recovery is a control licensing operation which forms monopoly (oligopoly). Control of profit via audited Capital Expenditure (Capex) and Operational Expenditure (Opex) need to be imposed;
- (ii) The storage facility and transportation cost can be optimised with proper network and collection systems. Government should play a role in assisting this to be achieved;
- (iii) The options for consumers to send in their waste are basically on how much they benefit from this process. If the retailers and manufacturers offer better perks in Take Back system via giving good discounts for new products it will encourage better participation from consumers. If waste collectors or second-hand dealers give a better return, consumers will choose them. Some level of competitions must be introduced as well. However, some used electrical and electronic products are too small in numbers for industry players to take back for recovery. This may require consumers to pay a higher fee to dispose such products and the disposal fee must be capped;
- (iv) Industry engagement on collection and recovery is vital to ensure the cost is kept as low as possible. Therefore, the entire plan must be developed with proper stakeholders engagements. However, this should not be done in form of campaigns and awareness programmes; and
- (v) To ensure a good collection volume of e-waste or scheduled waste (with mercury), regional level plants and coordination will also help. Coordination between Malaysia, Singapore, Brunei and Thailand can be seen as an immediate step to consider. Partial recovery plants can be placed in a particular country if necessary. Higher volume of waste recovery keeps the cost low and a good success to the Take back system.

8.3.4 Monitoring and Enforcement of TAKE BACK System

E-waste and scheduled waste (with mercury) must be handled to prevent contamination and leaching throughout the collection, transportation, storage, partial recovery as well as full recovery premises and facilities. Basic procedures must be developed and periodic monitoring is vital. This is to ensure the Take Back system functions well and does not contribute to any environmental damage.

AWER has also monitored some of the collection locations and identified many wrong doings as well as lack of awareness from stakeholders. JPSPN and DOE must ensure adequate information is available to assist both domestic consumers and businesses.

The recycling centres must also be monitored and guided in similar manner by JPSPN and DOE to ensure proper handling of wastes. Figure 8a gives some examples where e-waste and scheduled waste (with mercury) is not handled properly.

Figure 8a: Pictures of E-waste and Scheduled Waste (with Mercury) Handling

 <p>Wastes are kept without proper storage facility</p>	 <p>Wastes are kept without proper storage facility</p>
 <p>Wastes are kept without proper storage facility</p>	 <p>Wastes are kept without proper storage facility</p>
 <p>Truck carrying e-waste without cover and exposed. E-waste and scheduled waste (with mercury content) must be covered to prevent any form of leaching during rain.</p>	 <p>Renovation in commercial lot mixed construction waste and fluorescent tubes (a scheduled waste) together.</p>



### **8.3.5 Register Second-Hand Electrical and Electronic Products Dealers and Limit Age of Products**

The second-hand electrical and electronic products dealers must be registered by Energy Commission. These dealers will play a role in 'reusing' the electrical and electronic products or its parts. However, there are many concerns over what actually transpires such as safety issues, labelling, unused parts, etc. These products must at least fulfil basic safety standard and recorded. A registration system will also control the second-hand dealers to ensure no illegal dumping is committed after removing usable parts.

In addition to that, there should also be age limit to products or parts that can be sold as second-hand. This step is vital to ensure middle income and low income groups are not burdened with inefficient products that causes higher electricity bills over a long period. Introducing inefficient second-hand electrical and electronic products into the market is against the objective of improving energy efficiency in Malaysia.

### **8.3.6 Streamline Policy and Implementation Between Peninsular Malaysia, Sabah and Sarawak**

Currently, the e-waste and scheduled waste (with mercury) policy and implementation is not streamlined between Peninsular Malaysia, Sabah and Sarawak. There should be concerted efforts from Federal Government (JPSPN and DOE) with the Sabah and Sarawak state governments. This will also prevent unequal treatment to consumers and businesses between Peninsular Malaysia, Sabah and Sarawak. An early start will also prevent high investment cost in this field to boost the infrastructure development.

### **9.1 ENERGY EFFICIENCY AND CONSERVATION ACT IS NOT NEEDED**

Energy Efficiency and Conservation Act is seen as another redundant legislative tool that will be used by redundant agency like Sustainable Energy Development Authority (SEDA) to control energy efficiency portfolio. The policy makers in Ministry of Energy, Green Technology and Water (KeTTHA) are intruding into jurisdiction that is not given to them. Section 14 (l), 14(la), 23A, 23B and 23C of Electricity Supply Act and section 14 (1) (a), (b), (d), (e), (g), (i) of Energy Commission Act 2001 have clearly stipulated that the implementation and regulatory functions for energy efficiency is under Energy Commission (ST). This can be done via legislative documents such as rules, regulations and standards.

