UNEP en.lighten initiative

Lamp Sampling in Cambodia, Indonesia, Lao PDR, the Philippines, Thailand and Vietnam

Prepared for

UNITED NATIONS ENVIRONMENT PROGRAMME

By

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Leading the Transition to Clean Energy

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1. Background

The United Nations Environment Programme (UNEP) en.lighten initiative ("en.lighten") has executed a bilateral agreement with the Australian government entitled, "***Securing climate change benefits of efficient lighting in Southeast Asia and Pacific economies via monitoring, verification and enforcement capacity building activities***." As part of this agreement, UNEP is supporting developing countries in Southeast Asia, South Asia and the Pacific in their capacity building efforts to strengthen their national and regional resources for efficient lighting monitoring, verification and enforcement (MVE) which are the essential activities to ensure a sustainable transition to efficient lighting.

Six countries in Southeast Asia, Cambodia, Indonesia, Lao PDR, Philippines, Thailand and Vietnam, are the specific targets for intensive assistance under this UNEP agreement with the Australian government. These six countries account for 87% of Association of Southeast Asian Nations (ASEAN)'s total population in 2012 and thus serve as a good representative subset of the region as a whole.

1.1 Objective

The objective of this activity is to identify and sample energy efficient omnidirectional lamps (for indoor applications) in the six target countries. The samples will then be shipped to the UNEP project partner, Global Efficient Lighting Centre (GELC) in Beijing, China for testing.

1.2 Approach and Methodology

The approach and methodology adopted by the lamp sampling activities in Southeast Asia are primarily based on guideline documents prepared GELC and reviewed by UNEP. In general, the lamp sampling activities in the six target countries are divided into three steps, 1) retailer survey; 2) lamp purchasing and witnessing, and; 3) packing and shipping, as shown in Figure 1.1 (See Annex 3.3 for a clearer version of this diagram).

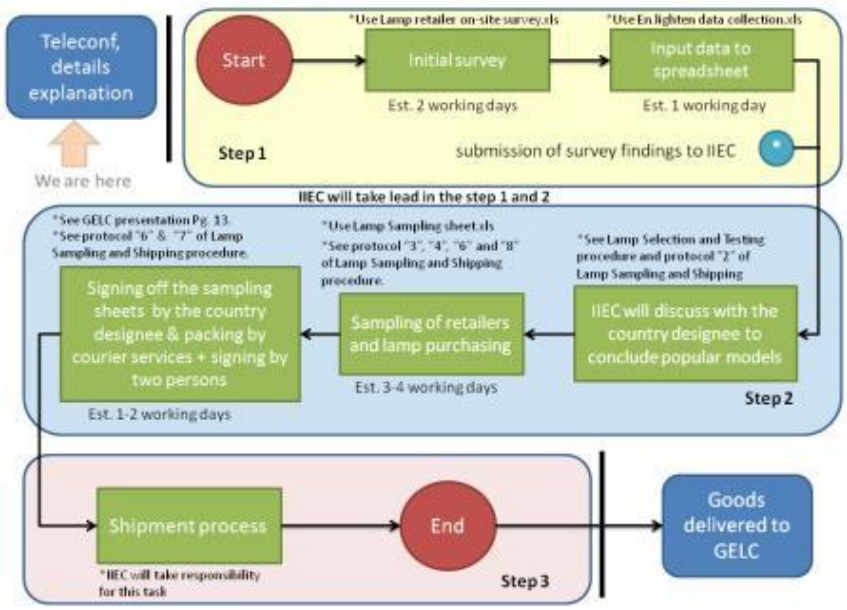


Figure 1.1: Approach and methodology for lamp sampling activities in Southeast Asia

1.2.1 Kick-Off Meeting/Teleconference

Prior to implementation of each step, a meeting between UNEP focal points, country designees and the lamp sampling team in each country was organized by IIEC. IIEC's representative in each country contacted and arranged a date and a time with the country designee for the conference. GELC also participated in the meetings through conference calls. In the meetings, details on each step (as briefly described below) and related sampling guideline documents (included as attachments to this report) were discussed, and the initial timeline for lamp sampling activities in each country was concluded.

1.2.2 Retailer Survey

This step aimed at identifying popular models of compact fluorescent and light emitting diode (LED) lamps that need to be purchased in each country. For the lamp sampling exercise, the definition of a specific lamp model is a lamp with a specific brand, rated wattage, colour temperature and physical characteristics (e.g. shape, lamp base, etc.). Per the agreement with the project partners UNEP and GELC, the scope of this lamp sampling exercise was limited to compact fluorescent and LED lamps for general lighting services; the initial lamp requirements are noted in Table 1.1.

Table 1.1: Initial lamp requirements

Lamp Type	**Requirement**
Compact fluorescent	Bare compact fluorescent (no covers, no reflectors) for residential (consumer) indoor applications, eligible base types include E27 or B22 depending upon local market situation.
LED	Replacements for conventional general service lamps (GLS) (clear and frosted type), eligible base types include E27 or B22 depending upon local market situation.
Lamp Wattage	**Requirement**
Compact fluorescent	30W (maximum)
LED	15W (maximum)

Based on the above requirements, survey questionnaires were designed to collect both quantitative and qualitative information (see Annex 2). In this retailer survey exercise, the overall frequency of a specific lamp model from all surveyed retailers was used to determine its popularity in comparison with other lamp models. This is based on the assumption that lamp retailers in each country will carry only models regularly sought by consumers and on-shelf availability will determine its popularity.

The diversity of retailers was envisaged in each country, and eligible retailers include shopping malls/supermarkets, large electrical shops, and small electrical shops. A minimum one outlet of each large retailer (e.g. shopping malls, supermarkets, hypermarkets) was included in the survey scope. Selections of large and small electrical shops depended upon the local situation in each country. Actual on-site selections of outlets and stores were spontaneously undertaken by the surveyor(s). Considering the limited timeframe for the survey and purchase of compact fluorescent and LED lamps, the surveys were limited to the capital cities. It should be noted that the retailer surveys in this lamp sampling exercise cannot be used to represent the market condition in each target country due to its limited sample size and geographical coverage.

The number of retailers sampled in each country ranged from 12 to 20, due to the size of each country, as shown in Table 1.2.

Table 1.2: Number of retailer outlets or shops surveyed in the six target countries

Country	Number of retailers to be surveyed
Cambodia	20
Indonesia	13
Lao PDR	12
Philippines	13
Thailand	20
Vietnam	16

Following the completion of the surveys, findings were entered into an analysis spreadsheet prepared by IIEC to produce summary charts suggesting popular compact fluorescent and LED lamps in each country. Results of the retailer surveys in each country are shown in Annexes 1.1 to 1.6.

1.2.3 Lamp Purchasing and Witnessing

Based on findings from the retailer surveys, IIEC worked with each country to conclude a list of lamp models to be purchased. To ensure integrity of the lamp sampling activities, lamp purchasing in each country was carried out in collaboration with the country designee. The sampling sheet used for this activity was designed to collect information of each selected model separately. Samplers were required to fill in the wattage, model series, colour, base type, bulb type and brand, and the country designee witnessed the purchasing by signing off the sampling sheets.

Based on the guidelines for lamp selection and testing (see Annex 3), 30 samples of each compact fluorescent lamp model and 20 samples for each LED lamp model were purchased from randomly selected retailers in each country – with 13 to 14 models of compact fluorescent lamps and 2 to 4 models of LED lamps purchased in each country. Final allocations of compact fluorescent lamps and LED lamp models for each country are summarized in Table 1.3. For the most popular wattage, at least three different models were selected. Different models of a specific brand with the same wattage were avoided. For LED lamps, there was no limitation on the purchased models; justifications on this matter were made by the country designee. It should be noted that most lamps (50 – 80%) were bought from large shops or large lighting shops due to the availability of lamps, for the tests to be conducted on each model of lamp).

Table 1.3: Number of compact fluorescent and LED lamp models purchased in the six target countries

Country	Compact fluorescent	LED	Total
	Number of lamp models		
Cambodia	14	3	17
Indonesia	14	4	18
Lao PDR	11	2	13
Philippines	14	4	18
Thailand	14	4	18
Vietnam	13	3	16
Subtotal	**80**	**20**	**100**

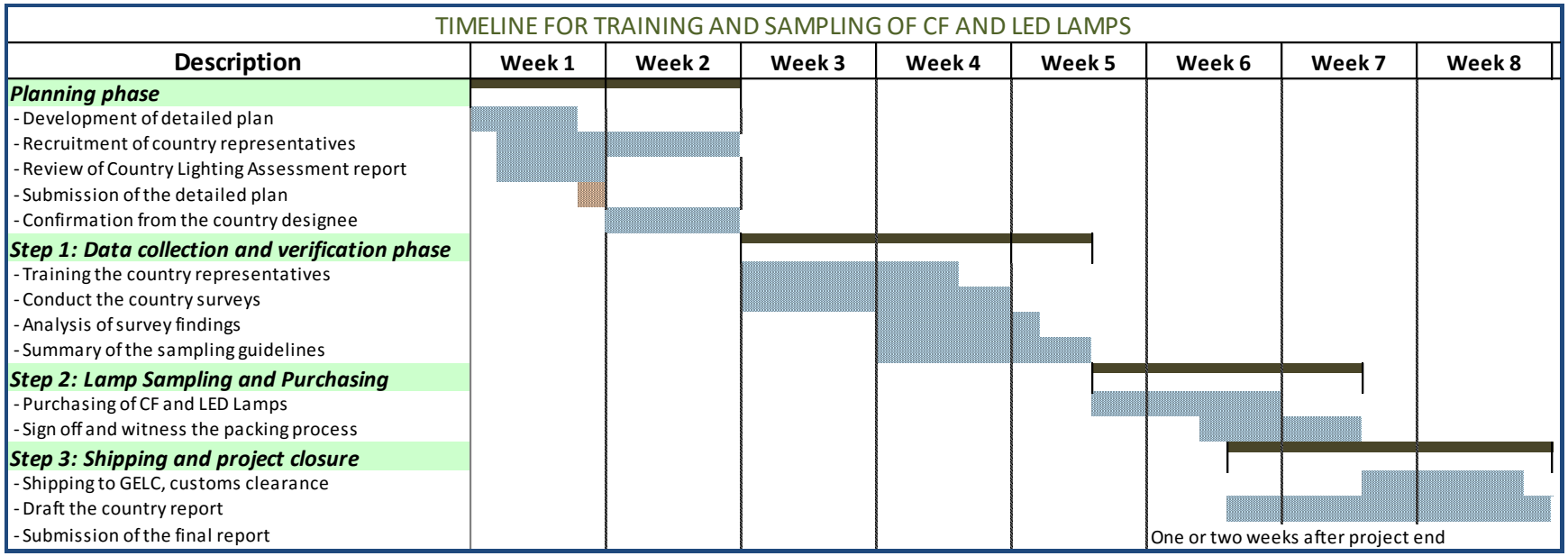
1.2.4 Packing and Shipping

This activity aimed at ensuring that all goods would be delivered in good condition. Trustworthy air freight forwarders were selected in this activity. Shipping products are fragile and prone to break easily, so professional packing was compulsorily required. The IIEC team in each country worked in close collaboration with the selected courier company and the country designee, and the packing strictly followed the guideline provided by GELC. In each country, the country designee(s) witnessed the packing process and signed off the packages. IIEC and GELC were responsible for the customs clearance process and worked closely in order to streamline the customs clearance.

1.2.5 Initial Implementation Timeframe

The project was intended to finish within eight weeks after confirmation of participation from the country designee was made, as shown Table 1.4. The actual implementation timeline in each country is discussed in the next chapter.

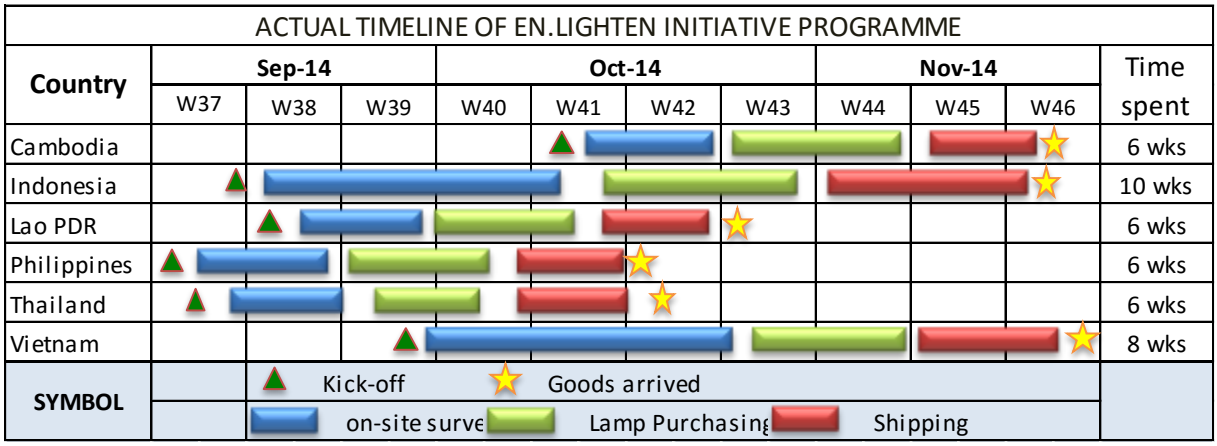
Table 1.4: Initial implementation schedule



2. Implementation of Lamp Sampling Activities

The initial work plan aimed at starting the lamp sampling activities in late August 2014 and completing all the activities by October 2014. However, confirmations from Cambodia and Vietnam for participation in the lamp sampling exercise encountered unexpected delays due to busy travel schedule of the UNEP in-country focal points. Table 2.1 shows the actual implementation timelines of the lamp sampling activities in the six target countries.

Table 2.1: Actual implementation timeline in the six target countries



The initial implementation timeframe was estimated to be eight weeks. The Philippines, Thailand, Indonesia and Lao PDR promptly confirmed with UNEP their participation in the lamp sampling activities. It can be seen from Table 2.1 that these four countries started the lamp sampling activities in the mid-September 2014, followed by Vietnam one week later. Cambodia did not begin this program until those aforementioned countries were conducting the surveys on the ground. In general, the whole lamp sampling process in Southeast Asian countries took about 6-10 weeks. The key factors affecting the implementation timeline in each country included availability of the country designees and local public holidays.

2.1 Main Findings from the Surveys of Lighting Markets in Southeast Asia

Although the six target countries conducting the lamp sampling exercise are located in the same region, where most products were imported or produced in this zone; the lighting market in each country was slightly different. Table 2.2 shows summary findings of the lighting market in each country.

Table 2.2: Summary findings of the lighting markets in the participating countries

Country	Most common type of lamp retailer	Availability of multiple brands of lamps (YES, NO)	Most common models, by wattage range	Most common models, by shelf space per wattage	Colour temperature
Cambodia	Medium-sized electrical hardware shops	YES	11-18 W (CF) 5-9 W (LED)	11W (CF) 5W (LED)	1st Day light (DL) 2nd Warm white (WW)
Indonesia	Medium-sized specialized lighting shops	YES	5-8 W (CF) 5-9 W (LED)	8W (CF) 7W (LED)	1st Day light (DL) 2nd Warm white (WW)
Lao PDR	Small retailers	YES	5-9 W (CF) 5-7 W (LED)	5W (CF) 7W (LED)	1st Day light (DL) 2nd Warm white (WW)
Philippines	Hypermarkets	YES	11-18 W (CF) 5-9 W (LED)	11W (CF) 7W (LED)	1st Day light (DL) 2nd Warm white (WW)
Thailand	Hypermarkets	YES	11-20 W (CF) 5-7 W (LED)	11W (CF) 5W (LED)	1st Day light (DL) 2nd Warm white (WW)
Vietnam	Small specialized lighting shops	NO	11-15 W (CF) 5-7 W (LED)	11W (CF) 5W (LED)	1st Day light (DL) 2nd Warm white (WW)

Note: CF = compact fluorescent

The lamp selection process was based on the initial survey results and the country designee's decision. Primarily, each country had to purchase at least three different brands for the most popular model of compact fluorescent lamps. To ensure the integrity of the program, IIEC requested the local consultant to upload photographs for each step, so that on-going activities could be verified, and comments could be provided as appropriate.

Findings and issues from implementation of the lamp sampling activities in each target country are described in the following section.

2.1.1 Cambodia

Cambodia was the last country that decided to join the lamp sampling activities. However, implementation of the lamp sampling activities in Cambodia went well and the whole process was completed within six weeks. Findings and issues of the lamp sampling in Cambodia are described below.

Kick-off meeting

The kick-off meeting between the Cambodia country designee and IIEC team members in Bangkok and Phnom Penh was organized on 14 October 2014 through teleconference. GELC could not participate due to short notice and conflict of meeting schedule.

Retailer surveys

The retailer surveys were conducted in Phnom Penh from the week of 13 October 2014 to the week of 20 October 2014 (see Table 2.1), and the survey results are shown in Annex 1.1. Figure 2.1 and Figure 2.2 respectively shows popular wattages of compact fluorescent and LED lamps being sold in Phnom Penh.

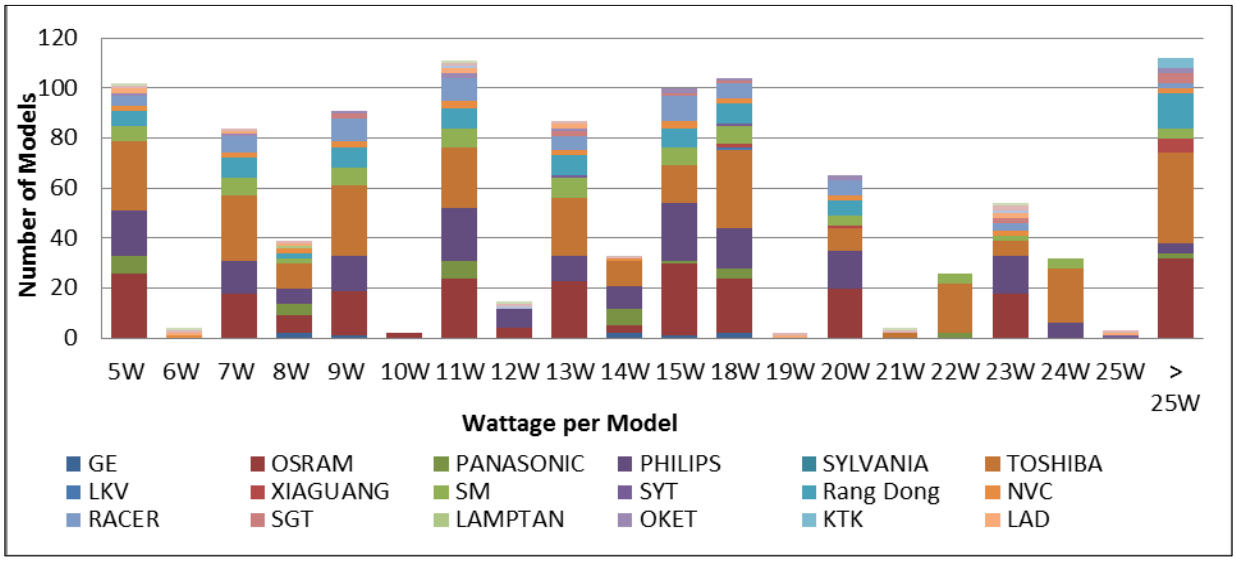


Figure 2.1: Initial survey results of compact fluorescent lamp models in Phnom Penh, Cambodia

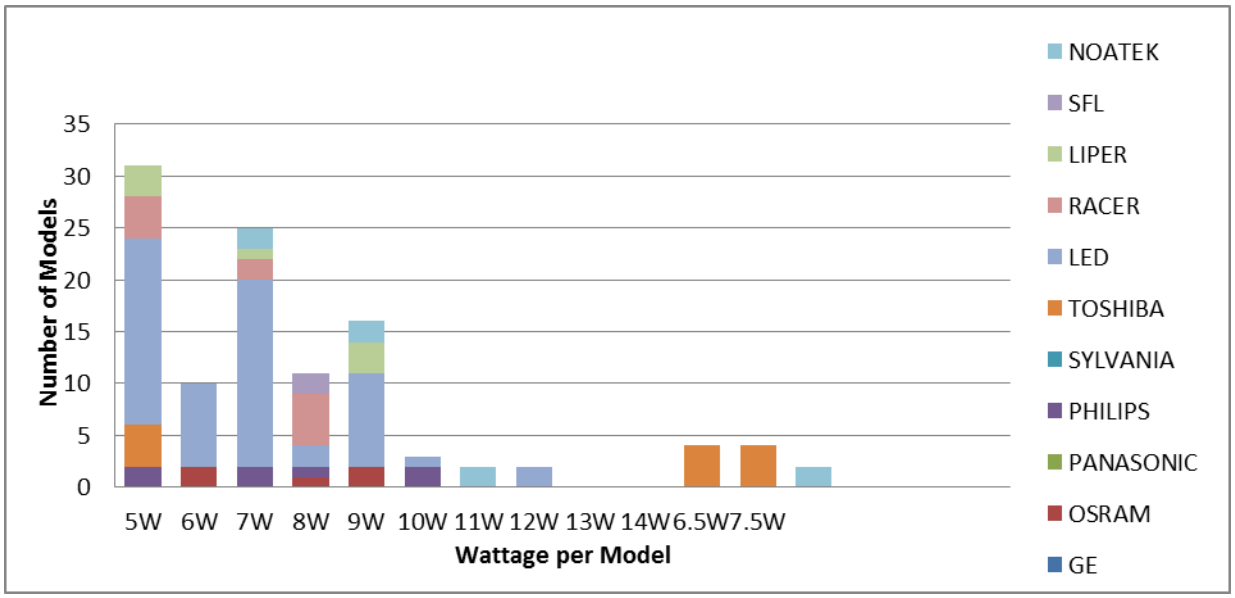


Figure 2.2: Initial survey results of LED lamps in Phnom Penh, Cambodia

The most popular wattage for compact fluorescent and LED lamps are 11W and 5W, respectively. Samplers observed that higher wattage compact fluorescent lamps (>25W) are relatively popular among Cambodian people. It was observed that there has been an influx of Chinese brands in the lighting market in Phnom Penh. Thai and Vietnamese brands can be found in various retailers (more analysis is included in Annex 1). Besides the popular wattages, popular brands and colour were also collected by the surveys and the results are shown in Table 2.3. It is observed that lighting retailers in Cambodia are a good mix of large and small electrical shops.

