

# **International CFL Market Review: A Study of Seven Asia-Pacific Economies**

---

---



---

**August 2006**

Prepared for



**Australian Government**  
Department of the  
Environment and Heritage  
Australian Greenhouse Office

In Support of the International CFL Harmonisation Initiative

**International CFL Market Review: A Study of Seven Asia-Pacific Economies**

© 2006. Published by the Australian Greenhouse Office

Prepared in support of the *International CFL Harmonisation Initiative* ([www.apec-esis.org/cfl](http://www.apec-esis.org/cfl))

Front cover photo by Andrew Buchan

Back cover photos by Peter Banwell



## TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b> .....	<b>3</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>4</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>5</b>
<b>LIST OF ACRONYMS</b> .....	<b>7</b>
<b>LIST OF TABLES</b> .....	<b>8</b>
<b>LIST OF FIGURES</b> .....	<b>8</b>
<b>1. INTRODUCTION</b> .....	<b>9</b>
BACKGROUND.....	9
OBJECTIVES OF THE INTERNATIONAL REVIEW .....	9
GLOBAL OVERVIEW .....	9
<b>2. METHODOLOGY</b> .....	<b>11</b>
LIST OF ECONOMY TEAMS .....	11
OVERVIEW OF GLOBAL CFL STANDARDS.....	11
<b>3. MARKET OVERVIEW</b> .....	<b>13</b>
OVERVIEW OF DATA COLLECTED .....	13
MARKET SIZE AND TRENDS IN THE SEVEN ECONOMIES .....	13
IMPORT AND EXPORT STATISTICS .....	14
MANUFACTURERS/SUPPLIERS AND MARKET SHARE .....	16
SALES CHANNELS .....	16
MARKET CHARACTERIZATION .....	17
<b>4. REVIEW OF CFL STANDARDS</b> .....	<b>20</b>
<b>5. REVIEW OF CFL TESTING PROGRAMS</b> .....	<b>22</b>
<b>6. SURVEY OF MANUFACTURER TESTING AND COMPLIANCE COSTS</b> .....	<b>24</b>
<b>7. CONCLUSIONS</b> .....	<b>26</b>
<b>APPENDIX A: LIST OF INTERVIEWS</b> .....	<b>A-1</b>
<b>APPENDIX B: TERMS OF REFERENCE</b> .....	<b>B-1</b>
<b>APPENDIX C: MANUFACTURER AND SUPPLIER SURVEY</b> .....	<b>C-1</b>

## ACKNOWLEDGEMENTS

This report was prepared under the direction of Peter du Pont of Danish Energy Management A/S, with assistance from Monthon Kumpengsath and Andrew Buchan. The review was made possible by the extensive efforts of national consultants in the seven economies surveyed: Mark Ellis & Associates in Australia; the Chinese Association of Lighting Industry (CALI) in China; the Electric Lamp & Component Manufacturers' Association of India (ELCOMA) in India; PT Pelangi Energi Abadi Citra Enviro in Indonesia; Engenius Solutions in New Zealand; Alexander Ablaza in the Philippines; and InvestConsult Group in Vietnam.

This is a summary report, and it synthesizes the results of seven individual economy reviews. These reviews will be made available in electronic form on the web site of the International CFL Harmonisation Initiative ([www.apec-esis.org/cfl](http://www.apec-esis.org/cfl)).

This work was supported by the Australian Greenhouse Office (AGO) as an input to the International CFL Harmonisation Initiative. We would like to acknowledge the AGO's support, and the advice and guidance of Mr. Shane Holt, AGO's Director of Equipment Energy Efficiency. We would also like to acknowledge the counsel of Mr. Stuart Jeffcott, previously the International Advisor for the China Green Lights Program, and currently Coordinator of the International CFL Harmonisation Initiative.

The data and conclusions presented in this report are those of the authors and do not represent the official view of any governmental organization. Any errors or omissions are the responsibility of the authors.

## EXECUTIVE SUMMARY

### Background

In order to provide a snapshot of the global CFL industry and the specific issues facing individual markets, the Australian Greenhouse Office commissioned an international market review in seven Asia-Pacific economies. The list of economies studied represents a range of income levels and economic development, and it also includes the world's two most populated countries: Australia, China, India, Indonesia, New Zealand, the Philippines, and Vietnam.