The ongoing Energy Efficiency and Conservation Act preparation can be converted into a suitable subsidiary legal document by ST. ST can adopt the same approach like National Water Services Commission (SPAN) where SPAN drafted Water Rules to manage technical and service quality for water services industry. There are also few more legal documents produced by SPAN including adopting some standards. SPAN is a regulator under KeTTHA. Therefore, there should not be any problem for ST to adopt such approach to improve energy efficiency legislative framework. Furthermore, there is no need for a new specific agency to manage energy efficiency as our population, gross domestic product and size of economy does not require such move.

The implementation of energy efficiency labelling and standards do not require a new set of law as well. ST is already doing this as it is within their jurisdiction. Therefore, AWER urges KeTTHA Minister to ensure tax money is not wasted in developing a new law that will be redundant in nature. Amending Rules, Regulations and Standards to follow suit international changes can be done easily compared to developing an Act.

The National Energy Efficiency Master Plan can be implemented directly by ST easily. This also means that the ST must have a focused and larger department to cater Demand Side Management and implementation of energy efficiency.

### **9.2 IMMEDIATE IMPLEMENTATION OF MINIMUM ENERGY PERFORMANCE STANDARD (MEPS)**

Few of the case studies conducted by AWER have echoed the similar conclusions that Malaysia is in dire need for Minimum Energy Performance Standard (MEPS). MEPS is regarded as the fastest and cost effective tool to weed out non-energy efficient products in the market. Detailed recommendations for implementation of MEPS are outlined in Part 4 of this report. AWER's regional review study has also identified that few ASEAN countries are few steps ahead of Malaysia.

In addition to that, the stakeholders engagement conducted by AWER concluded that price of energy efficient products might not be reducing with phased-out of cheaper non-energy efficient products. Phase-out programmes will remove market competition from cheap and non-energy efficient products towards energy efficient products. Therefore, ST must collaborate with Malaysia Competition Commission (MyCC) to promote and improve competition as well as reduce price of energy efficient and MEPS regulated products. MyCC is the agency entrusted to prevent cartel and price fixing.

### **9.3 ELECTRICAL AND ELECTRONIC PRODUCTS' LABELLING MUST BE STANDARDISED**

Label is one of the important elements in summarising a product's information for consumers. Accurate information will assist consumers to choose and use products wisely. Based on consultations with members of public and comparison with other international better labelling practises, AWER has recommended improved labelling requirements for electrical and electronic products in Malaysia to be carried out by ST. This can be viewed in Part 4 of this report.



As for the energy efficiency labelling, energy efficiency star rating label needs some amendments and the 5 star energy efficiency endorsement label should be abolished from the market. The endorsement label does not have any specific function to promote use of energy efficient products despite confuses consumers.

Once the improvement of labelling is done according to AWER's recommendations, it will give direct benefit for consumers to measure their electricity consumption easily. The improvements must also be done parallel with enforcement.

#### **9.4 TRAINING AND EDUCATION FOR SUPPLIERS AND RETAILERS**

During the consultation processes, we found that most of the suppliers and retailers were left in the dark over many issues related to policies, standards and products' information. Retailers have openly asked for proper training to be carried out to ensure they have sound knowledge on the legal requirements set for energy consuming products.

Currently, the training and information dissemination on products is not clear. The procurement staffing for retailers are also not well versed in labelling, standard and testing details. Hands-on training can assist the retailers to ensure increase in energy efficient products' sales, proper identification of labelling and testing results.

In addition to that, such training and education process can assist ST to boost enforcement and monitoring work.

#### **9.5 MANAGEMENT OF E-WASTE AND SCHEDULED WASTE (WITH MERCURY)**

As admitted by KeTTHA officials, the National Energy Efficiency Master Plan did not include the management of e-waste and scheduled waste (with mercury). Second-hand electrical and electronic products are also in the market and left unchecked. AWER has conducted a case study focused on both of the issues. The details of case study and its recommendations are published in Part 8 of this report.

While Department of Environment and National Solid Waste Management Department are committed in solving this issue, it needs 'cradle to cradle' approach. The 'cradle to cradle' approach via proper Life Cycle Assessment (LCA) will assist Malaysia to improve its waste management as well as increase raw material reserves that can be used in manufacturing sector. This approach needs long term commitment from public, businesses and government and it has been implemented successful in many parts of the world.

#### **9.6 COST BENEFIT ANALYSIS AND CLEAR OBJECTIVES ARE NEEDED FOR GOVERNMENT INCENTIVE OR REBATE PROGRAMMES**

Incentives given to the industry must be translated into reduction of products' cost. These incentives are given by the government via tax money. Therefore, there should be accountability from the business sector. For example, the retailing industries have admitted that prices of energy efficient products are not reducing despite these products are being given incentives. This is an alarming situation. When a ministry proposes incentive for a particular energy efficient product, the officials must measure its implication to the price of the particular product in the retailing sector.