Table 2.3: A summary of popular lamp models by category, in Phnom Penh, Cambodia

Country	Wattages (Top-3)	Brands (Top-3)	Colours	Most popular model
Cambodia	CF: 11W, 18W and 5W	CF: TOSHIBA, OSRAM and PHILIPS	1) Daylight (DL)	CF: 11W DL
	LED: 5W, 7W and 9W	LED: LED, TOSHIBA and RACER	2) Warm white (WW)	LED: 5W DL

Note: CF = compact fluorescent

Lamp purchasing and witnessing

The lamp sampling and purchasing step was conducted in Phnom Penh between the week of 20 October 2014 and the week of 27 October 2014. In total, Cambodia purchased samples of 14 compact fluorescent and three LED lamp models.

Figure 2.3: Lamp purchasing activities in Cambodia

Packing and shipping

Cambodia is the only country that struggled to find the required courier partner. Most giant and small shipping companies refused to engage in the packing and shipping task because it was against their regulations. Finally, after several attempts, FedEx agreed to ship the samples to GELC in China. However, the team decided to hire a trustworthy professional local packing company to ensure the quality of packaging of all the samples. Although the purchasing was completed before the end of October 2014, the packing was carried out in the week of 3 November 2014, due to the water festival, the long public holidays during the week of 27 October 2014. The Cambodian team maintained integrity well and strictly followed GELC's packing guidelines. In this step, a representative from the Ministry of Environment came to witness and sign off the packages.

Figure 2.4: Cambodian package

2.1.2 Indonesia

Indonesia started the program in the week of 8 September 2014, at the same time as Thailand and the Philippines. However, implementation of the lamp sampling activities in Indonesia faced some delays due to the availability of the in-country consultant, country designee and public holidays. In total, the whole process was completed in around 10 weeks. Findings and issues of the lamp sampling in Indonesia are captured below.

Kick-off meeting

The kick-off meeting between the Indonesia country designee and IIEC team members in Bangkok and Jakarta was organized on 12 September 2014 through teleconference. IIEC presented the step that Indonesia's representatives must be involved and GELC presented about the sampling and packing activities.

Retailer surveys

The retailer surveys were conducted in Jakarta from the week of 15 September to the week of 6 October 2014 (see Table 2.1), and the survey results are shown in Annex 1.2. Figure 2.5 and Figure 2.6 show popular wattages of compact fluorescent and LED lamps being sold in Jakarta.

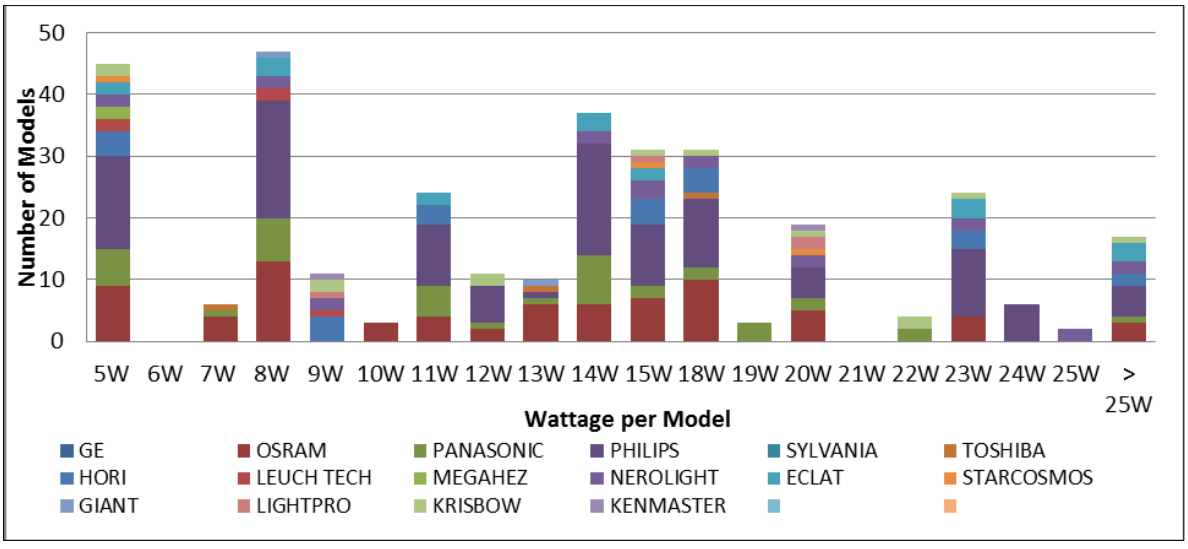


Figure 2.5: Initial survey results of compact fluorescent lamp models for Jakarta, Indonesia

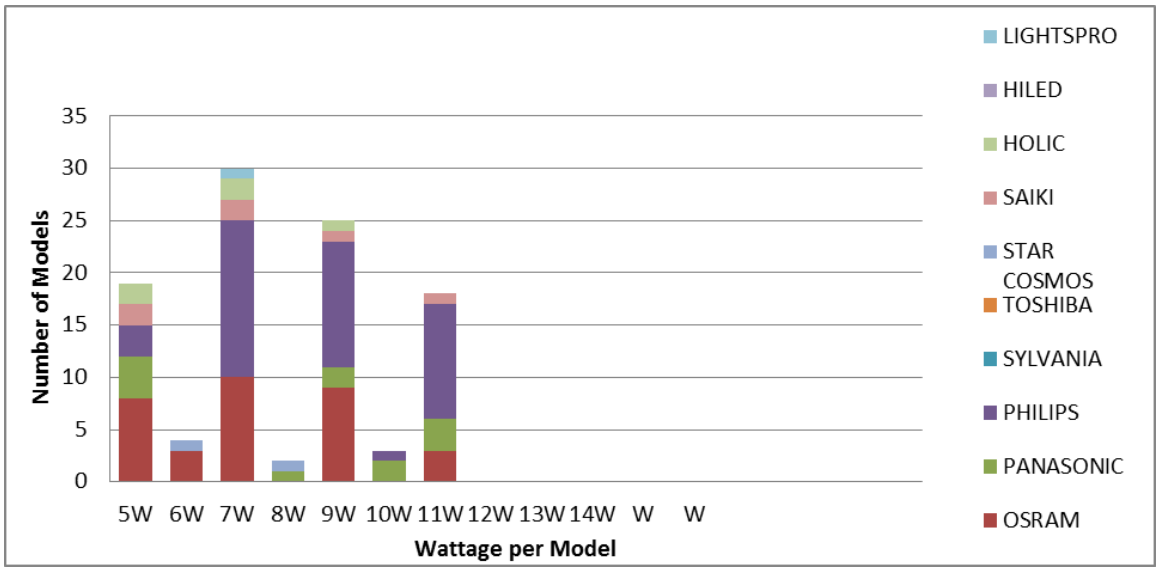


Figure 2.6: Initial survey results of LED lamp models for Jakarta, Indonesia

The most popular wattage for compact fluorescent and LED lamps are 8W and 7W, respectively. It was observed that there are quite a number of local brands available in Jakarta's lighting market. However, based on the on-shelf frequency, international brands still dominate the lighting market in the capital city of Indonesia. More analysis is included in Annex 1. Besides popular wattages, popular brands and colour were collected by the surveys and the results are shown in Table 2.4. It was found that the lighting market of Indonesia has a cluster of small lighting shops and some hypermarkets.

Table 2.4: A summary of popular lamps by category, in Jakarta, Indonesia

Country	Wattages (Top-3)	Brands (Top-3)	Colours	Most popular model
Indonesia	CF: 8W, 5W and 14W LED: 7W, 9W and 5W	CF: PHILIPS, OSRAM and PANASONIC LED: PHILIPS, OSRAM and PANASONIC	1) DL 2) WW	CF: 5W DL and 8W DL LED: 7W DL

Note: CF = compact fluorescent

Lamp purchasing and witnessing

The lamp sampling and purchasing step was conducted in Jakarta between the week of 13 October 2014 and the week of 20 October 2014. In total, the Indonesian team purchased samples of 14 compact fluorescent and four LED lamp models.

Figure 2.7: Lamp sampling and purchasing activities in Indonesia

Packing and shipping

Indonesia engaged DHL as a freight partner because the team had used their service in the similar assignment in the past. However, the DHL staff marked wrong information about customs duty but the team solved that problem within a week. The Indonesian team maintained well integrity and strictly followed GELC's packing guidelines. In this step, a representative from the Ministry of Energy and Mineral came to witness and signed off the packages.

Figure 2.8: Packing and signing off activities in Indonesia

2.1.3 Lao PDR

Lao PDR started the program in the week of 15 September 2014, one week after Indonesia, Thailand and the Philippines. Implementation of the lamp sampling activities in Lao PDR went relatively well and the whole process was completed within six weeks. Findings and issues of the lamp sampling in Lao PDR are captured below.

Kick-off meeting

The kick-off meeting between the Lao PDR country designee and IIEC team members in Bangkok and Vientiane was organized on 16 September 2014 through teleconference. IIEC presented the step that Lao PDR's representatives must be involved and GELC presented about the sampling and packing activities.

Retailer surveys

The retailer surveys were conducted in Vientiane from the week of 15 September 2014 to the week of 22 September 2014 (see Table 2.1), and the survey results were shown in Annex 1. Figure 2.9 and Figure 2.10 show popular wattages of compact fluorescent and LED lamps being sold in Vientiane.

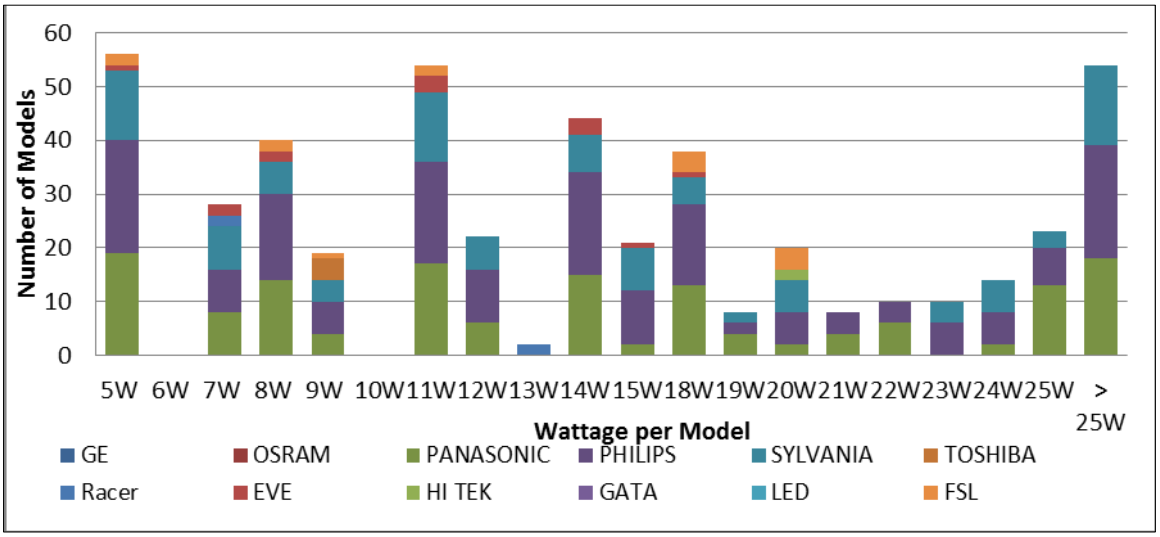


Figure 2.9: Initial survey results of compact fluorescent lamp models for Vientiane, Lao PDR

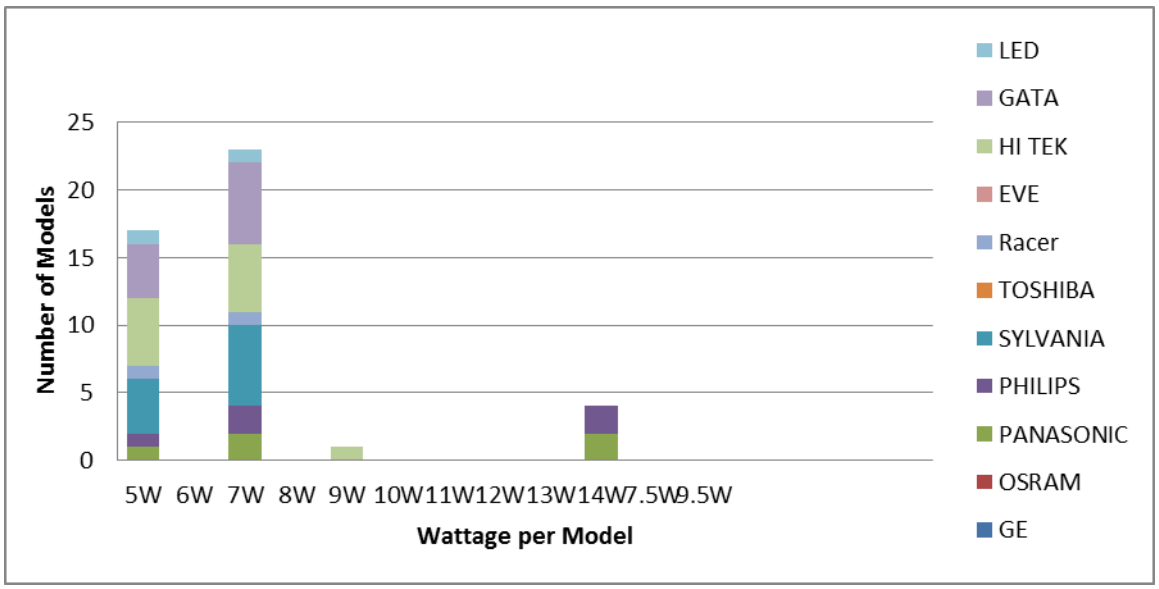


Figure 2.10: Initial survey results of LED lamp models for Vientiane, Lao PDR

It was evident that the most popular wattage for compact fluorescent and LED lamps are in the low-wattage range, 5W and 7W, respectively. Samplers observed that higher wattage compact fluorescent lamps (>25W) are relatively popular among Laotian people. In the Lao PDR lighting market, there is a strong influence from Thai lighting manufacturers and there are a number of brands that were imported from Thailand (more analysis is included in Annex 1). Besides the popular wattages, popular brands and colour were collected by the surveys and the results are shown in Table 2.5. It was evident that Lao PDR has mostly small retailers and no specialized lighting stores or hypermarkets were found in this survey.

***Table 2.5*: A summary of popular lamps by category in Lao PDR**

Country	Wattages (Top-3)	Brands (Top-3)	Colours	Most popular model
Lao PDR	CF: 5W, 11W and 14W	CF: PHILIPS, PANASONIC, and SYLVANIA	1) DL 2) WW	CF: 5W DL
	LED: 7W, and 5W	LED: HI-TEK, SYLVANIA		LED: 7W DL

Note: CF = compact fluorescent

Lamp purchasing and witnessing

Based on the initial survey results, it appears that the variety of lighting products in Lao PDR is limited, particularly the energy efficient ones. This is basically due to the limited market size and low purchasing power which discourage price competition and product availability. The lamp sampling and purchasing step was conducted in Vientiane between the week of 22 September 2014 and the week of 6 October 2014. In total, Lao PDR purchased samples of 11 compact fluorescent and two LED lamp models.

Figure 2.11: Lamp sampling and purchasing activities in Lao PDR

Packing and shipping

The Laotian team employed DHL for the packing and shipping step. The process went really well but they faced a slight problem regarding customs duty. The problem was fixed in the week of 20 October 2014. The Lao PDR team maintained integrity well and strictly followed GELC's packing guidelines. In this step, a representative from the Ministry of Energy and Mines came to witness and sign off the packages.

Figure 2.12: Packing and signing off activities in Lao PDR

2.1.4 Philippines

The Philippines started the program in the week of 8 September 2014, at the same time as Indonesia and Thailand. The Philippines was the first country to finish the lamp sampling activities. Implementation of the lamp sampling activities in the Philippines went well and the whole process was completed within six weeks. Findings and issues of the lamp sampling in the Philippines are captured below.

Kick-off meeting

The kick-off meeting between the Philippines country designee and IIEC team members in Bangkok and Manila was organized on 10 September 2014 through teleconference. IIEC presented the step that the Philippines' representatives must be involved and GELC presented about the sampling and packing activities.

Retailer surveys

The retailer surveys were conducted in Manila from the week of 15 September 2014 to the week of 22 September 2014 (see Table 2.1), and the survey results were shown in Annex 1. Figure 2.13 and Figure 2.14 show popular wattages of compact fluorescent and LED lamps being sold in Manila.

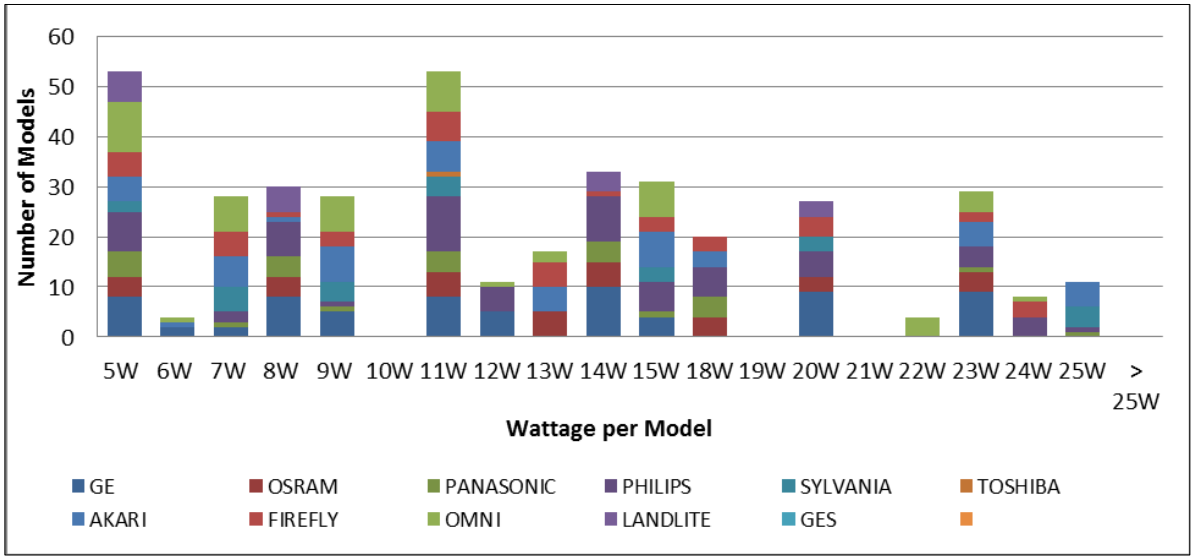


Figure 2.13: Initial survey results of compact fluorescent lamp models for Manila, the Philippines

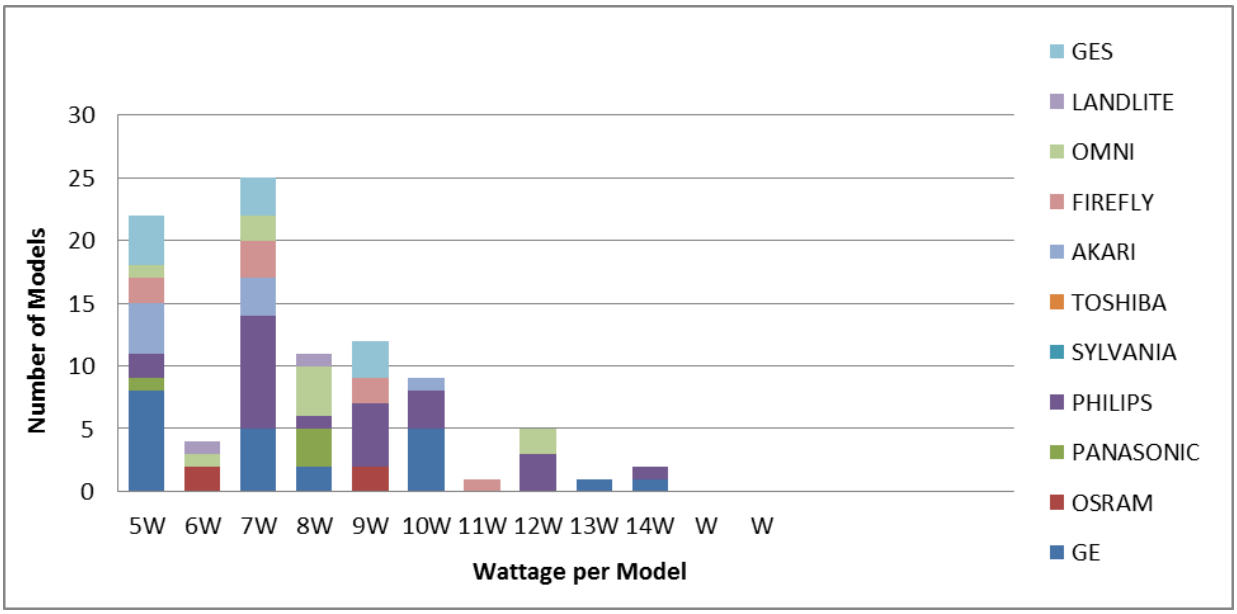


Figure 2.14: Initial survey results of LED lamp models for Manila, the Philippines

The most popular wattage for compact fluorescent and LED lamps are 11W and 7W, respectively. It was observed that higher wattage lamps are not popular in Manila and there are few local brands being sold in the capital city of the Philippines. More analysis is included in Annex 1. Besides the popular wattages, popular brands and colour were also collected by the surveys and the results are shown in Table 2.6. It was observed that lighting products are sold in large shopping malls and small retailers. Large shopping malls tend to sell international brands, while small retailers tend to display local brands.