### Objective of the Review

The primary objectives of this international CFL market review are to

1. gather and compare CFL market information from seven economies in the Asia-Pacific region in order to analyze and understand key market issues and trends related to the testing, regulation, trade, and quality of CFLs; and
2. survey CFL manufacturers and suppliers in order to solicit their views on the costs of certification and compliance, and the potential benefits of a globally harmonised approach to testing and regulation of CFLs.

### The Global CFL Market

At present, the compact fluorescent lamp (CFL) industry is undergoing rapid global expansion. Global CFL sales have risen 13 fold since 1990, and production has grown from 100 million to more than 1.5 billion units. Amid this unprecedented proliferation of CFLs, production has migrated chiefly to China. In turn, Chinese manufacturers and distributors export CFLs widely throughout the world. At the same time, a growing number of countries are adopting CFL promotion programs, and in some cases carrying out large-scale bulk procurement of CFLs (ranging up to millions of lamps).

### Problems in the CFL Market

The current climate of CFL production and distribution creates two problems, both of which the International CFL Harmonisation Initiative aims to tackle:

- *First, an abundance of poor-quality CFLs are entering the markets of economies either importing CFLs or manufacturing their own.* This is largely due to the fact that there exists no international quality mark, or minimum level of quality, for CFL lamps. Moreover, each economy maintains largely different standards of expected quality, or no standard at all. This proves to be problematic, as it leaves consumers to distinguish between products with no set of guidelines on which to base their CFL purchase. Without any universal quality guidelines, the consumer is attracted to cheaper, lower-quality products.
- *Second, CFLs are increasingly manufactured in a centralized location but regulated by no centralized or common set of standards.* Although nearly all CFLs are produced in China, each economy maintains different test procedures, specification levels, and minimum energy performance standards, if any at all. And many economies have in place neither the technical standards nor the method and means of testing CFL quality. In short, there is a lack of a common approach to regulating and certifying the quality of this globalised product.

### Proliferation of National Standards

A global search found more than 33 different national standards and labeling schemes for CFLs in place, and four under consideration.

- 9 economies have a MEPS program, and eight of these are mandatory;
- 4 economies are considering MEPS for currently under consideration; and
- 24 economies operate a labelling scheme for CFLs, although only three of these are mandatory. The remaining 21 are voluntary, and one more program is currently under consideration.

### **Comparison of CFL Quality across Economies**

In order to understand the extent of the “low-quality” CFL problem, we estimated the market share in each country comprised by models that are of inferior quality, with low lifetimes, and not made to international standards. Each of the National Consultants was asked to obtain estimates of market share for four different quality levels, based on market surveys and interviews with domestic suppliers. The market shares of poor quality CFLs were quite substantial – ranging from 15% to as high as an estimated 34% of CFLs sold in the market.

### **Lack of a Harmonised Test Procedure**

Currently there exists no systematic or harmonised test procedure for CFLs. Although most economies use a variation of the two IEC standards for performance and safety, even these permutations can vary significantly. Furthermore, many of the economies that have in place, or are planning, CFL programs are not using a quality test procedure as the basis for the program. Without testing, it is impossible to distinguish between products, aside from brand recognition, and consumers cannot separate a good quality from a poor quality CFL. Additionally, a lack of testing then makes it difficult for policymakers and regulators to certify and track product quality in the market.

### **Minimum Energy Performance Standard (MEPS)**

Of the seven economies studied, only the Philippines has a stringent, mandatory MEPS program in place. China also has a mandatory MEPS program, but it only establishes limits for values of energy efficiency and a rating criteria for self-ballasted lamps. Three economies are in the process of developing a minimum standard for CFLs. Vietnam has a program under consideration, while Australia and New Zealand are developing their respective programs in unison to be based on the Chinese model and to be harmonised with the International CFL Harmonisation Initiative.

### **Energy Labelling**

Only the Philippines has a mandatory labelling program. Four economies employ voluntary labelling programs. Both China, India, and Australia have voluntary programs, while Indonesia uses a comparative labelling program that tracks the energy efficiency of home electrical appliances or efficacy of CFLs. Additionally, Australia, as well as India, is developing its labelling program further to harmonise with the International CFL Harmonisation Initiative. Neither Vietnam nor New Zealand have implemented a CFL labelling scheme.