In addition to that, incentives should be given across the board to all energy efficient products and there should not be any favouritism. Only through this, Malaysia can have a fair playing field where people will be able to purchase best energy efficient products with equitable price.

In Part 6 of this report, we have reported the failure by the government in implementing Save Rebate Programme for energy efficient refrigerators and air conditioners. This programme was introduced to reduce financial burden to purchase an energy efficient product and in long term, consumers can reduce their electricity consumption. However, the implementing agency has totally overlooked pricing element and the actual objectives of the programme. This caused government to waste the budgeted allocation without sound benefits.

While there is a need to reduce price of energy efficient products in the market, a proper cost benefit analysis with clear objectives is vital. The implementation and monitoring of the incentives or programmes must also be put in place so that the tax money is spent accordingly. The agencies that propose such mechanism must be held responsible if a programme fails and do not give direct impact in reducing energy efficient products' pricing.

## **9.7 CONTINUOUS COMMITMENT, ENFORCEMENT AND MONITORING FROM ST**

ST must ensure continuous improvement of energy efficiency in Malaysia. As a regulator with its functions clearly defined, it should not shy away from responsibilities pertaining energy efficiency. Similarly, policy makers in KeTTHA must know their limit of messing up regulator's functions.

The key to the success in implementation of energy efficiency is enforcement and monitoring. While Ministry of Domestic Trade, Cooperatives and Consumerism is overwhelmed with many consumer products, a strategic partnership with ST can be formed to carry out enforcement for the benefit of the consumers. Continuous monitoring of products in the market is also vital. Therefore, ST must increase its enforcement unit's human capital as well as outreach.

Specific customs tariff codes for energy efficient products are needed to ensure these products are easily identified at entry point. ST must also carry out raids and checks in collaboration with Royal Malaysian Customs Department to prevent fake as well as counterfeit electrical and electronic products from entering the market.

These steps will protect genuine products, assist consumers to buy correct energy efficient products as well as create investors confidence in our market. In return, this will create a good role model for other developing countries.

Newton's third law states that every action has an equal and opposite reaction. This is also regarded as universal law. Every action we take now, we can observe a reaction that defines the actions taken. Some scenarios to examine the Newton's Law:

- i. If office politic between officers of Ministry of Energy, Green Technology and Water (KeTTHA), Energy Commission (ST) and Sustainable Energy Development Authority (SEDA) is allowed to continue, Malaysian businesses and public will face large energy bills due to infighting for rights to implement energy efficiency project "BUDGETS".
- ii. If Minimum Energy Performance Standard (MEPS) is not implemented, Malaysia will be a dumping ground for non-energy efficient products from neighbouring countries.
- iii. If unnecessary and wasteful publicity stunts for energy efficiency is continued to be implemented by wrong agencies, more tax payers' money will be wasted.
- iv. If energy efficiency is neglected, country will be in darkness.

Implementation of Energy Efficiency in Malaysia needs a greater cooperation and communication. ST must take leadership in implementing energy efficiency. Swift and fast solution are needed for Malaysia to implement full scale energy efficiency.

AWER has presented our finding with good intentions to build a better nation. As the Prime Minister always says, government does not know all. So, we hope this report will fill in the gaps. This report will be distributed to all relevant government agencies, members of parliament, members of the industry and a downloadable copy will be uploaded in both CLICK to Low Carbon Lifestyle Portal ([www.click.org.my](http://www.click.org.my)) and Awer's website ([www.awer.org.my](http://www.awer.org.my)).

Malaysians and likeminded friends all over the world, let's start CLICKing!

## ACKNOWLEDGEMENT

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### *International Organisation / Agency*

- Department of Energy, Philippines
- Electrical and Mechanical Services Department, Hong Kong
- Korean Energy Management Corporation (KEMCO), South Korea

### *Malaysian Organisation*

#### *Government*

- Department of Environment (DOE)
- Energy Commission (ST)
- Ministry of Domestic Trade, Cooperatives and Consumerism (KPDNKK)
- Ministry of Energy, Green Technology and Water (KeTTHA)
- Ministry of Finance (MoF)
- Ministry of International Trade and Industry (MITI)
- National Solid Waste Management Department (JPSPN)
- Royal Malaysian Customs Department
- SIRIM Bhd
- Small and Medium Enterprise Corporation Malaysia (SMECorp)