Table 2.6: A summary of popular lamps by category in the Philippines

Country	Wattages (Top-3)	Brands (Top-3)	Colours	Most popular model
Philippines	CF: 11W, 5W and 14W	CF: PHILIPS, GE, and OMNI	1) DL 2) WW	CF: 11W DL
	LED: 7W, 5W and 9W	LED: PHILIPS, GE, and OMNI		LED: 7W DL

Note: CF = compact fluorescent

Lamp purchasing and witnessing

The lamp sampling and purchasing step was conducted in Manila between the week of 22 September 2014 and the week of 29 September 2014. In total, the Philippines purchased samples of 14 compact fluorescent and four LED lamp models.

Figure 2.15: Lamp sampling and purchasing activities in the Philippines

Packing and shipping

The Philippines team maintained integrity well and strictly followed GELC's packing guidelines. DHL was engaged as their freight partner. In this step, a representative from the Department of Energy came to witness and sign off the packages. The Philippine team finished the lamp sampling activities in the week of 6 October 2014. However, the goods were quarantined in Beijing for two weeks since this was the first country that sent out the lamps and it did not correctly mark the shipping document that the customs duty was to be paid by the sender of the goods.

Figure 2.16: **Packing and signing off activities in the Philippines**

2.1.5 Thailand

Thailand started the program in the week of 8 September 2014, at the same time as Indonesia and the Philippines. Thailand was the second country that finished the lamp sampling activities. An Implementation of the lamp sampling activities in Thailand went really well and the whole process was completed within six weeks. Findings and issues of the lamp sampling in Thailand are captured below.

Kick-off meeting

The kick-off meeting between Thailand country designee and IIEC team members in Bangkok and Manila was organized on 11 September 2014 through teleconference. The meeting was attended by representatives from Department of Alternative Energy Development and Efficiency (DEDE) and Electricity Generating Authority of Thailand (EGAT). IIEC presented the steps that the Thailand's representatives must be involved and GELC presented about the sampling and packing activities.

Retailer surveys

The retailer surveys were conducted in Bangkok from the week of 15 September 2014 to the week of 22 September 2014 (see Table 2.1), and the survey results were shown in Annex 1. Figure 2.17 and Figure 2.18 show popular wattages of compact fluorescent and LED lamps being sold in Bangkok.

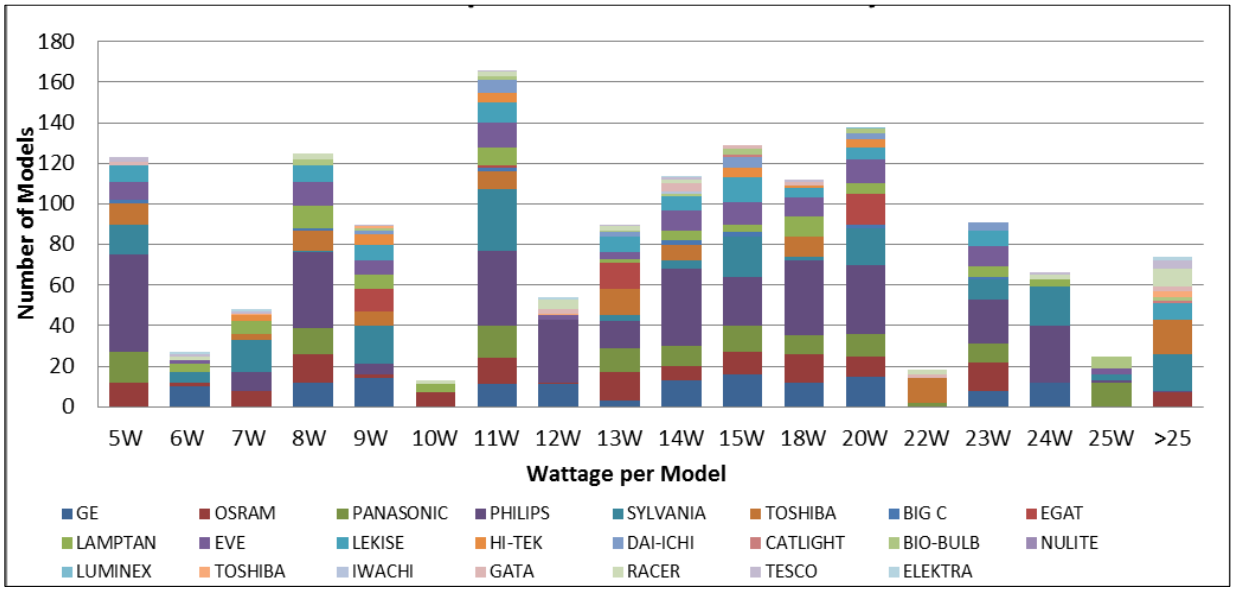


Figure 2.17: Initial survey results of compact fluorescent lamp models for Bangkok, Thailand

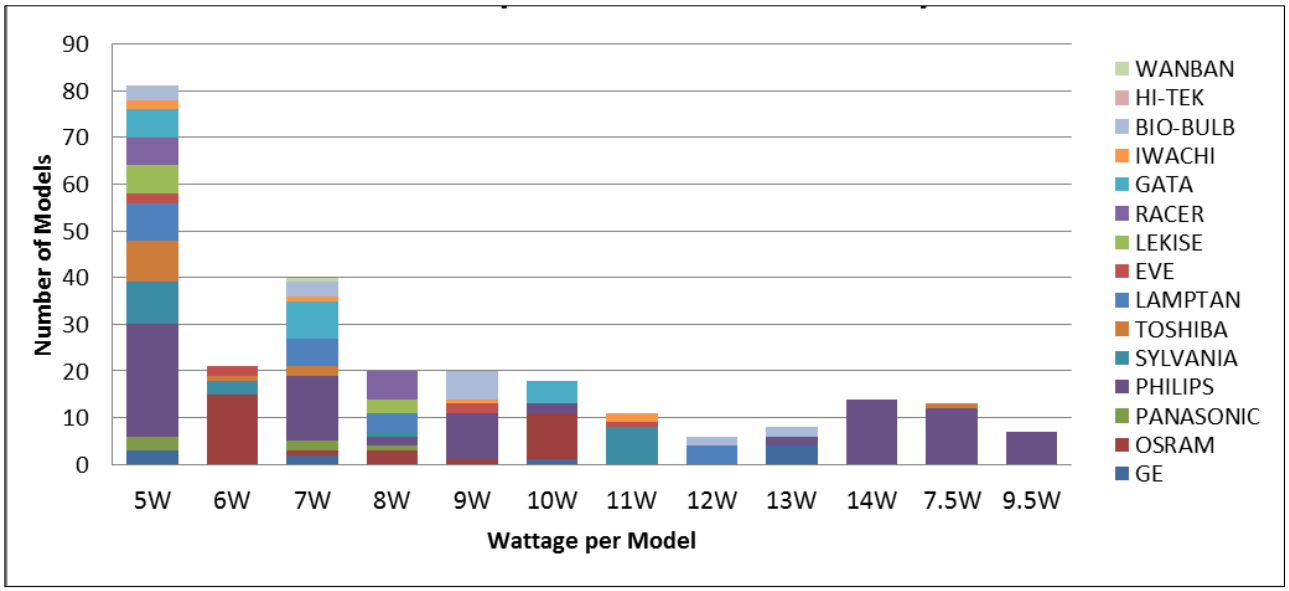


Figure 2.18: Initial survey results of LED lamp models for Bangkok, Thailand

It was obvious that Thailand has a large number of brands that are being sold, however international brands are reportedly to be the most active ones. It was observed that people in Bangkok are likely to buy mid-range wattage lamps, rather than any other range and the most popular wattage of compact fluorescent and LED lamps are 11W and 5W, respectively. More analysis is included in Annex 1. Besides the popular wattages, popular brands and colour were collected by the surveys and the results are shown in Table 2.7. It was evident that Thailand has a good mix of large retailers (hypermarkets and

large lighting shops) and small retailers; the on-shelf availabilities are considered to be sufficient to display how popular each type of lamp is.

***Table 2.7*: A summary of popular lamps by category in the Thailand**

Country	Wattages (Top-3)	Brands (Top-3)	Colours	Most popular model
Thailand	CF: 11W, 20W and 8W	CF: PHILIPS, SYLVANIA and GE	1) DL 2) WW	CF: 11W DL
	LED: 5W, 7W and 6W	LED: PHILIPS, OSRAM and SYLVANIA		LED: 5W DL

Note: CF = compact fluorescent

Lamp purchasing and witnessing

The lamp sampling and purchasing step was conducted in Bangkok between the week of 29 September 2014 and the week of 13 October 2014. In total, Thailand purchased samples of 14 compact fluorescent and four LED lamp models.

Figure 2.19: Lamp sampling and purchasing activities in Thailand

Packing and shipping

Thailand team maintained integrity well and strictly followed GELC's packing guidelines. FedEx was engaged as their freight partner. In this step, representatives from DEDE and Electricity Generation Authority of Thailand (EGAT) came to witness and sign off the packages.

Figure 2.20: **Packing and signing off activities in Thailand**

2.1.6 Vietnam

Vietnam started the program in the week of 22 September 2014, one week after the first three countries. Implementation of the lamp sampling activities in Vietnam faced some delays due to availability of the in-country consultant, country designee and public holidays. In total, the whole process was completed within eight weeks. Findings and issues of the lamp sampling in Vietnam are captured below.

Kick-off meeting

The kick-off meeting between Vietnam country designee and IIEC team members in Bangkok and Hanoi was organized on 25 September 2014 through teleconference. GELC could not participate due to short notice and conflict of meeting schedule.

Retailer surveys

The retailer surveys were conducted in Hanoi from the week of 29 September 2014 to the week of 13 October 2014 (see Table 2.1), and the survey results are shown in Annex 1. Figure 2.21 and Figure 2.22 show popular wattages of compact fluorescent and LED lamps being sold in Hanoi.

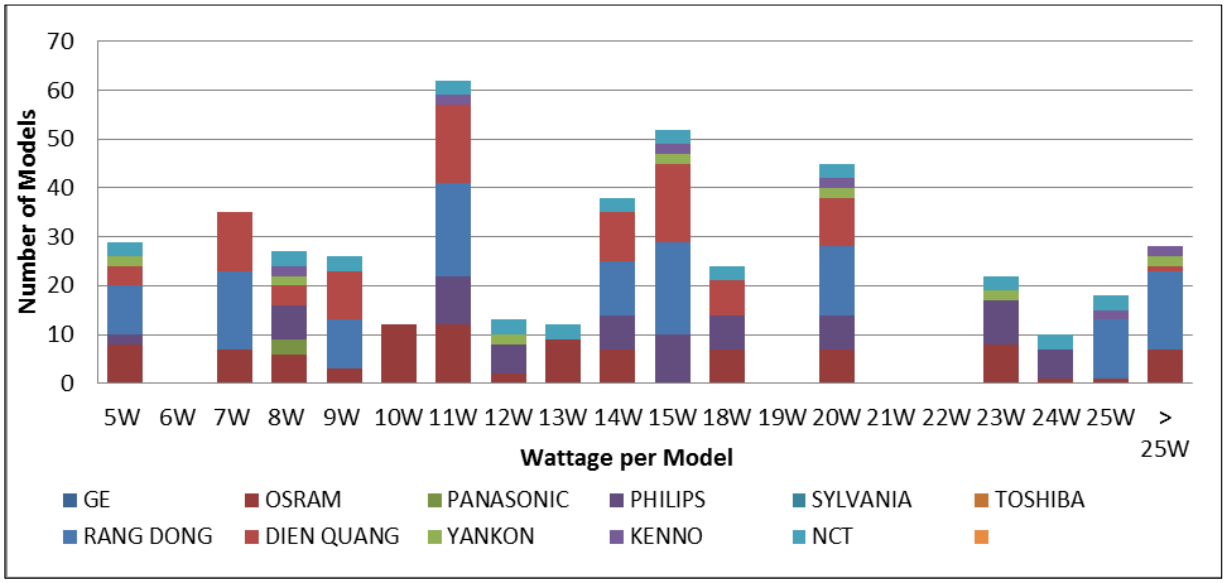


Figure 2.21: Initial survey results of compact fluorescent lamp models for Hanoi, Vietnam

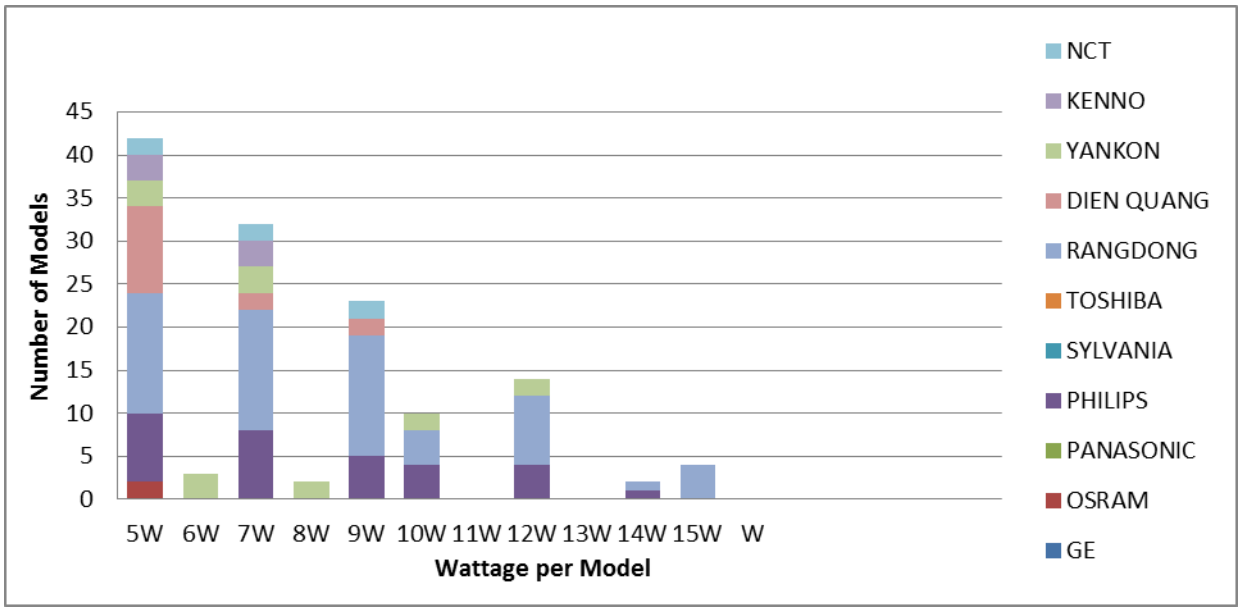


Figure 2.22: Initial survey results of LED lamp models for Hanoi, Vietnam

The lighting market in Vietnam is unique and totally different from other neighbouring countries. The market has a strong presence of local brands and international brands were hardly found in typical lighting stores. Moreover, most of the shops are the representatives of specific brands. In other words, multiple brands cannot be found in one shop. More analysis is included in Annex 1. Besides the popular wattages, popular brands and colour were collected by the surveys and the results are shown in Table 2.8. It was evident that the most popular wattage for compact fluorescent and LED lamps in Hanoi are 11W and 5W, respectively and the local brands are more popular than international brands. Data from the Vietnam survey cannot be considered representative of the lighting market of Vietnam as a whole since the surveys were conducted in Hanoi, in which the local market has a unique marketing system (local economy).

Table 2.8: A summary of popular lamps by category in Vietnam

Country	Wattages (Top-3)	Brands (Top-3)	Colours	Most popular model
Vietnam	CF: 11W, 15W and 20W	CF: RANG DONG, OSRAM and DIEN QUANG	1) DL 2) WW	CF: 11W DL
	LED: 5W, 7W and 9W	LED: RANG DONG, PHILIPS and YANKON		LED: 5W DL

Note: CF = compact fluorescent

Lamp purchasing and witnessing

The lamp sampling and purchasing step was conducted in Hanoi between the week of 13 October 2014 and the week of 20 October 2014. In total, Vietnam purchased samples of 13 compact fluorescent and three LED lamp models.

Figure 2.23: Lamp sampling and purchasing activities in Vietnam

Packing and shipping

The Vietnam team maintained integrity well and strictly followed GELC's packing guidelines. In this step, a representative from the Ministry of Industry and Trade came to witness and sign off the packages. Although Vietnam used a local shipping company rather than a giant freight forwarder, goods were shipped correctly and safely to Beijing by the end of November 2014.

3. Implementation Issues and Lesson Learned

Several implementation issues and lessons learned were identified by IIEC's in-country consultants, as summarized in Table 3.1.

Table 3.1: Implementation issues and actions undertaken

Step	Implementation Issues	Actions Undertaken	Lesson Learned
Preparation	Delay of the project due to availability of the country designee.	IIEC made phone calls, emails and provided all necessary supports to the country.	Witnessing requirements by at least two different parties cause some delays. Field sampling activities (e.g. retailers survey and lamp purchasing activities) could be fast tracked if they can be carried out by a single party.
Preparation	Protocols and procedures are relatively complex and full of tiny details, most participating countries unable to follow all the requirements with only one teleconference	IIEC created a visual aid to illustrate all the steps and explained country representatives by following up calls.	The sampling protocols should be simplified and better training materials and guidelines are necessary.
Lamp purchasing	Small retailers and some large retailers could not provide enough lamps from the same batch number (same manufacturing date).	Large retailers eventually chosen as the sampling venues.	Requirements of the sampling venues do not reflect local market situations in Southeast Asia.
Shipping: Import tax and duty	The Chinese customs office quarantined the goods because of import tax and duty arrangements.	IIEC's representatives contacted shipping companies to change the waybill and let the shipping companies pay the duties in advance, and then IIEC covered them afterward.	It was not common for the sender of goods to pay customs duty. It is an international practice that the receiver of goods is the one who pays the customs duty.
Packing	Packing a large quantity of lamp samples requires preparation of appropriate materials.	IIEC hired specialized courier services that provide packing service as well as shipping.	Specific packages and packing methods are required when air freighting fragile goods. Products should be packed by the professional staff.
Shipping	Availability of courier services. Many air freight forwarders in Cambodia refused to ship lighting products.	Extra efforts and time were mobilized in seeking the shipping companies that are willing to provide services.	Shipping of lamps by air freight may not be allowed in some countries.

4. Recommendation and Next Steps

This section summarises recommendations to address implementation issues and lessons learned for future implementation of lamp sampling activities in Southeast Asia, and perhaps in other regions. The problems reported by GELC will be discussed in the Chapter 5.

IIEC's experience with the lamp sampling and retailer survey using the GELC methodology was generally good. However, some procedures and requirements should be amended to facilitate different conditions in developing countries. For example, the requirement to have at least two persons involved in field activities, one sampler and one from a national agency, was a relative bottleneck in executing the survey and sampling in a limited timeframe. It is recommended that if the requirement is made to ensure the integrity of the sampling, the project should allow sufficient time for the process. Otherwise, the sampling could be conducted by only one person on a condition that it is be done by a trustworthy organization.

In general, the GELC procedures were completed and maintain the international standards for sampling and survey. However, during field work it was found that the protocol may need to take into account the local market and retailer conditions, especially in developing countries. For example, there is no large retailer of electric products in Cambodia and Lao PDR. Therefore, Clause 3 b) that requires sampling venues to represent 40% large retailers and 60% small retailers could not be carried out in Lao PDR and Cambodia.

The questionnaire is relatively straightforward and the local consultants in the six countries were able to conduct the survey without problems. However, during the survey process, IIEC needed to keep close monitoring of the consultant's work to ensure that they comply with the GELC requirements. There were several errors made by some national consultants. IIEC resolved these problems by developing a set of presentations to explain the process step by step (see A3.4 *Guidelines for the Lamp Sampling and Shipping Steps*). A training workshop on the survey could have been more effective than using teleconference. Nonetheless, the issues were resolved and after receiving guidance, the consultants were able to conduct the survey without any issues.

The key recommendations are summarised in Table 4.1.