### **Benefits of a CFL Harmonisation**

The responses clearly indicate that suppliers view the certification and compliance costs as significant: 16 of 23 suppliers reported that a harmonised CFL test procedure would result in *at least* a substantial reduction in compliance costs. Suppliers also reported that testing and compliance costs range as high as a few percent of production costs for domestic sales, and an even greater percentage for exports. Although the absolute compliance costs for each supplier are not prohibitive in and of themselves, they represent the cost *to only a single supplier*. When these costs are multiplied across the full range of CFL suppliers across the world, the costs accumulate to tens of millions of dollars a year in unnecessary retesting and certification costs.

## LIST OF ACRONYMS

AGO	Australian Greenhouse Office
BEE	The Bureau of Energy Efficiency (India)
BIS	The Bureau of Indian Standards
BPS	The Bureau of Product Standards (Philippines)
CFL	Compact Fluorescent Lamp
CISPR	Limits and Methods of Measurement of Radio Disturbance Characteristics of Electrical Lighting and Similar Equipment
CPRI	Central Power Research Institute
DTI	Department of Trade and Industry (Philippines)
DOE	Department of Energy (Philippines)
EC	European Commission
ELI	Efficient Lighting Initiative
ERDA	Electrical Research & Development Association
IAL	Initial Accredited Laboratories
IEC	International Electrotechnical Commission
LATL	Lighting and Appliance Testing Laboratory
MEPS	Minimum Energy Performance Standard
NATA	National Association of Testing Authorities (Australia)
NPB	Goods Registration Number (Indonesia)
NPL	National Physical Lab
PNS	Philippine National Standard
SNI	Indonesia National Standard

## LIST OF TABLES

TABLE 1. OVERVIEW OF THE ECONOMY TEAMS .....	11
TABLE 2. SUMMARY OF CFL STANDARDS AND LABELLING PROGRAMS IN PLACE GLOBALLY .....	12
TABLE 3. SUMMARY OF CFL STANDARDS AND LABELLING PROGRAMS BY ECONOMY .....	12
TABLE 4. OVERVIEW OF THE DATA COLLECTED .....	13
TABLE 5. AVERAGE UNIT VALUE PER CFL.....	16
TABLE 6. CFL BRANDS AND MARKET SHARE .....	16
TABLE 7. DOMESTIC SALES CHANNELS FOR CFLS .....	16
TABLE 8. SUMMARY OF CFL TESTING STANDARDS IN 7 ECONOMIES .....	21
TABLE 9. SUMMARY OF CFL TESTING PROGRAMS IN 7 ECONOMIES .....	22
TABLE 10. SCALE OF COST REDUCTION .....	24
TABLE 11. SUMMARY OF SURVEY ON MANUFACTURER TESTING AND COMPLIANCE COSTS.....	25

## LIST OF FIGURES

FIGURE 1. GLOBAL CFL SALES VS. CHINESE PRODUCTION .....	10
FIGURE 2. PRODUCTION OF CFLS IN CHINA AND INDIA.....	14
FIGURE 3. PRIMARY EXPORT MARKETS OF CHINESE CFLS.....	14
FIGURE 4. IMPORT STATISTICS OF 6 ECONOMIES .....	15
FIGURE 5. CHARACTERIZATION OF DOMESTIC CFL SALES BY QUALITY .....	18
FIGURE 6. RATED POWER VS. EFFICACY FOR PHILIPPINES CFLS.....	19
FIGURE 7. MEASURED LIFETIME VS. LUMEN MAINTENANCE FOR PHILIPPINES CFLS.....	19

## 1. INTRODUCTION

### BACKGROUND

As society addresses the critical issue of climate change, it is increasingly evident that energy efficiency is a major building block of the solution. Older, less efficient equipment and appliances can be changed out for more efficient, energy-saving equipment, and the rapid adoption of these energy-saving products can transform entire product lines within a period of a few years. The lighting industry, in particular, is one of the primary markets in which market transformations (i.e. from T12 to T8 fluorescent lamps) are extremely cost effective and can be realized quite rapidly.

At present, the compact fluorescent lamp (CFL) industry is undergoing rapid global expansion. Global CFL sales have risen nearly 15-fold since 1990 -- from 100 million to more than 1.5 billion units. The CFL Harmonisation Initiative aims to work with international stakeholders to rationalize the approach to the testing, labelling, and regulation of CFLs. The initiative, which was launched in May 2005, has gained the support of 22 international governments, private-sector companies, and non-governmental organizations worldwide.