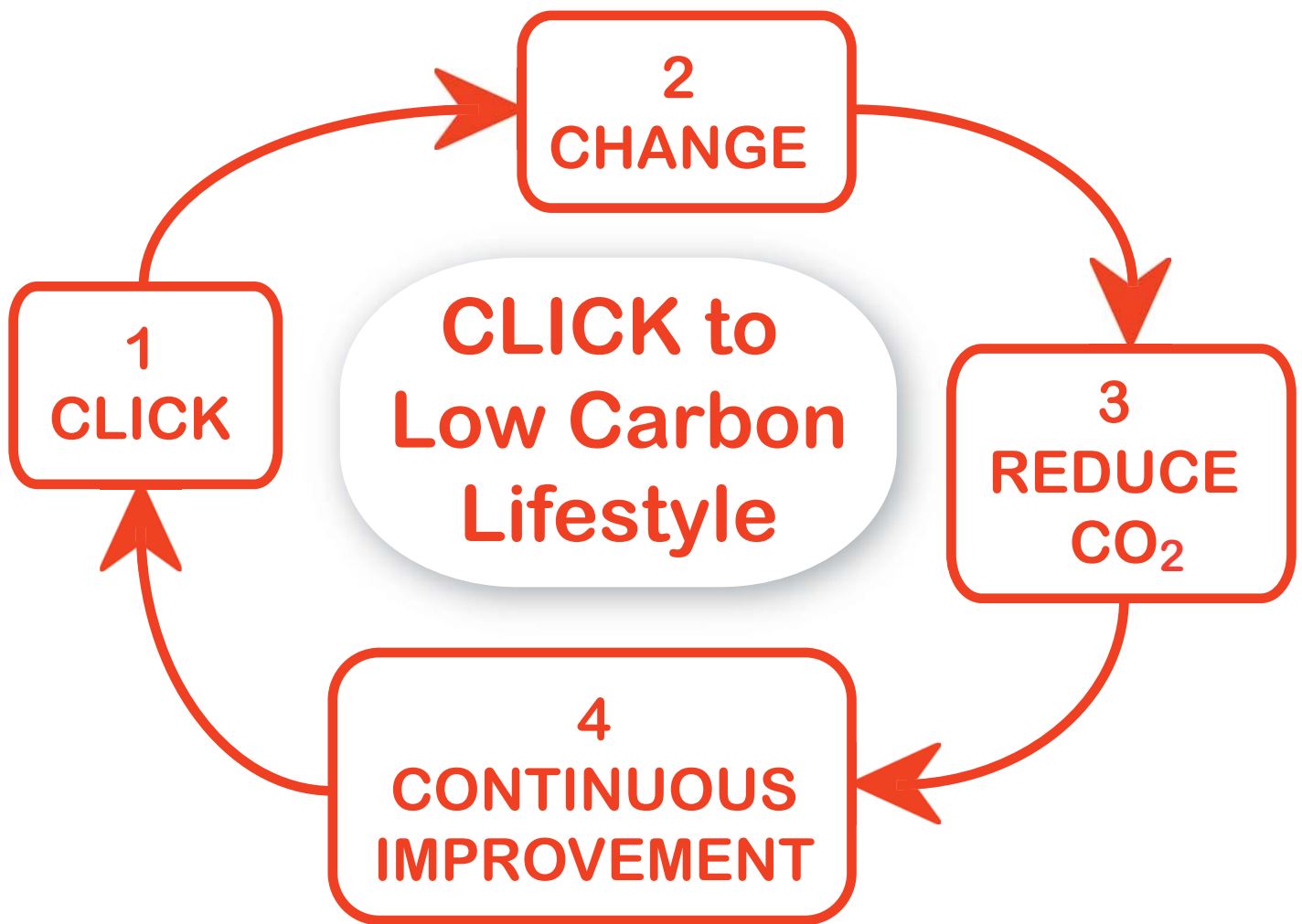
#### *Industry*

- Acer Sales and Services Sdn Bhd (Acer)
- Canon Marketing (Malaysia) Sdn Bhd (Canon)
- Electrolux Home Appliances Sdn Bhd (Electrolux)
- Federation of Malaysian Manufacturers (FMM)
- GCH Retail (Malaysia) Sdn Bhd (Giant)
- Haier Electrical Appliances (Malaysia) Sdn Bhd (Haier)
- Hitachi Sales (Malaysia) Sdn Bhd (Hitachi)
- MELCO Sales Malaysia Sdn Bhd (Mitsubishi)
- Panasonic Malaysia Sdn Bhd (Panasonic)
- Pensonic Holdings Bhd (Pensonic)
- Real Estate & Housing Developers' Association Malaysia (REHDA)
- Sony (Malaysia) Sdn Bhd (Sony)
- Tesco Stores (Malaysia) Sdn Bhd (Tesco)
- The Electrical and Electronics Association of Malaysia (TEEAM)
- The National ICT Association of Malaysia (PIKOM)
- Few electrical shops which asked to be anonymous

#### *Public*

- Sekolah Kebangsaan Permatang Badak, Kuantan, Pahang (Sustainable School)
- Taman Megah Residential Association (Tamera), Petaling Jaya, Selangor
- Members of public whom attended consultation in Perak, Kelantan, Kedah, Kuala Lumpur and Melaka





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