Table 4.1: Recommendations for future lamp sampling activities

Step	Issues/Lesson Learned	Recommendations
Preparation	Protocol's requirement: multiple persons must conduct and witness field activities (retailer surveys and lamp purchasing).	The lamp sampling protocol should allow field activities to be performed by a single party with different (alternative) means for validating and witnessing, to maintain the integrity of the process. Alternatively, sufficient time should be allowed to ensure the availability and coordination on necessary personnel.
Preparation	Protocol's requirement: The sampling venues requirements cannot be adopted due to limited product availability in small shops (not enough units of each model available in each shop).	The sampling venue requirements should be made flexible, reflecting results of the retailer surveys.
Shipping of lamps	Customs duty and tax issue	A budget for customs duty and tax should be allocated to the testing laboratory receiving the goods, so that the clearance of the goods can be processed without delay.
Shipping of lamps	Availability of in-country courier services.	Prior to implementation of lamp sampling activities, the team needs to check the possibility of sending the goods out by air. Where air freight is not feasible, sea freight could be included as an option; however, the timeframe for completion of the process would have to be extended substantially.
Packing	Packaging must comply with the packing regulations imposed by courier companies.	Implementing agency should use a professional packing service provider because shipping of lighting equipment is restricted by certain regulations (or local interpretation thereof) for shipments of hazardous materials, such as mercury-added lamps (compact fluorescent lamps).

5. Reported Problems from GELC

This section summarizes the problems reported by GELC after receipt of the lamp shipments.

Table 5.1: Problems reported by GELC after receipt of lamp shipments

Topic	Issues	Actions undertaken
Missing lamps	GELC reported that two models of the Indonesian's team – LEUCHAR 9W and PANASONIC 11W were not sent in complete quantity (30 units per model). However, the Indonesian team confirmed that they had sent correct quantity by sending the evidence of shipment.	IIEC reported back to the country, however since the quantity is enough to do the test, GELC started the test with the received samples.
Sampling	Two models did not come from the same batch	This was reported to UNEP and GELC only carried out testing on lamps from one batch. It is recommended that the samplers carefully check each of the samples when purchasing the lamps.
Sampling	No information (V, Hz, W, CCT, etc.) marked on the lamp or on the package of one model from Cambodia.	This was reported to UNEP and GELC informed IIEC, who were able to confirm the model details with the Cambodian representative: 220V, 50Hz, 7W.
Broken lamps	It is found that two lamps were broken when received, from two models. These models were from Cambodia and the Philippines separately.	This was reported to UNEP. However, as the quantity was sufficient to do the test, GELC started testing with those well received samples.
Sampling sheet	Sampling sheets from Indonesia were not submitted with the samples as requested.	GELC contacted IIEC, who were able to send an electronic copy of the sampling sheet from the Indonesian team.

ANNEX 1: Selection of Popular Models in Each Country

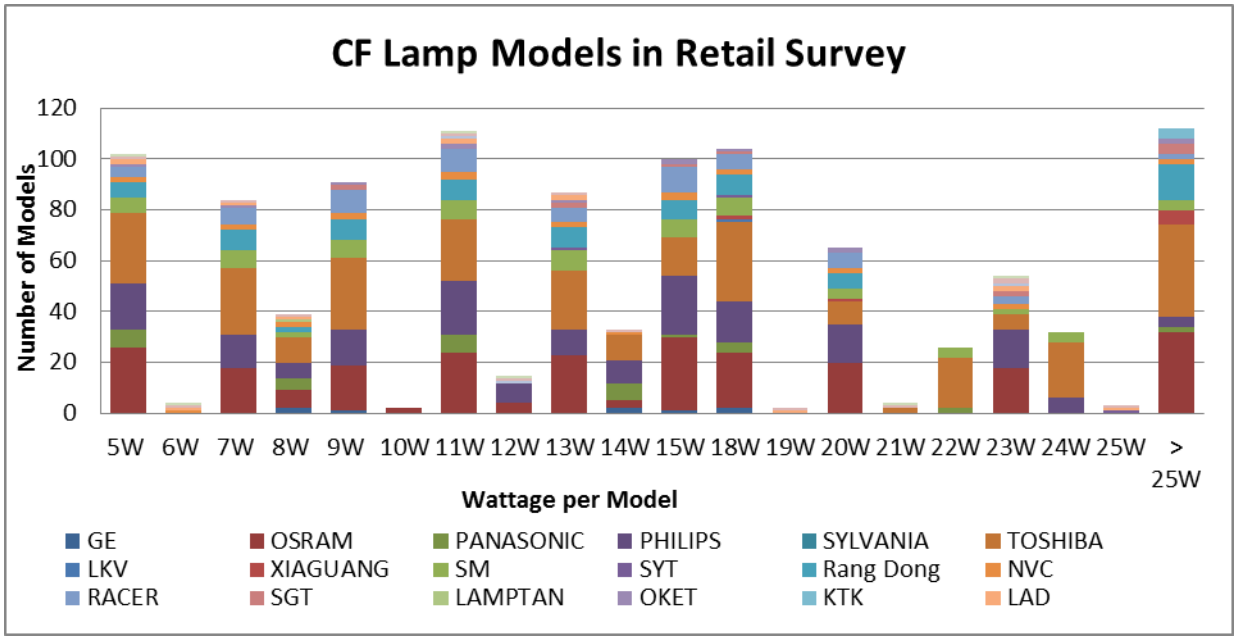
A1.1 Cambodia

Compact fluorescent lamps

A wide range of preferred wattages were witnessed in Cambodia, while the most popular ones are in the mid-range (60 to 75W replacement bulbs)

	Popularity	Model	Brand
CFL	1	11W DL	TOSHIBA
	2	18W DL	OSRAM
	3	5W DL	PHILIPS
	4	13W DL	Rang Dong
	5	9W DL	SM
	6	11W WW	RACER

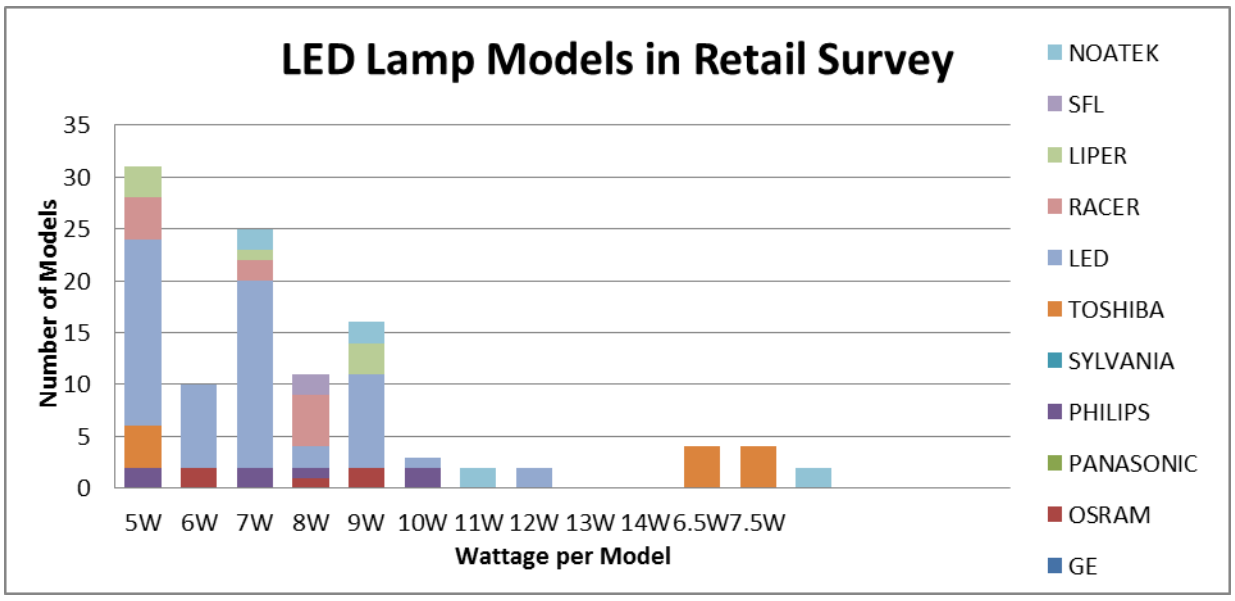
Clearly, 11W DL is the most popular model for CFLs in Cambodia, followed by 18W DL, 5W DL and 15W DL. It is evident that Toshiba dominates the Cambodian lighting market, especially in the capital city, and Osram is the runner-up in this competitive competition. The preferred wattages for majority Cambodian are in the mid-wattage range (11-18W), followed by the low-wattage range, which is 5-9W and high-wattage range. Samplers observed a high tendency for bulbs larger than 25W (150W replacement lamps) to be sold in the country more than the range (19-25W).



LED lamps

LED	1	5W DL	LED
	2	7W DL	TOSHIBA
	3	5W WW	RACER

Clearly, the 5W DL dominates majority of shelf in Phnom Penh, followed by 7W DL and 9W DL. LED brand dominates the efficient lighting market of Cambodia, followed by Toshiba and Racer. Daylight is the popular colour for the Cambodian market.

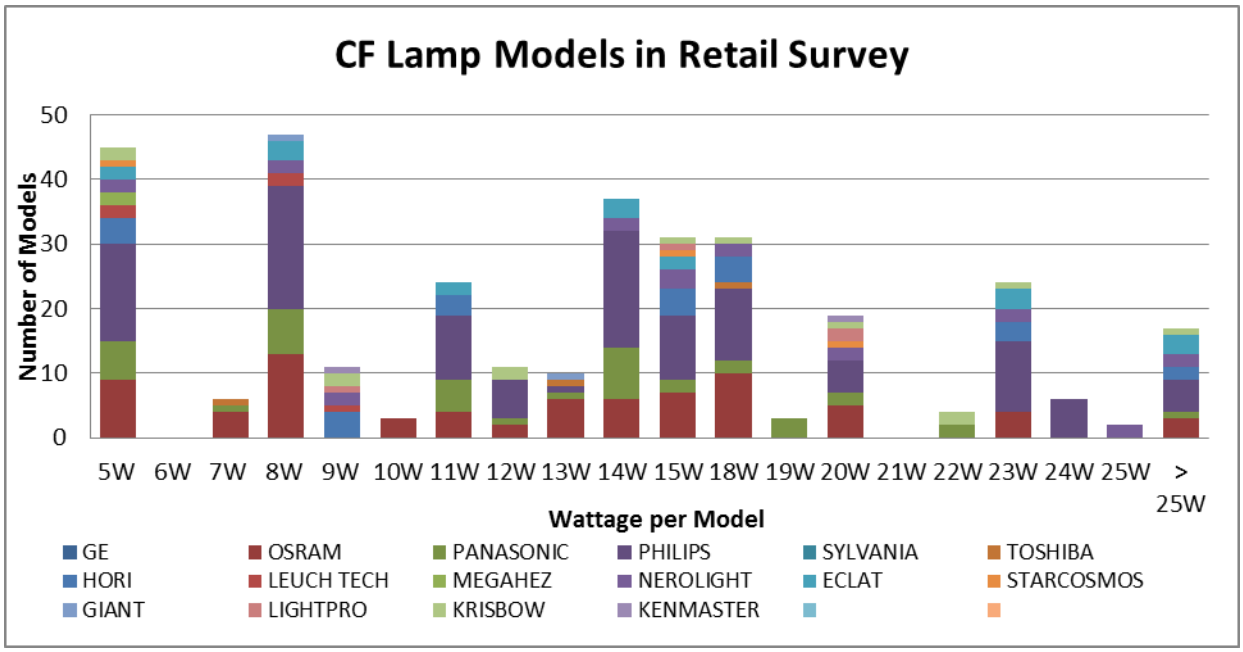

LED Lamp Models in Retail Survey
Number of Models
35
30
25
20
15
10
5
0
5W
6W
7W
8W
9W
10W
11W
12W
13W
14W
6.5W
7.5W
Wattage per Model
NOATEK
SFL
LIPER
RACER
LED
TOSHIBA
SYLVANIA
PHILIPS
PANASONIC
OSRAM
GE

A1.2 Indonesia

Compact fluorescent lamps

	Popularity	Model	Brand
CFL	1	5W DL	PHILIPS
	2	8W DL	OSRAM
	3	14W DL	PANASONIC
	4	18W DL	HORI
	5	8W WW	NEROLIGHT

It is evident that 5W DL is the most popular model for CFLs in Indonesia, followed by 8W DL, 14W DL and 18W DL. It is evident that Philips dominates the Indonesia lighting market, especially in the capital city, and Osram is the second rank. The preferred wattages for majority Indonesian are in the low-wattage range (5-10W), followed by the mid-wattage range, which is 11-18W and high-wattage range. It is observed that high-wattage range is not very popular amongst the Indonesian lighting market.

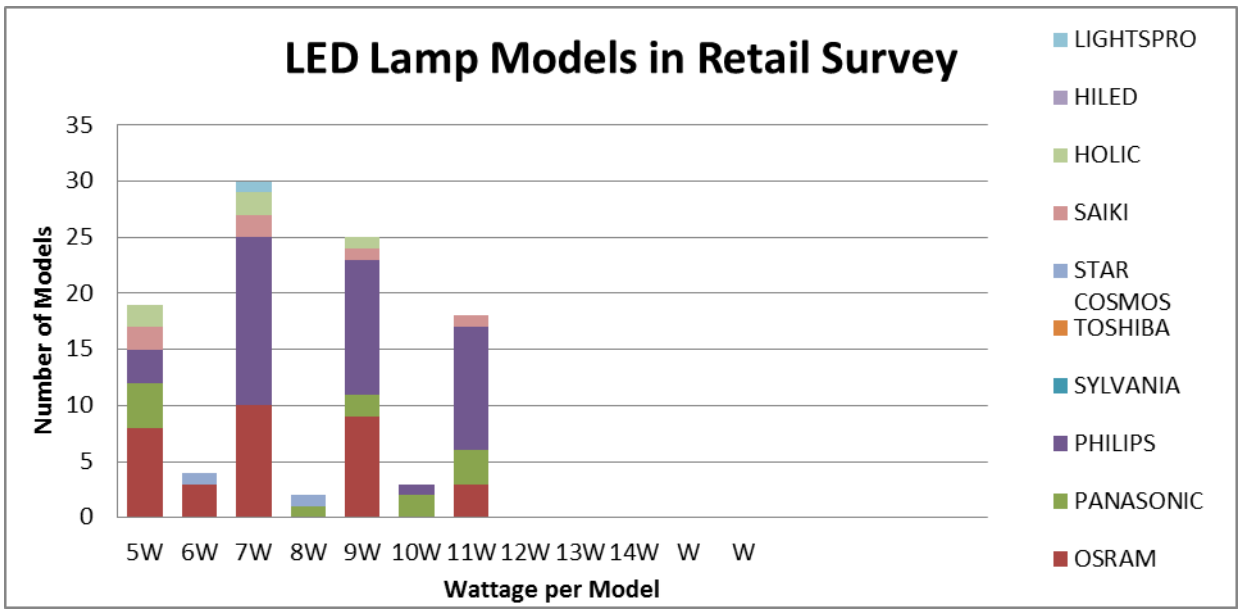


A wide diversity of lamps in Indonesian market reflects the size of the Indonesian lighting market. Unlike other countries in the region, Indonesian people are more likely to purchase lower wattage than higher wattage lamps; and 11Watt-model, which is, coincidentally being the most popular wattage in other Southeast Asian countries, apparently is not popular amongst Indonesian people.

LED lamps

LED	1	7W DL	PHILIPS
	2	9W DL	OSRAM
	3	11W DL	PANASONIC

Clearly, the 7W DL dominates majority of shelf in Jakarta, followed by 9W DL and 11W DL. Philips dominates the efficient lighting market of Indonesia, followed by Osram and Panasonic. Daylight is the popular colour for the Indonesian market.


LED Lamp Models in Retail Survey
Number of Models
35
30
25
20
15
10
5
0
5W
6W
7W
8W
9W
10W
11W
12W
13W
14W
W
W
Wattage per Model
LIGHTSPRO
HILED
HOLIC
SAIKI
STAR
COSMOS
TOSHIBA
SYLVANIA
PHILIPS
PANASONIC
OSRAM

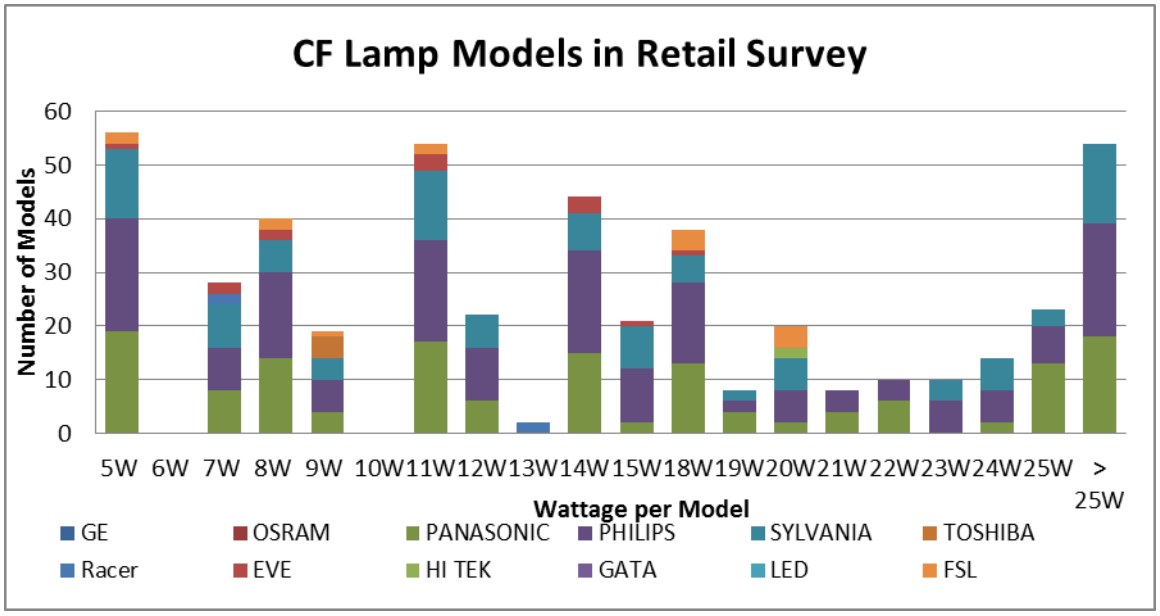
A1.3 Lao PDR

Compact fluorescent lamps

A good mixture between international brands and local brands are evident in Lao PDR. Due to their economy size, only a handful of local brands were observed.

	Popularity	Model	Brand
CFL	1	5W DL	PHILIPS
	2	11W DL	PANASONIC
	3	5W WW	SYLVANIA
	4	11W WW	FSL
	5	14W DL	EVE

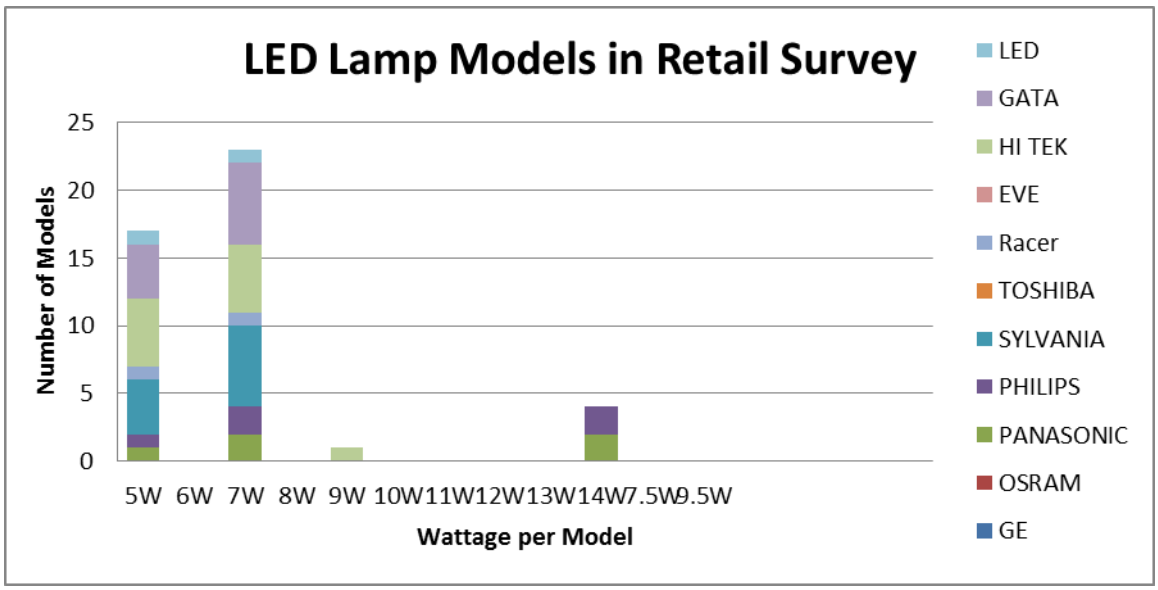
Clearly, 5W DL is the most popular model for CFLs in Lao PDR, followed by 11W DL, 5W WW and 11W WW. It is evident that Philips dominates the Lao PDR lighting market, especially in the capital city, and Panasonic is the second rank. The preferred wattages for majority Laotian are in the mid-wattage range (11-18W), followed by the low-wattage range, which is 5-10W and high-wattage range. Samplers observed a high tendency for lamps higher than 25W (150W replacement lamps) to be sold in the country more than the range (19-25W).



LED lamps

LED	1	7W DL	HI TEK
	2	5W DL	SYLVANIA
	3	7W WW	GATA

Clearly, the 7W DL dominates majority of shelf in Vientiane, followed by 5W DL and 7W WW. HI-TEK dominates the efficient lighting market of Lao PDR, followed by Sylvania and Gata. Daylight is the popular colour for the Lao PDR market.