The purpose of the CFL Harmonisation Initiative is to

- create a uniform international testing method, covering the performance features of self-ballasted CFLs, suitable for submission to national and international standard bodies to measure CFL performance;
- identify a number of performance specifications for self ballasted CFLs to facilitate testing comparisons and possible rationalisation of CFL performance requirements; and
- propose these initiatives to the wider international lighting community and implement them within a three-year time frame (by mid-2008).

In order to provide a snapshot of the global CFL industry and the specific issues facing individual markets, the Australian Greenhouse Office commissioned an international market review in seven Asia-Pacific economies. This International CFL Market Review supports the overall goals of the International CFL Harmonisation Initiative by collecting and analyzing market data on CFLs from seven economies that represent a range of income levels and conditions. The list of economies also includes the world's two most populated countries: Australia, China, India, Indonesia, New Zealand, the Philippines, and Vietnam.

### OBJECTIVES OF THE INTERNATIONAL REVIEW

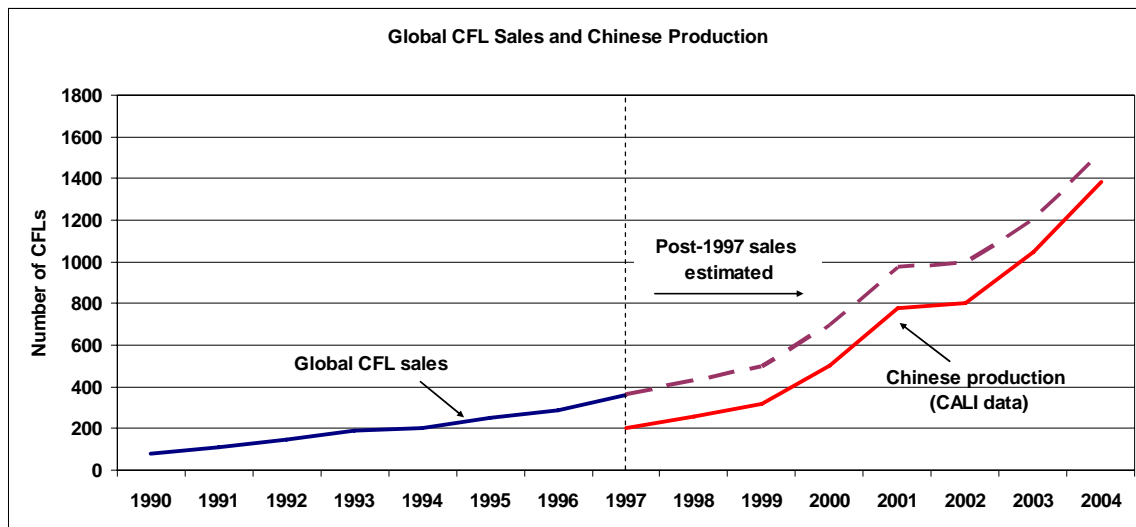
The primary objectives of this international CFL market review are to:

1. gather and compare CFL market information from seven economies in the Asia-Pacific region in order to analyze and understand key market issues and trends related to the testing, regulation, trade, and quality of CFLs; and
2. survey CFL manufacturers and suppliers in order to solicit their views on the costs of certification and compliance, and the potential benefits of a globally harmonised approach to testing and regulation of CFLs.

### GLOBAL OVERVIEW

Since 1990, global CFL sales have been increasing at an average rate of approximately 25% per year. Although there are no integrated global sales data available after the mid-1990s, sales figures can be approximated by examining CFL production in China. Chinese production has risen from slightly more than half (56%) of the market in 1997 to roughly 90% in 2004 (see Figure 1). CFL production has become concentrated in China as a by-product of inexpensive, available labour; cheaper materials; and the economies of large-scale production. Assembling a billion and a half units every year,

Chinese manufacturers export a majority of their products to the United States and Europe, but also to markets as diverse as Brazil, Canada, Indonesia, Japan, Mexico, and South Korea.