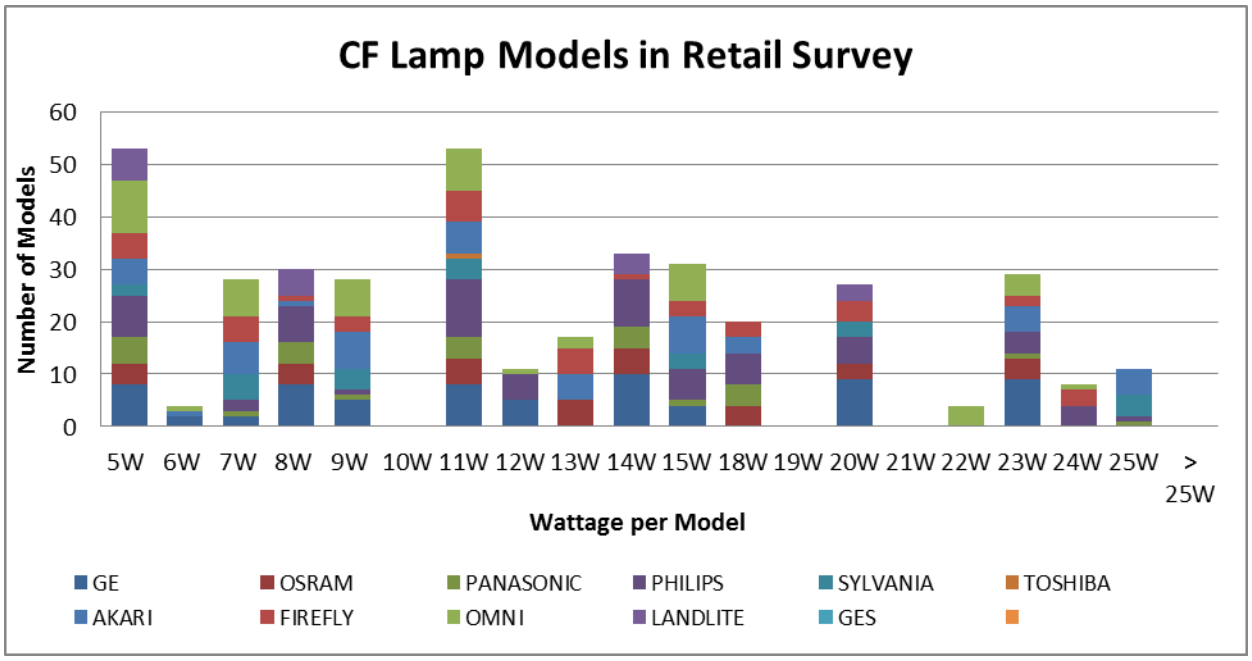

LED Lamp Models in Retail Survey
Number of Models
25
20
15
10
5
0
5W
6W
7W
8W
9W
10W
11W
12W
13W
14W
7.5W
9.5W
Wattage per Model
LED
GATA
HI TEK
EVE
Racer
TOSHIBA
SYLVANIA
PHILIPS
PANASONIC
OSRAM
GE

A1.4 The Philippines

Compact fluorescent lamps

	Popularity	Model	Brand
CFL	1	11W DL	PHILIPS
	2	5W DL	GE
	3	14W DL	OMNI
	4	9W DL	AKARI
	5	8W DL	FIREFLY

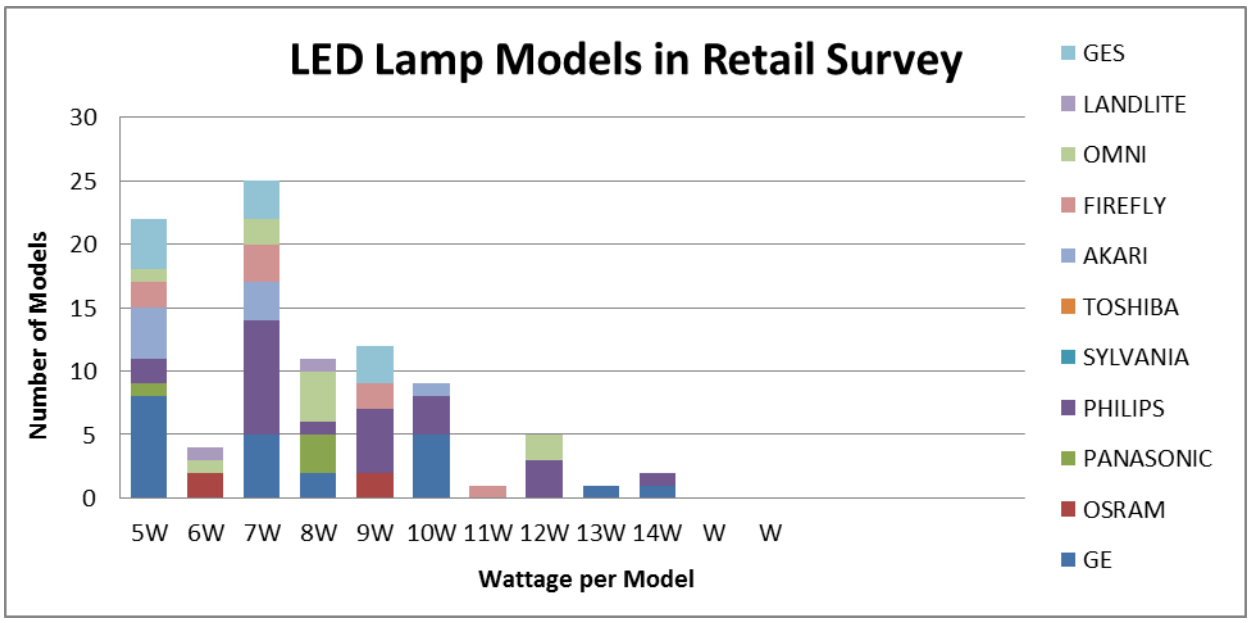
It is evident that 11W DL is the most popular model for CFLs in the Philippines, followed by 5W DL, 14W DL and 9W DL. It is evident that Philips leads the Philippines lighting market, especially in the capital city, and GE is the second rank. The preferred wattages for majority Filipino are in the mid-wattage range (11-18W), followed by the low-wattage range, which is 5-10W and high-wattage range. It is observed that high-wattage range is not very popular amongst Filipinos.



LED lamps

LED	1	7W DL	PHILIPS
	2	5W DL	GE
	3	9W DL	OMNI

Clearly, the 7W DL dominates majority of shelf in Manila, followed by 5W DL and 9W DL. Philips dominates the efficient lighting market of Manila, Philippines, followed by GE and OMNI. Daylight is the popular colour for the market in Manila, the Philippines.


LED Lamp Models in Retail Survey
Number of Models
30
25
20
15
10
5
0
5W
6W
7W
8W
9W
10W
11W
12W
13W
14W
W
W
Wattage per Model
GES
LANDLITE
OMNI
FIREFLY
AKARI
TOSHIBA
SYLVANIA
PHILIPS
PANASONIC
OSRAM
GE

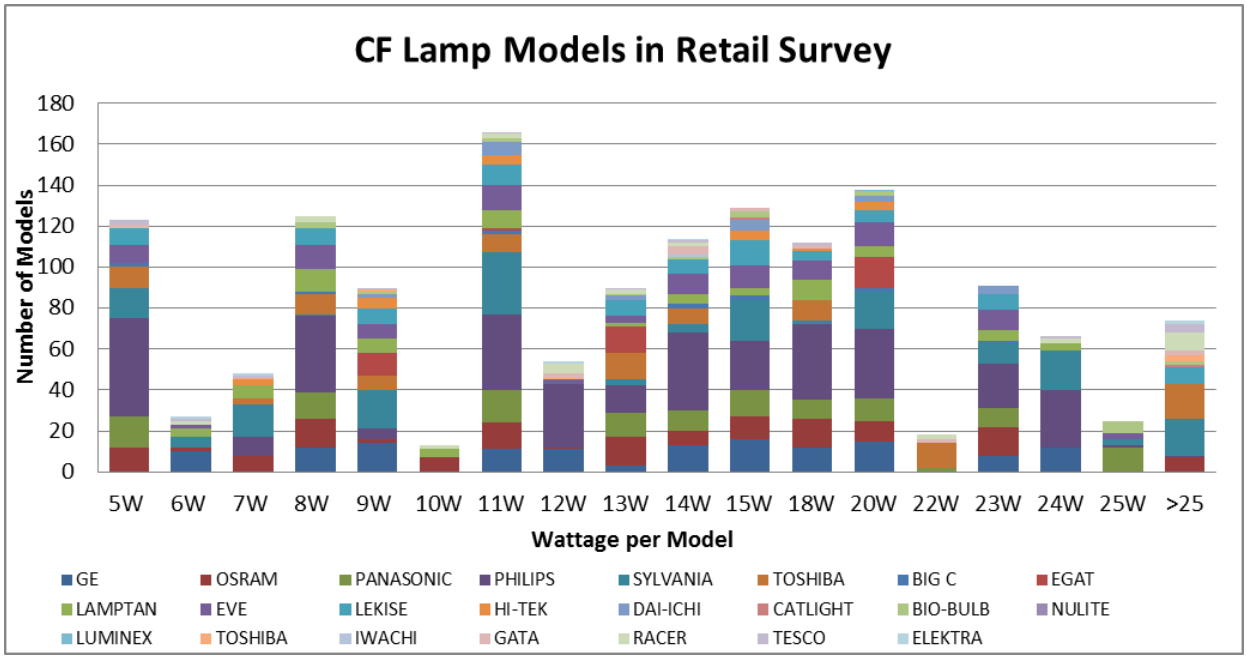
A1.5 Thailand

A large country of the region that is a hub of electrical home appliances, consumers in Thailand can benefit from a wide selection of lighting products.

Compact fluorescent lamps

	Popularity	Model	Brand
CFL	1	11W WW	PHILIPS
	2	11W DL	SYLVANIA
	3	20W DL	GE
	4	8W DL	OSRAM
	5	15W DL	PANASONIC

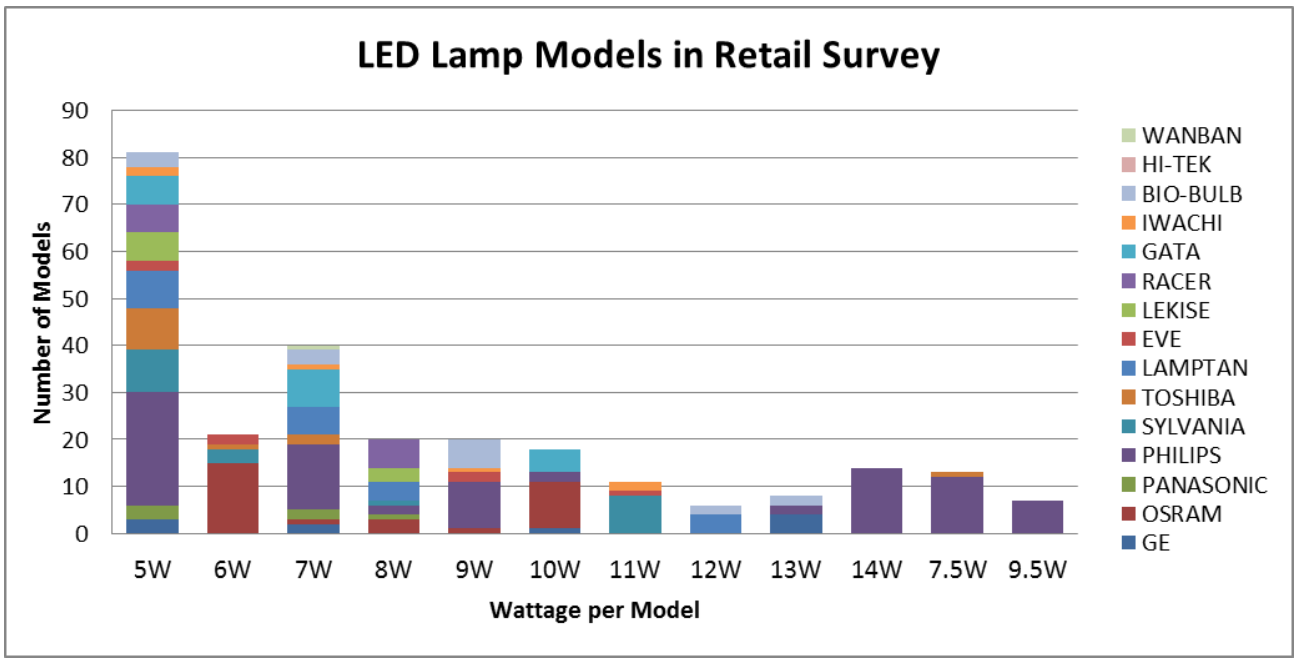
It is observed that 11W WW is the most popular model for CFLs in Thailand, followed by 11W DL, 20W DL and 8W DL. It is evident that Philips dominated Thailand lighting market, especially in the capital city, and Sylvania is the runner in this competitive market. The preferred wattages for majority Thais are in the medium-high wattage range (11-20W), followed by the low-wattage range, which is 5-10W and high-wattage range. In the capital city of Thailand where condominiums and newly designed buildings were built, It is observed that the presence of warm white in retailers are higher due to this colour gives warm feeling and suitable for elaborate decorations



LED lamps

LED	1	5W DL	PHILIPS
	2	5W WW	OSRAM
	3	7W DL	SYLVANIA
	4	9W DL	LAMPTAN
	5	7W WW	GATA

Clearly, the 5W DL dominates majority of shelf in Bangkok, followed by 5W WW and 7W DL. Philips dominates the efficient lighting market of Bangkok, Thailand followed by Osram and Sylvania. Daylight is the popular colour for the market in Bangkok, Thailand. It is observed that there was a promotional campaign run by lighting giants in the low-wattage range of LED in Bangkok

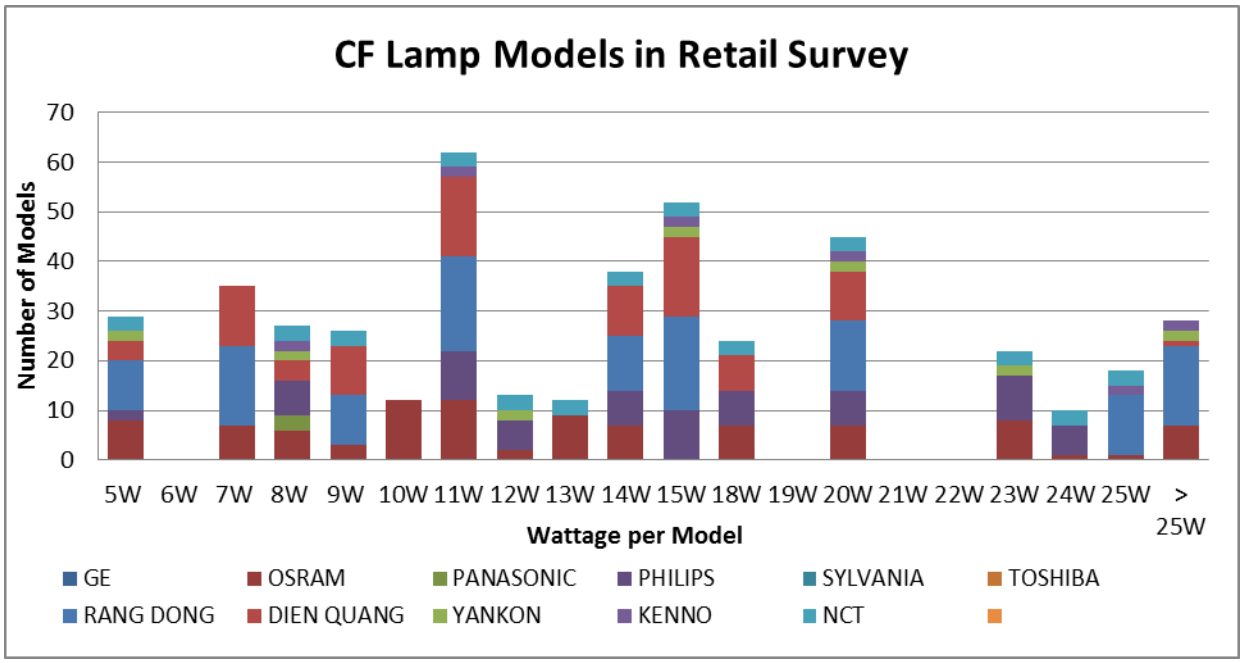

LED Lamp Models in Retail Survey
Number of Models
90
80
70
60
50
40
30
20
10
0
5W
6W
7W
8W
9W
10W
11W
12W
13W
14W
7.5W
9.5W
Wattage per Model
WANBAN
HI-TEK
BIO-BULB
IWACHI
GATA
RACER
LEKISE
EVE
LAMPTAN
TOSHIBA
SYLVANIA
PHILIPS
PANASONIC
OSRAM
GE

A1.6 Vietnam

Compact fluorescent lamps

	Popularity	Model	Brand
CFL	1	11W DL	RANG DONG
	2	15W DL	OSRAM
	3	11W WW	DIEN QUANG
	4	15W WW	PHILIPS
	5	20W WW	NCT
	6	20W DL	YANKON

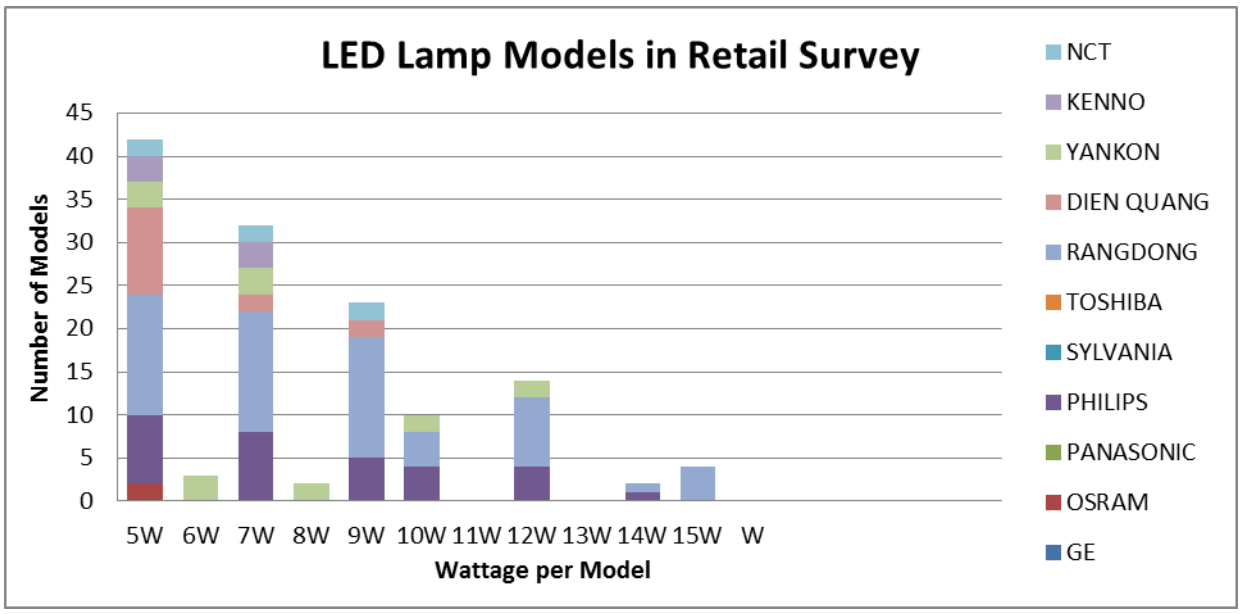
Obviously, 11W DL is the most popular model for CFLs in Vietnam, followed by 15W DL, 11W WW and 15W DL. It is evident that Rang Dong leads the Vietnam lighting market, especially in the north capital city, and Osram is the second rank. The preferred wattages for majority Vietnamese are in the mid-wattage range (11-18W), followed by the low-wattage range, which is 5-10W and high-wattage range. It is observed that high-wattage range is not very popular amongst Vietnamese. Day light is a little bit more popular than warm white in Hanoi.



LED Lamps

LED	1	5W DL	RANGDONG
	2	5W WW	PHILIPS
	3	7W DL	YANKON
	4	7W WW	DIEN QUANG

Clearly, the 5W DL dominates majority of shelf in Hanoi, followed by 5W WW and 7W DL. Rang Dong dominates the efficient lighting market of Hanoi, Vietnam, followed by Philips and Yankon. Daylight is the popular colour for the market in Hanoi, Vietnam.


LED Lamp Models in Retail Survey
Number of Models
45
40
35
30
25
20
15
10
5
0
5W
6W
7W
8W
9W
10W
11W
12W
13W
14W
15W
W
Wattage per Model
NCT
KENNO
YANKON
DIEN QUANG
RANGDONG
TOSHIBA
SYLVANIA
PHILIPS
PANASONIC
OSRAM
GE

ANNEX 2: Lamp Retailers On-site Survey and Sampling Sheet

Compact Fluorescent Lamp Sampling Survey

IIEC is conducting a lamp sampling survey on behalf of the United Nations Environment Programme's *en.lighten initiative* in order to strengthen the national and regional resources for efficient lighting monitoring, verification and enforcement (MVE). The survey will be conducted in six Southeast Asian countries. Website: *http://www.enlighten-initiative.org/*

Country	City	Date
Sampler's name	phone	email
Name of retailer	Address and telephone of retailer	□ Shopping mall □ Specialized lighting shop □ Electrical/Hardware shop □ Others_____

1. Lamp Wattage and Color (note color description and/or color temperature in Kelvin, such as 2700K, "warm white")

5W	DL		**13W**	DL		**20W**	DL	
	CW			CW			CW	
	WW			WW			WW	
6W	DL		**14W**	DL		**21W**	DL	
	CW			CW			CW	
	WW			WW			WW	
7W	DL		**15W**	DL		**22W**	DL	
	CW			CW			CW	
	WW			WW			WW	
8W	DL		**16W**	DL		**23W**	DL	
	CW			CW			CW	
	WW			WW			WW	
9W	DL		**17W**	DL		**24W**	DL	
	CW			CW			CW	
	WW			WW			WW	
10W	DL		**18W**	DL		**25W**	DL	
	CW			CW			CW	
	WW			WW			WW	
11W	DL		**19W**	DL		**greater than 25W**	DL	
	CW			CW			CW	
	WW			WW			WW	
12W	DL		DL="daylight" CW="cool white" WW="warm white"					
	CW							
	WW							

2. Manufacturer and/or Brand Information

A	GE	**E**	Sylvania	**I**		**M**	
B	OSRAM	**F**	Toshiba	**J**		**N**	
C	Panasonic	**G**		**K**		**O**	
D	Philips	**H**		**L**		**P**	

3. Lamps: Bulb and Base Types

Lamp	**Bulb type** (circle if available)	bare, spiral		bare, U-bend			covered				
	Base type (circle if available)	E26 or E27		G23		B22		GU10		Other	

4. Average Price, per Wattage of Lamp

Local currency: _____	5W-8W		9W-12W		13W-20W		21W-28W		greater than 28W	

5. Qualitative Comments

Retailer	Best selling brand		Best selling color (white)		Best selling lamp type		Customers' common questions about compact fluorescent lamps				
Energy labels	□ **Yes** □ **No** **lumen/watt:** _____		**Comment from the Sampler**								

Compact Fluorescent Lamp Sampling Sheet

Ref. No.:_____

IIEC is conducting lamp sampling on behalf of the United Nations Environment Programme's *en.lighten initiative* in order to strengthen the national and regional resources for efficient lighting monitoring, verification and enforcement (MVE). The lamp sampling will be conducted in six Southeast Asian countries. Website: *http://www.enlighten-initiative.org*

Country	City	Date

Sampler's name	phone	email

Name of retailer	Address and telephone of retailer	
		□ Shopping mall □ Specialized lighting shop □ Electrical/Hardware shop □ Others_____

1. Lamp Wattage, Model Number and Color (specify lamp wattage, note model number,color description and/or color temperature in Kelvin, such as 2700K, "warm white")

	DL	
	CW	
	WW	

Note:
1) Use one sampling sheet for only one lamp model
2) Lamp wattage equal to or greater than five watts and equal to or less than thirty watts (≥5W and ≤30W)
3) Sampling quantity = 30 samples per model
4) DL="daylight" CW="cool white" WW="warm white"

2. Manufacturer and/or Brand Information

A	GE	**E**	Sylvania	**I**	
B	OSRAM	**F**	Toshiba	**J**	
C	Panasonic	**G**		**K**	
D	Philips	**H**		**L**	

3. Lamps: Bulb and Base Types

Lamp	**Bulb type** (circle if available)	bare, spiral		bare, U-bend		covered					
	Base type (circle if available)	E26 or E27		G23		B22		GU10		Other	

4. Average Price, per Wattage of Lamp

Local currency: _____	5W-8W		9W-12W		13W-20W		21W-28W		greater than 28W	

5. Qualitative Comments

Retailer	Best selling brand		Best selling color (white)		Best selling lamp type		Customers' common questions about compact fluorescent lamps	
Sampler								

6. Signatures

Samplers and Witnesses	1	Signature	Name	Title	Organization
	2	Signature	Name	Title	Organization
	3	Signature	Name	Title	Organization
	4	Signature	Name	Title	Organization

ANNEX 3: Procedures and Protocols

A3.1 Lamp Sampling and Shipping Procedure

Lamp Sampling and Shipping Procedures

The Lamp Sampling Procedure explains the sampling process in detail to make sure the sampling process is consistent in each country.

1. Lamp type and model selected

See "Description of Lamp Selection and Testing."

2. Lamp selection requirements

a) The models selected must be labeled to indicate that they meet the country's electrical safety requirements (if any), minimum energy performance standards (if any) and labeling requirements (if any). At a minimum, the models selected must include a declared wattage on the lamp, label or packaging.

b) The models selected should be identified by the country designee(s) as the most popular ones in the local markets.

c) The models should be of a commonly used correlated color temperature (CCT), per local preference.

d) The models selected in each country should be from at least five manufacturers/brands of compact fluorescent lamps and at least two manufacturers/brands of light emitting diode lamps.

e) All the units sampled for each model should be from the same batch: all the information on the lamp and in the package should be the same, including the model number, bar code (or other scannable identifier) and manufacturing date (if available).

3. Sampling venue

a) Purchase the lamps from: shopping malls, supermarkets, general stores, hardware and lighting shops and other small commercial markets.

b) Approximately 40% of models should be from shopping malls or supermarkets. 60% of models should be from stores, shops and other small commercial markets.

c) Please choose random units for the sample.

4. Persons conducting the lamp sampling

a) UNEP project partner, IIEC, will sample, purchase and ship the lamps. There shall be at least two people to conduct the sampling, one of whom makes the purchases, and one of whom witnesses the sampled lamps before they are packaged for shipping.
b) Follow instructions for completing the "Lamp Sampling Sheet." The retailer survey must be completed on-site, prior to sampling. More information can be added, however, during and after sampling.
c) The samplers should contact IIEC or GELC if they have any questions regarding the sampling.

5. Sampling and shipping time

a) Scheduled sampling time: September 2014
b) All the samples and sampling sheets should be shipped to GELC within three business days after completion of sampling.

6. Sampling procedure and other matters

a) Each sampling transaction shall be witnessed by representatives from at least two different organizations. The samplers shall take photos with date stamped to record the sampling and packing process. Photographs of all the samples shall include, but not necessarily be limited to, purchase receipt and sampling venue to prove where they sampled and packed the lamps.
b) When entering the sampling venue, please show the official letter and explain the lamp sampling purpose[1] to the salesperson. Please ask the salesperson how many brands and models of CFLs and LED lamps they have before sampling.

   If there are not sufficient variety and numbers of lamps (see 2d), please choose another retailer for the sampling.
c) Select the models according to, "Description of Lamp Selection and Testing."
d) Make sure that there are sufficient quantities (units) of lamps within each model available to meet the sampling requirements (for CFLs 30 lamp units per model, for LED lamps, 20 lamp

[1] IIEC will issue a letter to the samplers to explain the purchasing purpose and to certify the samplers.

units per model).

e) If there are enough lamp units for the selected models, ask the salesperson to provide more than 30 samples of CFLs and more than 20 samples of LEDs.

If there are not enough lamp units, please choose another retailer for sampling.

f) First, check to make sure that all the samples are from the same batch. This means that they have the same manufacturing date. Second, check that all the parameters of each sample are the same including the model number, brand, rated voltage, rated frequency, rated power, correlated color temperature and so on. Inspect the packages to make sure they are in good condition: no tears, holes, crushing, or other signs of possible damage.

g) Samplers should fill in the sampling sheet in the sampling venue. Later, at the office of the country designee, more information may be added. Print the words so that they are easy to recognize. If anything is written incorrectly which needs to be revised, use two strikethrough bars ~~"sample"~~ overlapping the words needing to be revised and then confirm the revision by initialing beside. Samplers shall be responsible for the accuracy and completeness of the sampling sheet. Ask the country designee to check the contents of the sampling sheet and sign it to confirm their agreement with accuracy and completeness.

h) Each sampling sheet shall contain a reference to each model. Each sheet shall be signed by at least two representatives from different organizations. It is recommended that one representative from IIEC and the country designee sign each sampling sheet.

i) Copies of the sampling sheets shall be placed inside the box with the lamps. IIEC will collect and keep the original copies for their records.

Please do not send any sample sheets or copies to UNEP.

j) Package the samples in sturdy packing boxes, including some vibration absorption materials to fill in all of the hollow spaces in the box. The entire perimeter of the box should be lined with shock-absorbent material. This is to make sure that during the transportation, the lamps would not be broken or damaged by the vibration.

k) Samplers should use sealing tape to seal the box after packaging. Two persons should sign across the joint of the sealing tape. Use clear tape to cover and protect the signatures.

7. Transportation requirements

a) Please ship the samples to the following address:

Name: Global Efficient Lighting Centre

Address: No. A3 Changpocun, Dabeiyao, Chaoyang District, Beijing

Postcode: 100022

Country: China

Contact Person: Ms. Jing Wang

Email: **wangjing@gelc.com**

Tel: +86 10 6770 8989 ext 4113

b) Ship through an air express company (UPS or DHL). ***Do not ship by land or sea!*** When shipping the lamps, notify the air express company that the sender will pay the shipping fee and custom duties to China.
c) Insure each box for the value of the lamps inside the box.
d) Mark on the packaging and shipper's information form: ***"These samples are used for quality testing, not for commercial purpose; Samples: Not for sale or resale."***
e) Scan and email a copy of the shipping documents to GELC. IIEC shall keep the original shipping receipts, in case of any problems.

8. Sampling discipline

a) Maintain confidentiality. Do not inform the manufacturers or distributors of the models to be sampled or where the sampling venues are located.
b) Please maintain professional integrity throughout the process. For example, do not offer, give or accept any gift or any meal or drink invitation from manufacturers in the industry or undertake any sightseeing or other shopping during the sampling process.
c) Please follow the instruction of IIEC, "the Responsible Person (group leader)" and do not take any actions without his/her permission. Please carry out the sampling process according to this procedure. The samplers must take their responsibilities seriously during the sampling work.
d) Please keep a record of any problems and submit them in writing (by email) to GELC and to IIEC.

A3.2 Lamp Selection and Testing procedure

Description of Lamp Selection and Testing

1. Lamp type and model selected

Two types of omnidirectional lamp products are included in the testing: compact fluorescent lamps (CFLs) and light emitting diode (LED) lamps. 80 models of CFLs and 20 models of LED lamps will be purchased by the United Nation Environment Program's project partner, the International Institute for Energy Conservation (IIEC), from six Southeast Asia countries and shipped to GELC for testing, as follows[2].

Country/# models	*CF*	*LED*	*Total*
Cambodia	13	3	16
Indonesia	14	4	18
Lao PDR	13	3	16
Philippines	14	4	18
Thailand	13	3	16
Vietnam	13	3	16
Subtotal	**80**	**20**	**100**

The specific requirements of the lamps are provided as below:

1.1 Compact fluorescent lamps (CFLs)

Type: Integral (self-ballasted); for indoor lighting, general lighting service applications; "white" light emitting; omnidirectional light distribution pattern; no cover (bare lamp). *Note: do not select "color" or "tinted" lamps, directional lamps or reflector-type lamps or decorative lamps.*

[2] Countries and purchasing model numbers are provided by IIEC and UNEP. IIEC will inform UNEP and GELC of any change.

Lamp base: "Normal" size for typical socket in the country. For example, for a screw base lamp, choose E26 or E27 base. *Note: do not purchase lamps with "mogul" (large) or "mini" (small) size bases.*

Voltage: Between 100V to 240V; mains voltage (per country requirements). *Note: do not purchase low voltage (12 V) lamps.*

Frequency: 50Hz or 60Hz.

Other features: *Note: Do not purchase lamps with other electrical or functional features such as dimming or remote control.*

Wattage: Lamp wattage equal to or greater than five watts and equal to or less than 30 watts (≥5W and ≤30W).

Sample size: 30 units per model.

1.2 Light emitting diode (LED) lamps

Type: Integral (self-contained driver); for indoor lighting, general service applications; "white" light emitting; omnidirectional light distribution pattern; no cover (bare lamp). *Note: do not select "color" or "tinted" lamps, directional lamps, reflector-type lamps or decorative lamps.*

Lamp base: "Normal" size for typical socket in the country. For example, for a screw base lamp, choose E26 or E27 base. *Note: do not purchase lamps with "mogul" (large) or "mini" (small) size bases.*

Voltage: Between 100V to 240V; mains voltage (per country requirements). *Note: do not purchase low voltage (12 V) lamps.*

Frequency: 50Hz or 60Hz.

Other features: *Do not purchase lamps with other electrical or functional features such as dimming, color-changing or remote control.*

Wattage: Lamp wattage equal to or greater than five watts and equal to or less than 15 watts (≥5W and ≤15W).

Sample size: 20 units per model.

2. Testing items and reference standards

For the CFL products, GELC will test performance parameters and mercury content.

For the LED lamp products, GELC will test only the performance parameters.

2.1 Reference Standards

Performance test reference standards

- IEC 60969-2001 Self-ballasted lamps for general lighting services – Performance requirements
- IEC/PAS 62612-2009 Self-ballast LED-lamps for general lighting services – Performance requirements
- Lighting Distribution: LM79-08 Electrical and Photometric Measurements of Solid-State Lighting Products

Mercury test reference standard

- IEC 62554-2011 Sample preparation for measurement of mercury level in fluorescent lamps

2.2 Testing items and required sample size

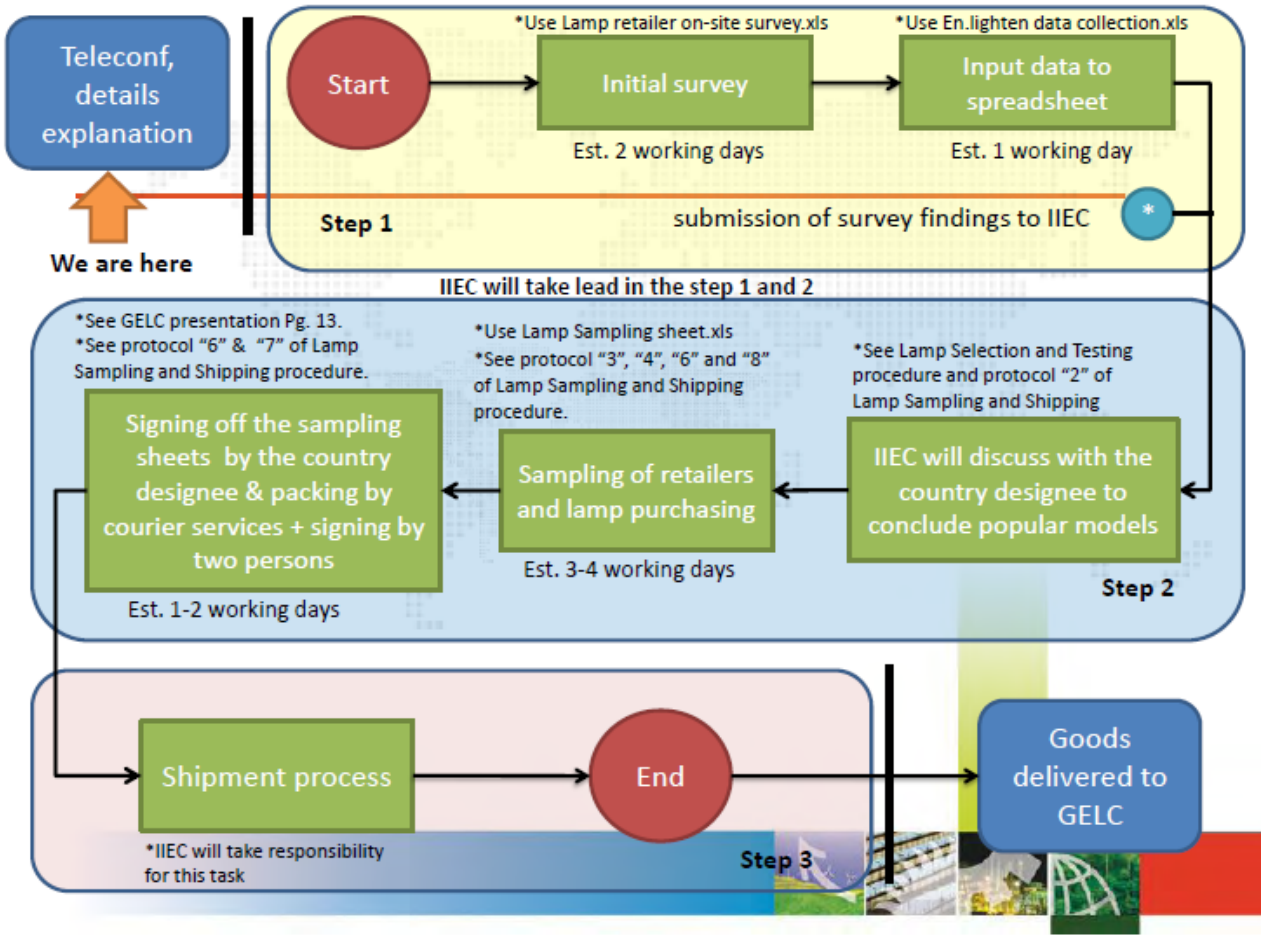
Compact Fluorescent Lamp Performance Tests		
No.	Item	Sample size
1	Lamp power @ 100 hours	10
2	Power factor@ 100 hours	10
3	Luminous flux @ 100 hours	10
4	Efficacy @ 100 hours	10
5	CRI @ 100 hours	10
6	*x* coordinate @ 100 hours	10
7	*y* coordinate @ 100 hours	10
8	CCT @ 100 hours	10
9	SDCM @ 100 hours	10
10	Lumen maintenance @ either 1000 hrs or 2000 hrs	10
Compact Fluorescent Lamp Mercury Tests		
No.	Item	Sample size
1	Mercury content	5
2	Format of mercury	5

Light Emitting Diode Lamp Performance Tests		
No.	Item	Sample size
1	Lamp power @ 0 hour	10
2	Power factor @ 0 hour	10
3	CRI @ 0 hour	10
4	Luminous flux @ 0 hour	10
5	Efficacy @ 0 hour	10
6	Light distribution @ 0 hour	1
7	Lamp power @ 1000 hour	10
8	Power factor @ 1000 hour	10
9	CRI @ 1000 hour	10
10	Luminous flux at @ 1000 hour	10
11	Efficacy @ 1000 hour	10

Schedule of Reporting

- Report: "Results and Analysis of Testing of Mercury Content of 80 Models of Compact Fluorescent Lamps" (anticipated in December 2014);
- Report: "Results of Initial Testing of 80 Models of Compact Fluorescent Lamps and 20 Models of Light-Emitting Diode Lamps" (anticipated in December 2014);
- Report: "Results and Analysis of 1000-Hour Performance Testing of 100 Models of Compact Fluorescent Lamps and Light-Emitting Diode Lamps" (anticipated in February 2015);
- Or, if schedule allows, Report: "Results and Analysis of 1000-Hour Performance Testing of 20 Models of Light-Emitting Diode Lamps and 2000-Hour Testing of 80 Models of Compact Fluorescent Lamps" (anticipated in May 2015);
- Report: "Results, Analysis and Recommendations of Testing of 100 Models of Lamps" (anticipated in May 2015);

A3.3 Steps to be Undertaken by the National Consultants



A3.4 Guidelines for the Lamp Sampling and Shipping Steps

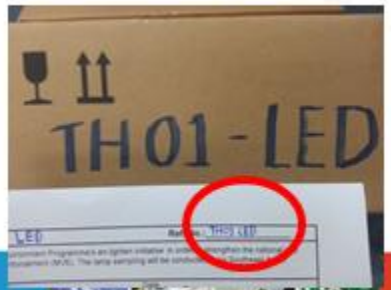
Step 2:Involvement of the country's focal points

- Electricity Generating Authority of Thailand (EGAT)
- Department of Alternative Energy Development and Efficiency (DEDE)

3

Step 2: Example of the model referencing

CFL:
TH01CFL, TH02CFL,...
LED:
TH01LED, TH02LED,...