**Figure 1. Global CFL Sales vs. Chinese Production**

The current climate of CFL production and distribution creates two problems, both of which the CFL Harmonisation Initiative aims to tackle. First, large quantities of poor-quality CFLs are still being sold in economies that either import CFLs or manufacture their own. This is largely due to the fact that there exists no international quality mark<sup>1</sup>, or minimum level of quality for CFL production. Moreover, each economy sets different criteria for testing and rating CFL quality, or else have no arrangements for CFL testing and standards at all. This leaves consumers in many economies without any clear guidance on how to distinguish between adequate or high-quality CFLs and poor-quality CFLs when they make their CFL purchase. Without a commonly accepted set of quality guidelines (or product labelling), consumers are typically attracted to cheaper, lower-quality products.

Second, CFLs are increasingly manufactured in a centralized location but regulated by no centralized or common set of technical standards. Though nearly all CFLs are produced in China, each economy maintains a distinct set of test procedures, specification levels, and minimum energy performance standards, if any. And many economies maintain neither the technical standards nor the method and means of testing CFLs. In short, there is a lack of a common approach to testing, regulating, and labelling this globalised product.

Each manufacturer or supplier must test each shipment of CFLs to meet the technical specifications and standards of the importing economy. The manufacturer or supplier is therefore required to perform a multitude of tests, and this adds to the total cost of producing and delivering the product to the end user. This duplication has two negative effects: it makes it difficult to distinguish whether products meet a common standard of quality; and it ultimately places upward pressure on the shelf cost of the final product.

This international review assesses the compliance costs for manufacturers and suppliers of CFLs—i.e the costs to perform testing and remain compliant with the CFL specifications in various economies. The report analyzes whether the compliance costs are significant enough that they will be positively affected and reduced by CFL harmonisation. Ultimately, if certification and compliance costs can be reduced, consumers will be delivered a lower-cost, higher-quality CFL.

<sup>1</sup> The Efficient Lighting Initiative (ELI, [www.efficientlighting.net](http://www.efficientlighting.net)) has a certification scheme for high-quality CFLs, and this is being used by a number of countries; however, there is no international agreement on a common set of minimum specifications or arrangements for testing and certifying CFLs that meet a minimum quality standard.

## 2. METHODOLOGY

### LIST OF ECONOMY TEAMS

Danish Energy Management (DEM) assembled a team of national consultants in the seven economies listed in Table 1.

**Table 1. Overview of the Economy Teams**

Economy	Role	Consultant
<b>All</b>	Overall coordination and analysis	Danish Energy Management A/S
<b>Australia</b>	Data collection	Mark Ellis & Associates
<b>China</b>	Data collection	Chinese Association of Lighting Industry
<b>India</b>	Data collection	Electric Lamp & Component Manufacturers' Association of India (ELCOMA)
<b>Indonesia</b>	Data collection	PT Pelangi Energi Abadi Citra Enviro
<b>New Zealand</b>	Data collection	Engenius Solutions
<b>Philippines</b>	Data collection	Mr. Alexander Ablaza
<b>Vietnam</b>	Data collection	InvestConsult Group

The national consultants were responsible for collecting and gathering available data in their respective economies and supplying this data to DEM. DEM then carried out the data analyses presented in this report and integrated the data and conclusions across the seven economies.

The consultants gathered data according to a terms of reference (TOR) that can be found in Appendix B. The information includes data on production and market size; information on manufacturers/suppliers such as market shares; import-export statistics; market characterization related to quality of CFLs; CFL standards; CFL testing programs; and manufacturer costs for testing and compliance. The data were collected mainly from available studies, publications, statistics, web sites, and interviews with manufacturers and suppliers.

### OVERVIEW OF GLOBAL CFL STANDARDS

In order to get a global overview, our team reviewed the Global Standards and Labeling Database maintained at [www.apec-esis.org](http://www.apec-esis.org). ESIS, or the Energy Standards Information System, is growing to become a comprehensive global database of energy efficiency standards related to end-use equipment. The global search of ESIS found more than 33 different national standards and labeling schemes for CFLs in place, and four under consideration.

- 9 economies have a MEPS program, and eight of these are mandatory;
- 4 economies are considering MEPS for currently under consideration;
- 24 economies operate a labelling scheme for CFLs, although only three of these are mandatory. The remaining 21 are voluntary, and one more program is currently under consideration.

Table 2 and Table 3 summarize the standards and labeling programs in place or under consideration.

**Table 2. Summary of CFL Standards and Labelling Programs in Place Globally**

Program	Mandatory	Voluntary	Under Consideration	Total
Minimum Standard	8	1	4	13
Labelling	3	21	1	25
<b>Total</b>	11	22	5	38

**Table 3. Summary of CFL Standards and Labelling Programs by Economy**

Economy	Minimum Standard	Labelling	Economy	Minimum Standard	Labelling
Argentina		Yv	New Zealand	U	
Australia	U	Yv	China	Ym	
Brazil	Ym	Ym, Yv	Peru		Yv
Canada	Ym	Yv	Philippines	Ym	Ym
China	Ym	Yv	Poland		Yv
Colombia	Ym		Korea	Ym	Ym, Yv
Czech Republic		Yv	Singapore		Yv
Ghana	Yv	Yv	South Africa		Yv
Hong Kong		Yv	Sri Lanka		Yv
Hungary		Yv	Thailand	U	Yv
Indonesia		Yv	USA	Ym	Yv
Latvia		Yv	Vietnam	U	U
Mexico	Ym	Yv			

Source: <http://www.apec-esis.org/>

Note: Yv = Yes, voluntary; Ym = Yes, mandatory; U = under consideration

### 3. MARKET OVERVIEW

#### OVERVIEW OF DATA COLLECTED

Table 4 gives an overview of the seven study economies and the type of data collected from each economy.

**Table 4. Overview of the Data Collected**

	Data on CFL Market	Data on CFL Standards	Data on CFL Testing	Results of CFL Testing	Survey Of CFL Suppliers
<b>Australia</b>	Yes	Yes	Yes	No	Yes
<b>China</b>	Yes	Yes	No	No	Yes
<b>India</b>	Yes	Yes	Yes	No	Yes
<b>Indonesia</b>	Yes	Yes	Yes	No	Yes
<b>New Zealand</b>	Yes	Yes	Yes	No	No
<b>Philippine</b>	Yes	Yes	Yes	Yes	Yes
<b>Vietnam</b>	Yes	Yes	No	No	Yes

#### MARKET SIZE AND TRENDS IN THE SEVEN ECONOMIES

The production and sale of CFLs in the seven economies surveyed have increased substantially. This is due largely to increased public awareness campaigns; government incentive programs, such as demand-side management (DSM) programs; bulk-purchasing; quality improvement; and a decrease in individual unit costs.

As mentioned earlier, global production has migrated primarily to China. India marks an exception, as it has been working in the past few years to build up its production capacity. Figure 2 shows the approximate production outputs of China and India. While China occupies a full 90% of global production, India soon will have a place at the table. If India holds true to its projected estimates, the number of units produced a year in India will rise from 50 million in 2005 to 172 million in 2009. This growth will cap a 344% increase from 2002. With this increase in production, India hopes to limit its reliance on Chinese imports and to establish larger global market for its CFL exports.

Of the remaining three CFL-manufacturing economies in this study, there exists very little information on their respective production outputs. Two of the primary manufacturers in the Philippines relocated their operations to other economies in the late 1990s. In Indonesia two companies produce under the brand names Luseram, Chiyoda, Focus and Panasonic; however, information on their production outputs were unavailable. CFL production in Vietnam has undergone significant turmoil in the past several years, which effectively has caused production for export to cease; however, a recent national DSM program, with bulk procurement of 1 million units over the past 18 months, has stimulated additional market demand and an increase in domestic CFL sales.