4

Step 2: Signature

Outlet's manager signs a sampling sheet

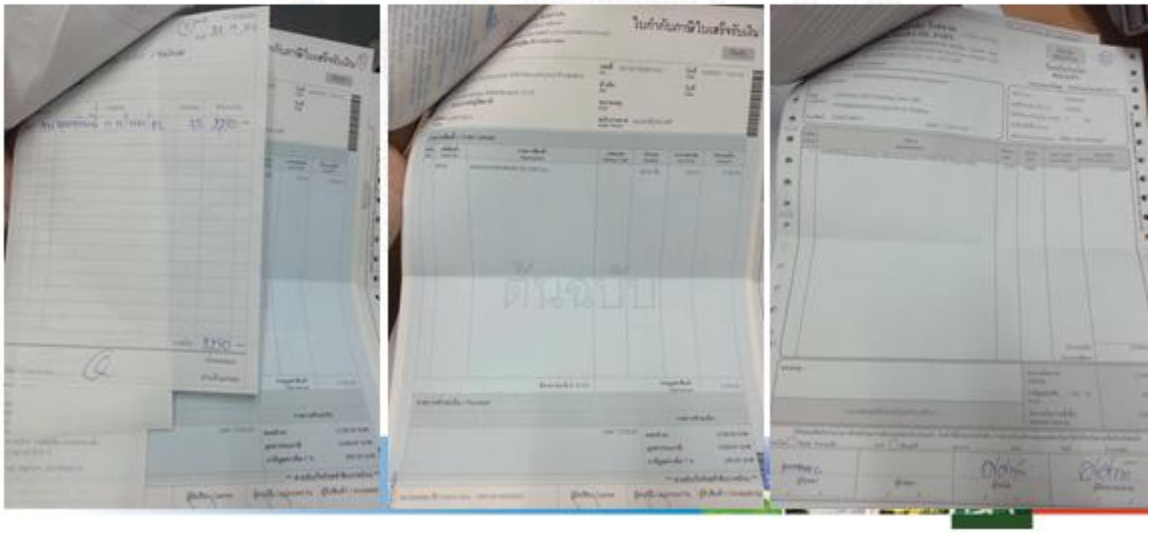
At least 3 signatures are required in this process:

1. National consultant
2. Country's focal point
3. Shopkeeper or seller or the owner of the shop

5

Step 2: Receipt

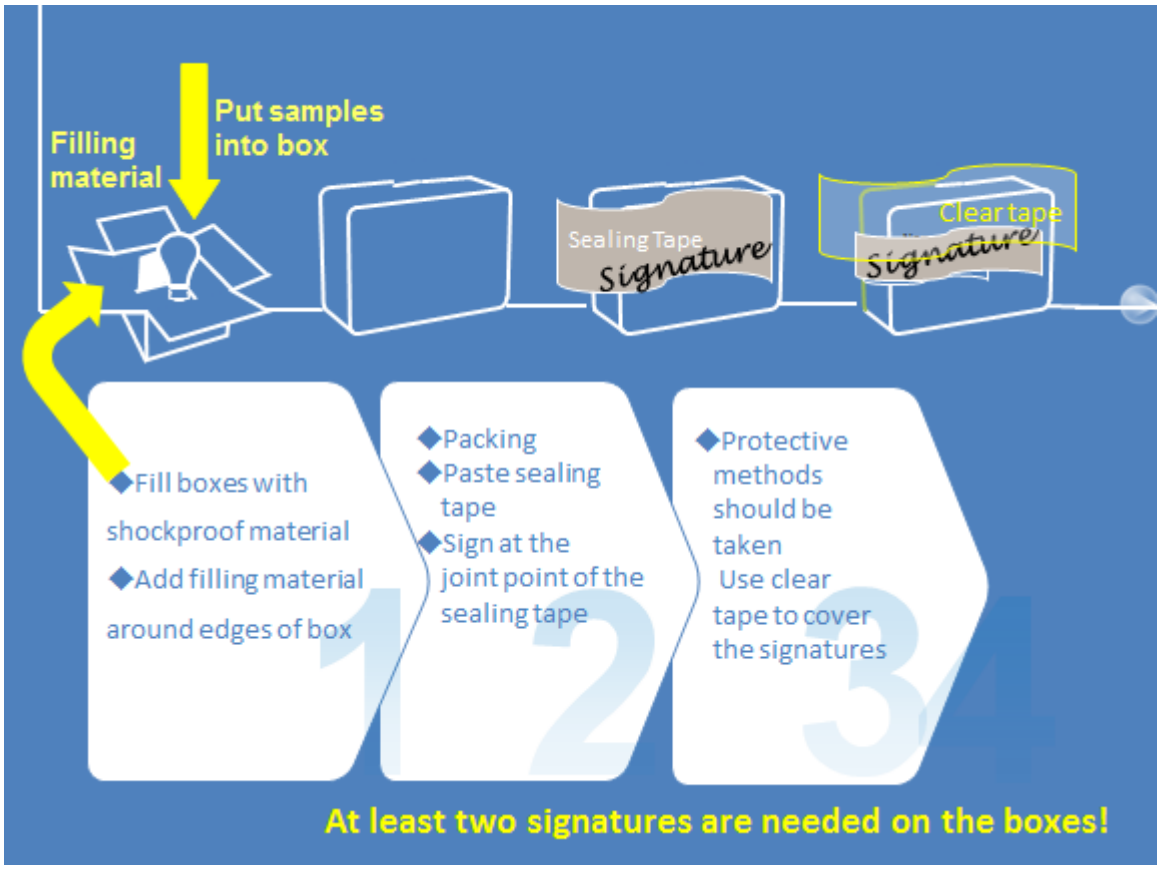
- Official receipt is a must
- Tax invoices are preferred



Step3: Shipping process

- **Please use these Harmonised codes:**
  - CFL: 8539319100
  - LED: 8541401000
  - **Please identify the quantity of lamps**
  - E.g. 400 CF lamps, 60 LED lamps

7



Step 3:Sign off+Packing process






Step 3 *IMPORTANT*

Please make sure that the shipping staff marks **"SENDER"** in the Transportation charges and **DUTIES and TAXES** boxes

Any dangerous goods in the shipment? ☐ Yes ☒ No

Payment – TRANSPORTATION CHARGES PAID BY:

☒ Sender ☐ Consignee ☐ Third Party ☐ Credit Card ☐ Cash

Bill Account No. 000000000 Expiry

Credit Card No. ..... Type ..... Date

Payment DUTIES AND TAXES PAID BY:

☒ Sender ☐ Consignee ☐ Third Party Payment Type:

Bill Duty Account 000000000

Step 3: *IMPORTANT*

COMMERCIAL INVOICE

DATE OF EXPORT	Tracking Number	CURRENCY
SEPTEMBER 24, 2014	1739443370	PHILIPPINE PESO

SHIPPER / EXPORTER	CONSIGNEE
MS. ELAINE LAYUS IIEC - MANILA Rm 106 ISO Bldg., Ateneo de Manila University Loyola Heights, Katipunan Avenue Quezon City, Philippines 1108	Ms. Jing Wang Global Efficient Lighting Centre No. A3 Changpocun, Dabeiyao, Chaoyang District, Beijing 100022 Tel: +86 10 6770 8989 ext 4113
COUNTRY OF ULTIMATE DESTINATION China	
COUNTRY OF MANUFACTURE Philippines	
REASON OF EXPORT Sample for quality testing and evaluation	

No	FULL DESCRIPTION OF GOODS	QUANTITY	Unit of Measure	UNIT VALUE (PHP)	TOTAL VALUE (PHP)
1	CFL G.E. 5W	30	PCS	94.00	2,820.00
2	CFL OMNI 5W	30	PCS	99.75	2,992.50
3	CFL PHILIPS 8W	30	PCS	144.00	4,320.00
4	CFL G.E. 8W	30	PCS	159.75	4,792.50
5	CFL OMNI 9W	30	PCS	99.75	2,992.50
6	CFL AKARI 9W	30	PCS	109.75	3,292.50
7	CFL G.E. 11W	30	PCS	62.67	1,880.00
8	CFL PHILIPS 11W	30	PCS	117.00	3,510.00

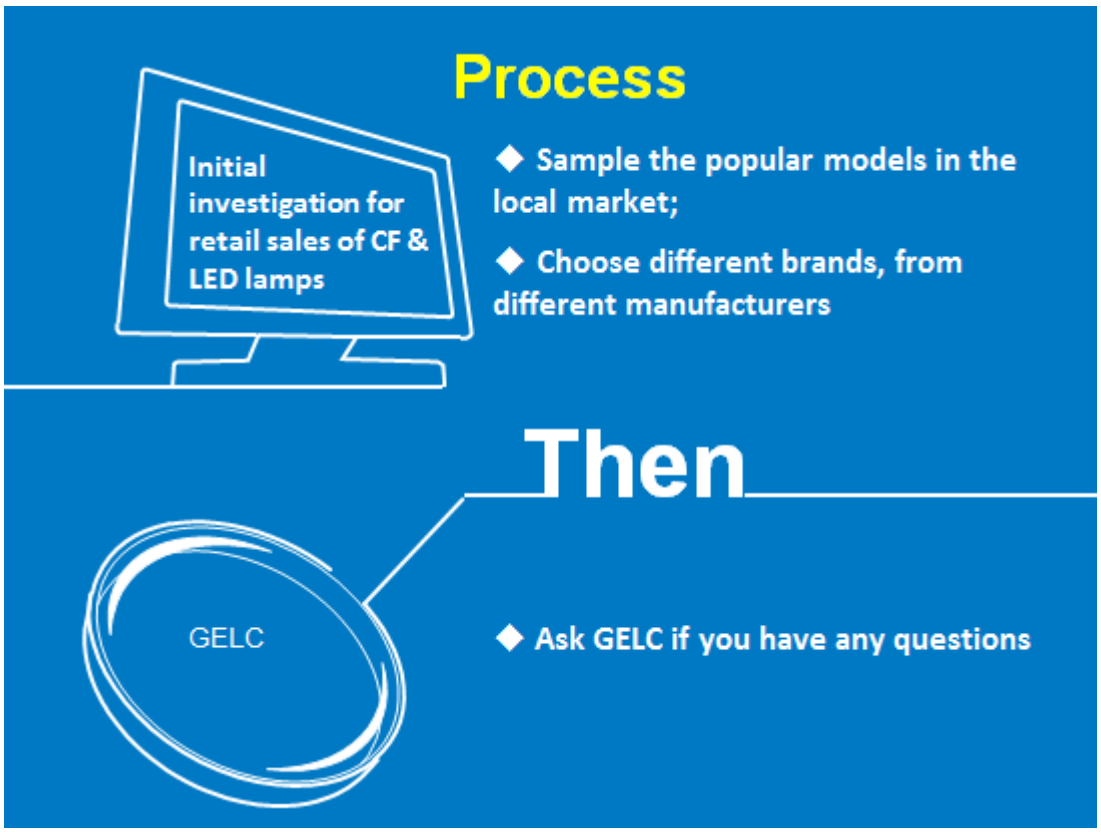
A3.5 Lamp Sampling Procedure (GELC's presentation)

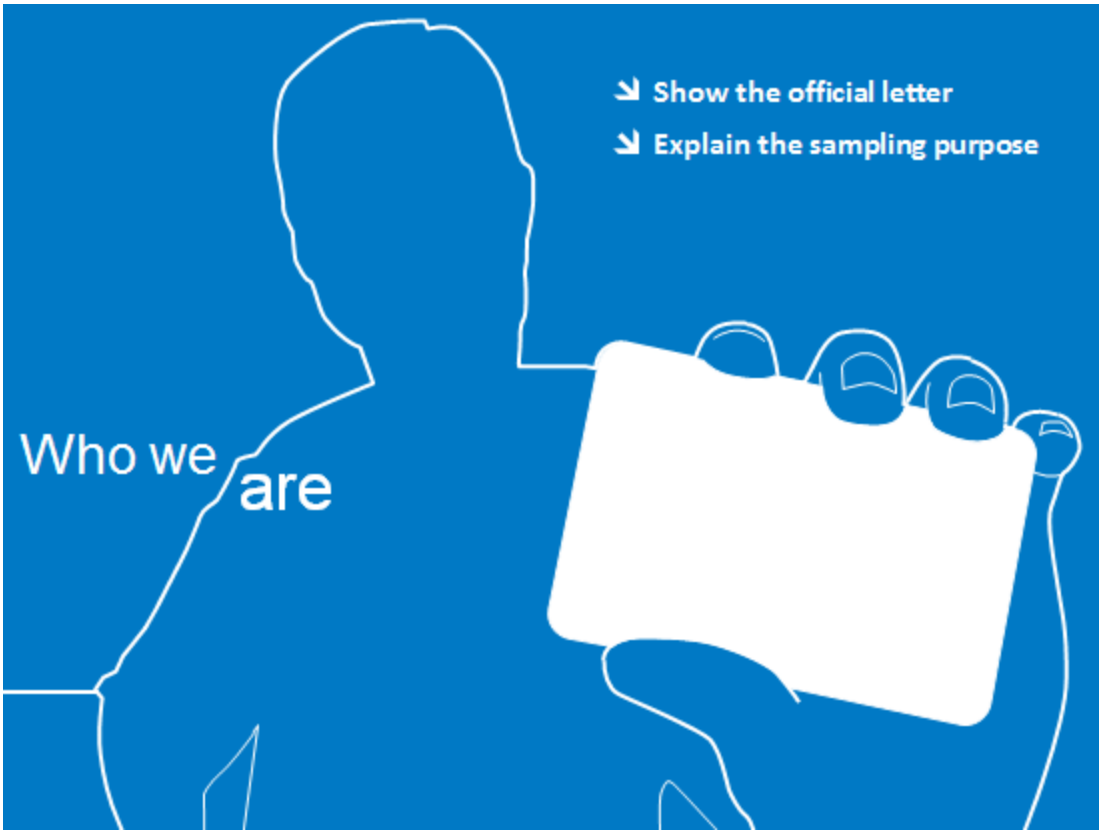
Requirements: Compact Fluorescent Lamps

- **Type:** Integral (self-ballasted); for indoor lighting, general lighting service applications; "white" light emitting; omnidirectional light distribution pattern; no cover (bare lamp). *Note: do not select "color" or "tinted" lamps, directional lamps or reflector-type lamps or decorative lamps.*
- **Lamp base:** "Normal" size for typical socket in the country. For example, for a screw base lamp, choose E26 or E27 base. *Note: do not purchase lamps with "mogul" (large) or "mini" (small) size bases.*
- **Voltage:** Between 100V to 240V; mains voltage (per country requirements). *Note: do not purchase low voltage (12 V) lamps.*
- **Frequency**: 50Hz or 60Hz.
- **Other features**: Do not purchase lamps with other electrical or functional features such as dimming or remote control.
- **Wattage**: Lamp wattage ≥5W and ≤30W;
- **Sample size**: 30 units per model.

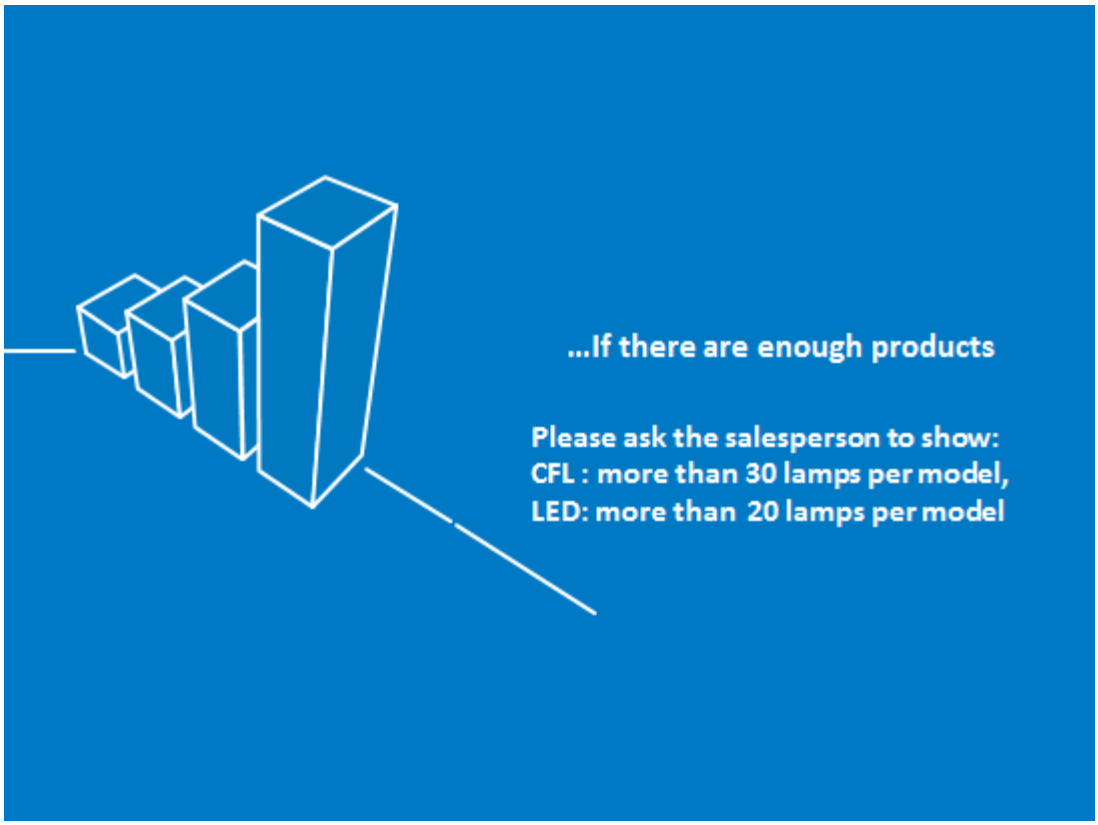
Requirements: Light Emitting Diode Lamps

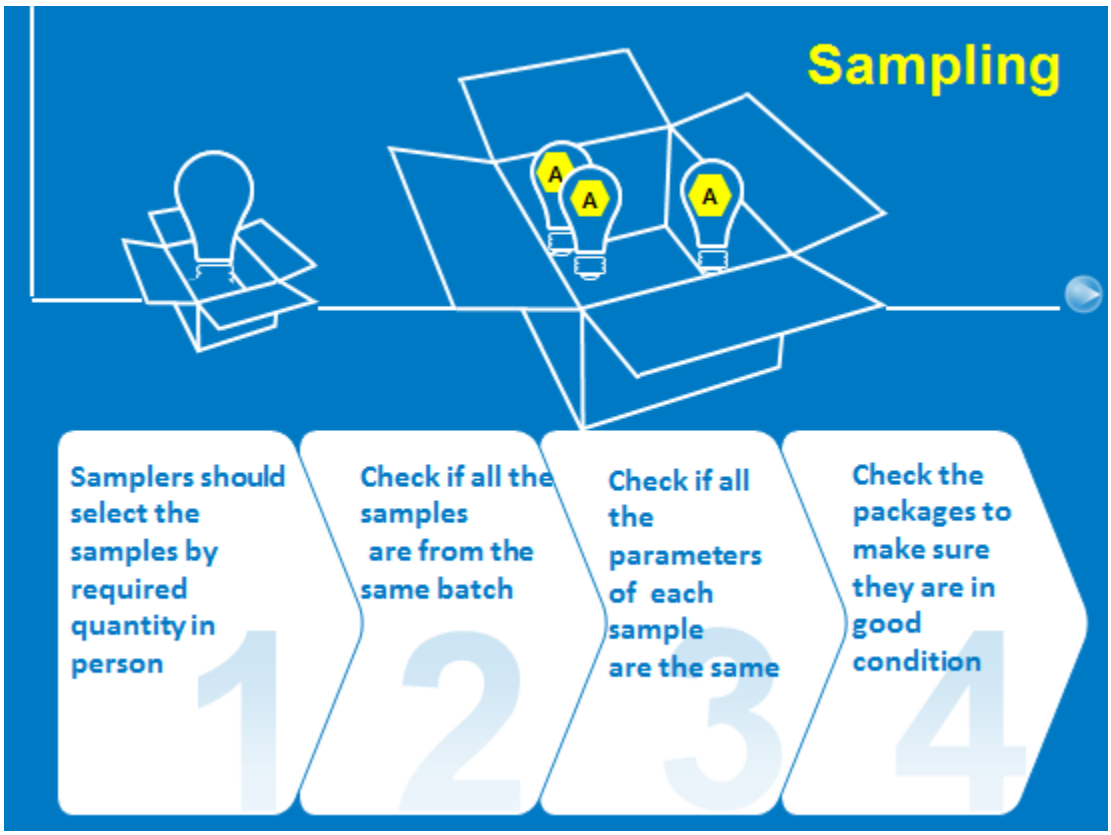
- **Type:** Integral (self-contained driver); for indoor lighting, general service applications; "white" light emitting; omnidirectional light distribution pattern; no cover (bare lamp). *Note: do not select "color" or "tinted" lamps, directional lamps or reflector-type lamps or decorative lamps.*
- **Lamp base:** "Normal" size for typical socket in the country. For example, for a screw base lamp, choose E26 or E27 base. *Note: do not purchase lamps with "mogul" (large) or "mini" (small) size bases.*
- **Voltage:** Between 100V to 240V; mains voltage (per country requirements). *Note: do not purchase low voltage (12 V) lamps.*
- **Frequency**: 50Hz or 60Hz.
- **Other features**: *Note: do not purchase lamps with other electrical or functional features such as dimming, color-changing or remote control.*
- **Wattage**: Lamp wattage ≥5W and ≤15W;
- **Sample size**: 20 units per model.

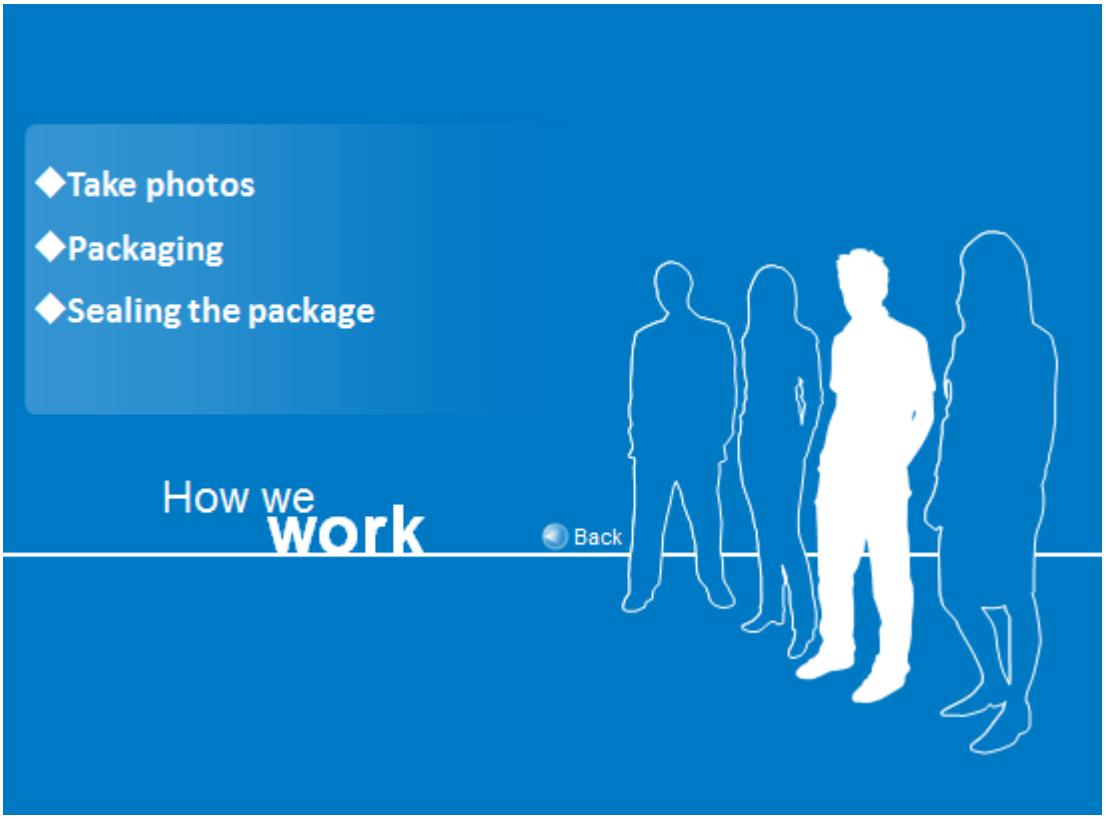

Process
Initial investigation for retail sales of CF & LED lamps
◆ Sample the popular models in the local market;
◆ Choose different brands, from different manufacturers
Then
GELC
◆ Ask GELC if you have any questions


Show the official letter
Explain the sampling purpose
Who we are

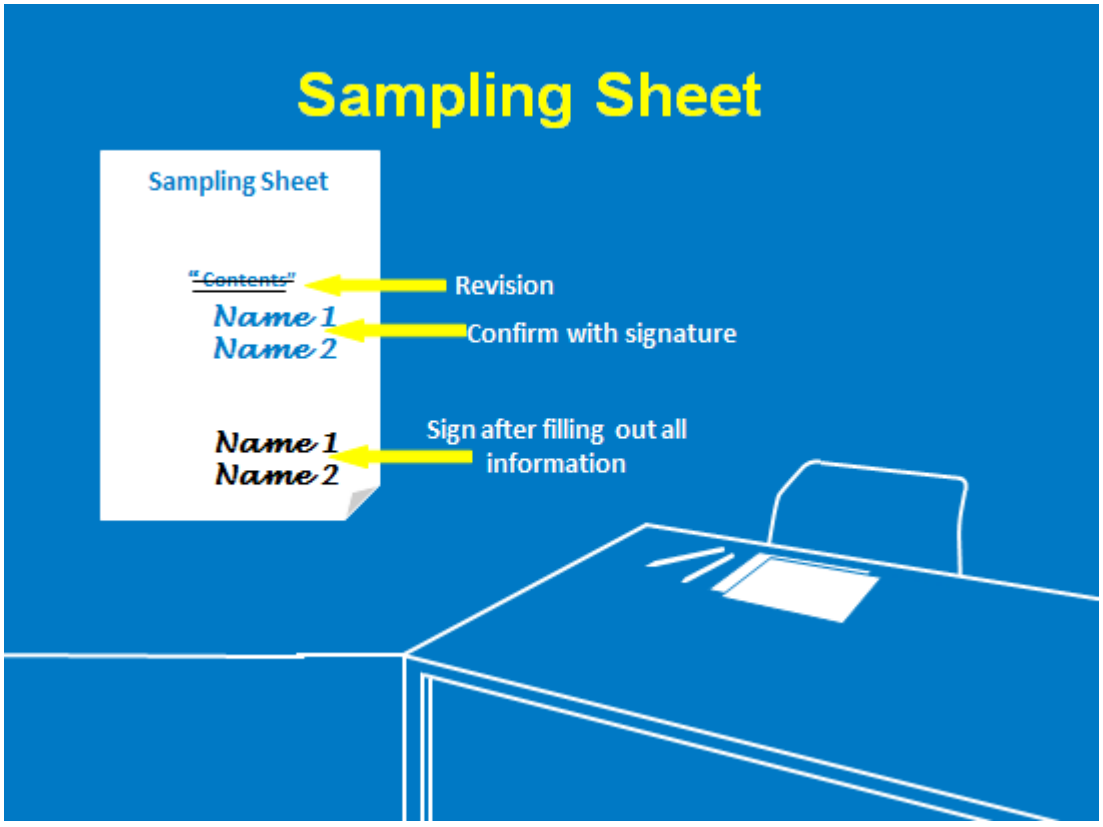

Questions for Salesperson
"Do you have the lamps I would like to purchase? Do you have enough quantity of lamps?"
"Do you have compact fluorescent and light emitting diode lamps on sale? (CFLs and LED lamps?) How many brands and models do you have?"
"Are these lamps for indoor, general lighting?

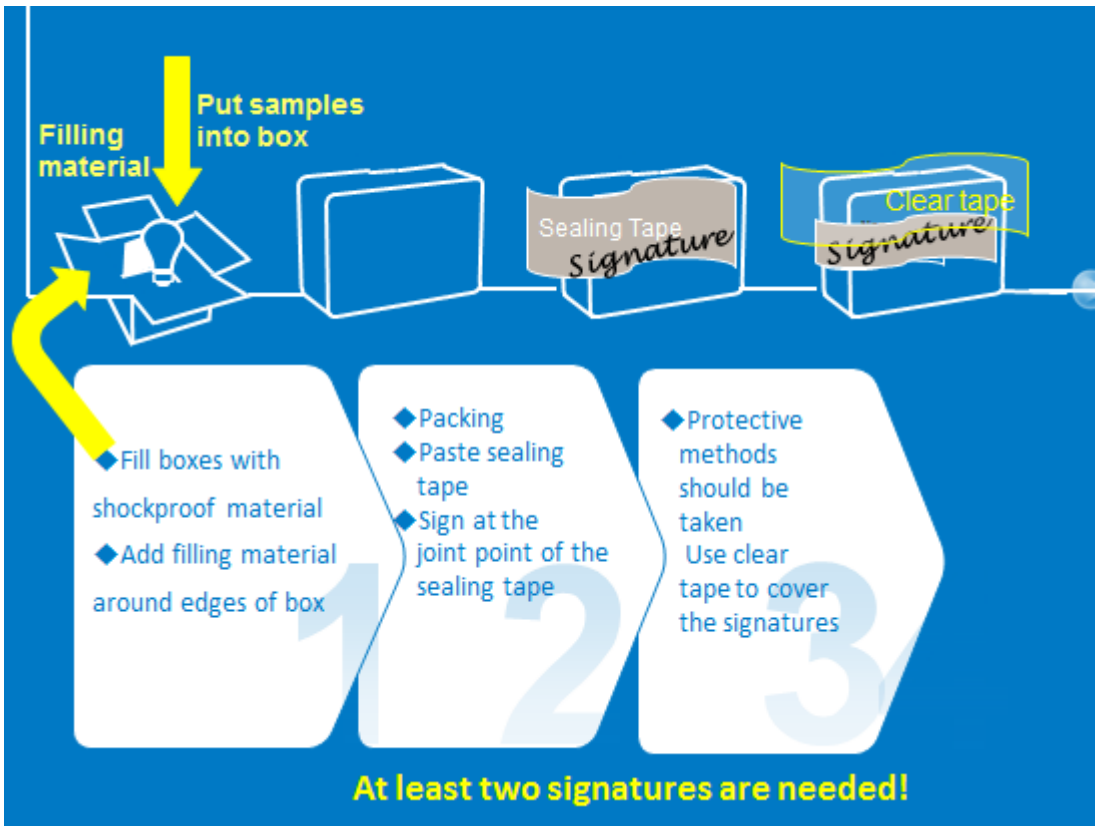

...If there are enough products
Please ask the salesperson to show:
CFL : more than 30 lamps per model,
LED: more than 20 lamps per model


Sampling
A
A
A
Samplers should select the samples by required quantity in person
1
Check if all the samples are from the same batch
2
Check if all the parameters of each sample are the same
3
Check the packages to make sure they are in good condition
4

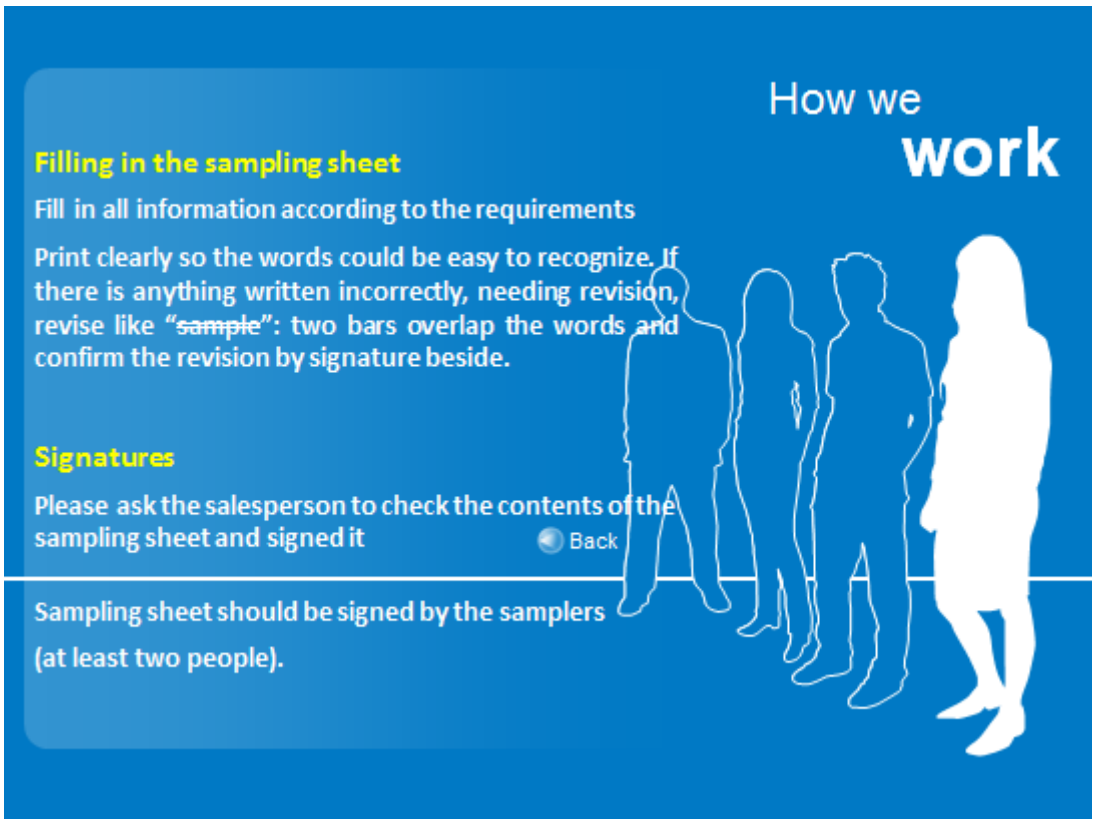

Take photos
Packaging
Sealing the package
How we work
Back

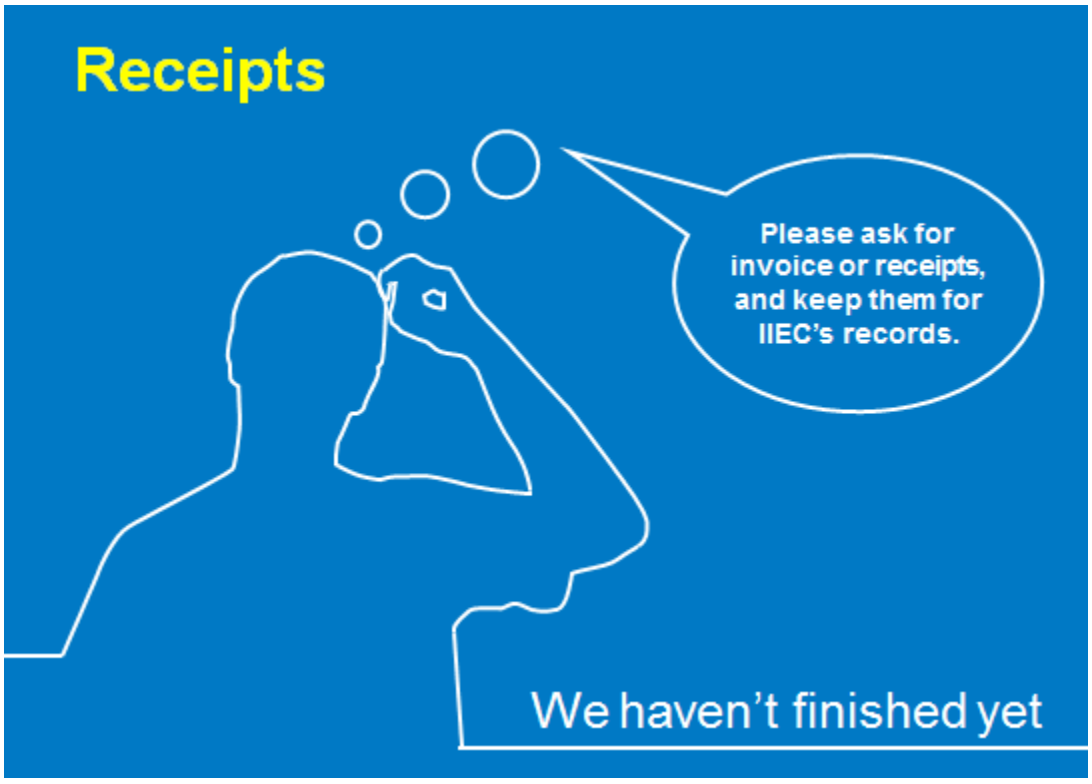

Lamp Shop
Take date-stamped photos of
the samples and the shops!


Sampling Sheet
Sampling Sheet
"Contents"
Revision
Name 1
Name 2
Confirm with signature
Name 1
Name 2
Sign after filling out all
information

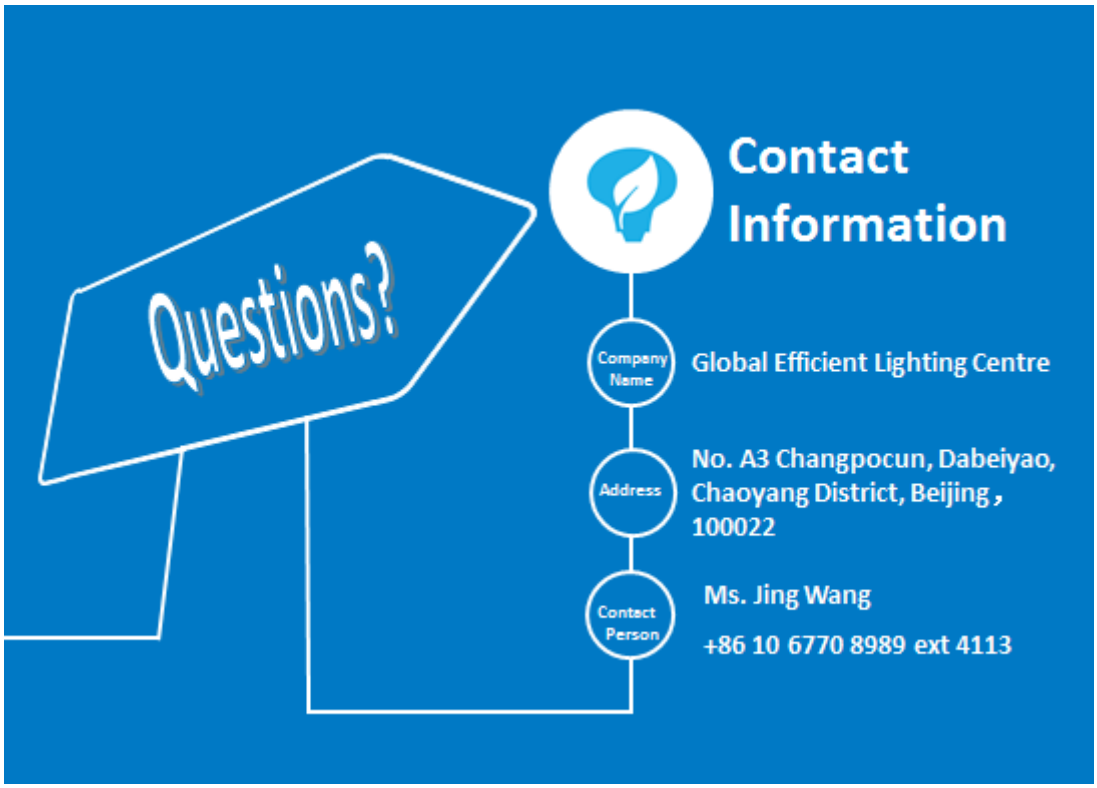

Filling material
Put samples into box
Sealing Tape
Signature
Clear tape
Signature
◆Fill boxes with shockproof material
◆Add filling material around edges of box
◆Packing
◆Paste sealing tape
◆Sign at the joint point of the sealing tape
◆Protective methods should be taken
Use clear tape to cover the signatures
1
2
3
At least two signatures are needed!

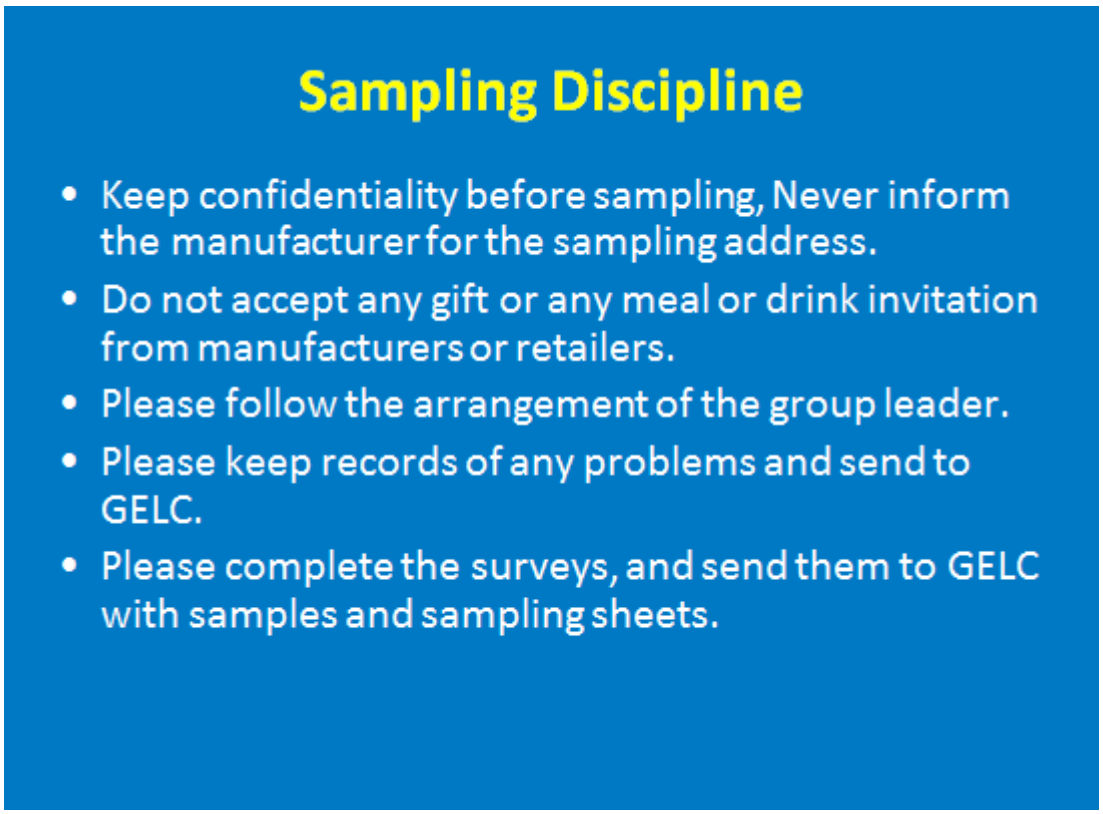

Information for shipping label
Name: Global Efficient Lighting Centre
Address: No. A3 Changpocun, Dabeiyao, Chaoyang District, Beijing
Postcode: 100022
Country: China
Contact Person: Ms. Jing Wang
Email: wangjing@gelc.com
Tel: +86 10 6770 8989 ext 4113
IMPORTANT-- Mark on the package:
" These samples are used for quality testing, for non-commercial purpose;
Samples: Not for sale or resale".


How we
work
Filling in the sampling sheet
Fill in all information according to the requirements
Print clearly so the words could be easy to recognize. If there is anything written incorrectly, needing revision, revise like "~~sample~~": two bars overlap the words and confirm the revision by signature beside.
Signatures
Please ask the salesperson to check the contents of the sampling sheet and signed it
Back
Sampling sheet should be signed by the samplers (at least two people).


Receipts
Please ask for invoice or receipts, and keep them for IIEC's records.
We haven't finished yet


Shipping
Deliver
The samples by
Air express company: UPS or DHL
Ship the samples within three business days after sampling


Questions?
Contact Information
Company Name
Global Efficient Lighting Centre
Address
No. A3 Changpocun, Dabeiyao, Chaoyang District, Beijing , 100022
Contact Person
Ms. Jing Wang
+86 10 6770 8989 ext 4113


Sampling Discipline
• Keep confidentiality before sampling, Never inform the manufacturer for the sampling address.
• Do not accept any gift or any meal or drink invitation from manufacturers or retailers.
• Please follow the arrangement of the group leader.
• Please keep records of any problems and send to GELC.
• Please complete the surveys, and send them to GELC with samples and sampling sheets.