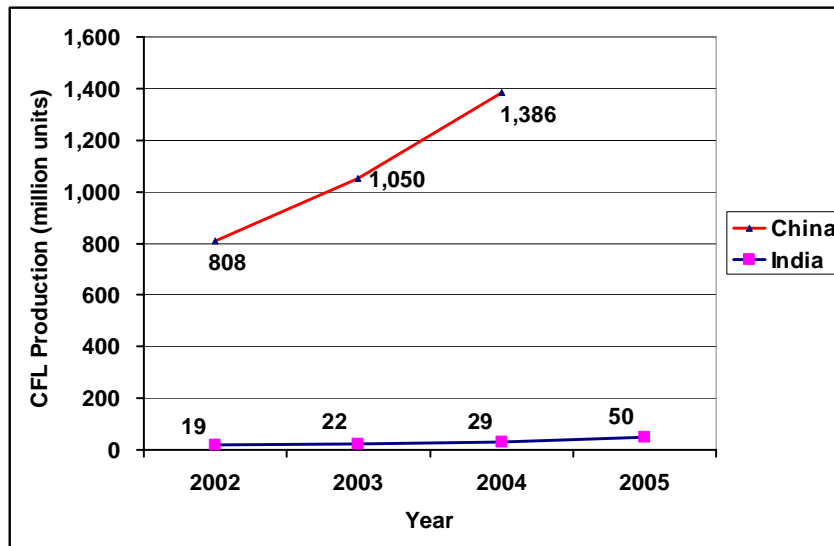


Figure 2. Production of CFLs in China and India

### IMPORT AND EXPORT STATISTICS

As of 2004, the major export markets of Chinese CFLs were the U.S., Brazil and Indonesia. These markets accounted for 17%, 6.7% and 6.7% of the total FOB value, respectively. Figure 3 shows primary export markets from 2002-4, covering about 50% of the total export markets or about US\$ 778 million, an increase of about 42% from 2003. Production costs have fallen, and consequently production has increased in India. As a result India has increased its export of CFLs to foreign markets. Its primary export markets are USA and Europe. India's total export volume was 4.2 million units in 2002, and by 2003 this number had reached 7.3 million.

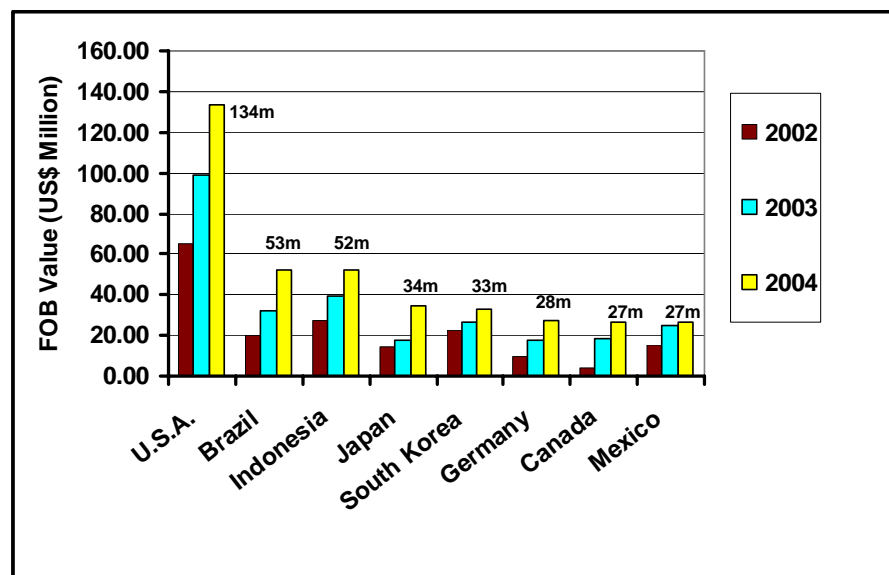
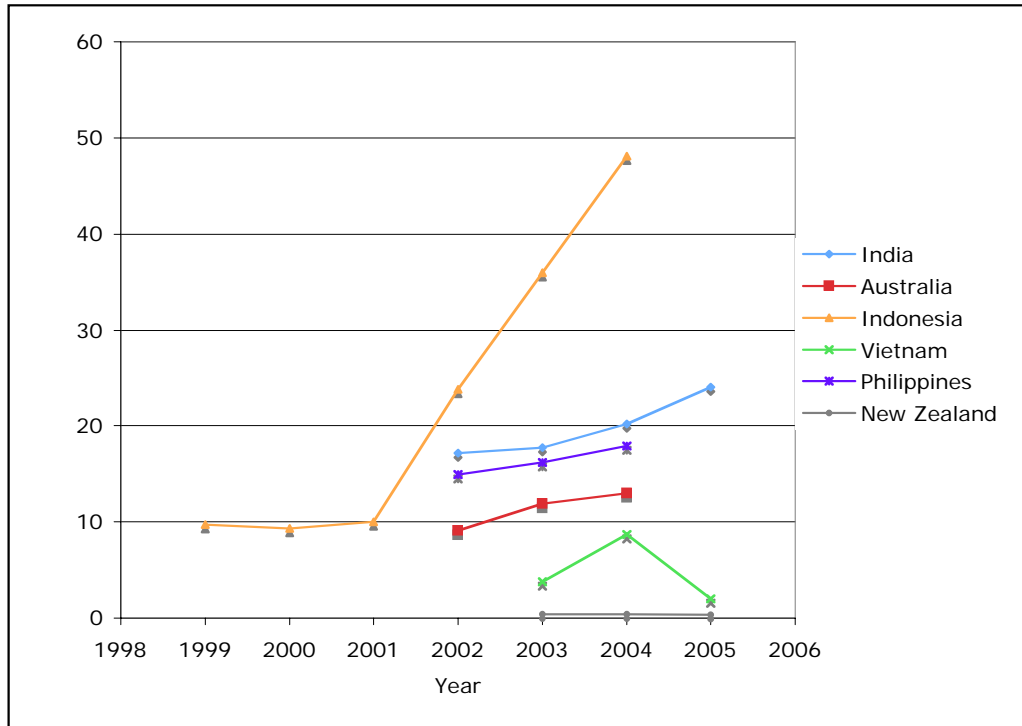


Figure 3. Primary Export Markets of Chinese CFLs. (Source: CALI)

All of the surveyed economies import CFLs mainly from China, but also India and various other Asian and EU economies (e.g., India, Japan, Korea, Germany, and Italy). Figure 4 shows import statistics for the six other economies, besides China.



**Figure 4. Import Statistics of Six Economies**

Figure 4 shows that Australia, India, and the Philippines have maintained fairly regular growth through the periods for which there are data available. And Indonesia has seen a quantum increase in the growth of CFL sales since 2001. However, the data for Vietnam are markedly different: after a peak in 2004, imports to Vietnam dramatically decreased. This anomaly is due to trade restrictions on CFLs promulgated by the European Commission (EC). The EC launched an investigation into the suspect export practices of Chinese CFL manufacturers at the request of the Lighting Industry and Trade in Europe (LITE.) LITE became suspicious that various Chinese manufacturers were circumventing anti-dumping measures by exporting CFLs bound for the EU via Vietnam or even assembling them in Vietnam. These CFL received a Certificate of Origin label from Vietnam, and China benefited from Vietnam’s favorable duty preferences. As a consequence of the investigation, several Vietnamese manufacturers and suppliers either curtailed production or shut down completely.

Figure 4 also seemingly shows that New Zealand imported an average of 370,000 CFL units per year, far fewer than the other 5 economies. Yet, there is an explanation for this as well. It is very difficult—if not impossible—to track New Zealand’s CFL imports, as they are tracked statistically in a larger category: “Lamps; discharge, fluorescent, hot cathode.” Thus, the numbers shown for New Zealand are the best approximations available.

It is also of interest to compare the average cost of CFLs in various markets. In order to approximate average CFL costs, we divided the total import (CIF, or cargo in freight) value of CFLs by the number of CFL lamps imported into the economy. While the average gross CFL values are broadly similar -- in the range of US\$ 1.20 to 1.50 per CFL -- the unit values in Indonesia appear to be substantially lower. One explanation for this may be a lack of mandatory standards for CFL quality or minimum efficiency (Indonesia has only a voluntary labelling program).

**Table 5. Average Gross Unit Value Per CFL**

Economy	Average Gross Unit Value per CFL <sup>a</sup>						
	1999	2000	2001	2002	2003	2004	2005
Australia				\$1.29	\$1.32	\$1.31	
Indonesia	\$.53	\$1.10	\$1.40	\$.89	\$.59	\$.57	
New Zealand					\$1.03	\$1.26	\$1.53
Philippines				\$1.59	\$1.47	\$1.37	

<sup>a</sup> Total import (CIF, or cargo in freight) value of CFLs divided by the number of CFL lamps imported into the economy.

#### MANUFACTURERS/SUPPLIERS AND MARKET SHARE

China has eight major manufacturers that account for about 30% of the economy's total CFL production. India has five major, and three slightly smaller, manufacturers. India's present production capacity is now more than 50 million units per year, and this number is projected to increase to 172 million units per year by 2009. Table 6 lists the market shares in each economy for three largest manufacturers—Philips, GE and Osram. Their market shares are compared where possible against the rest of the CFL suppliers in each economy.

**Table 6. CFL Brands and Market Share**

	Australia	China	India	Indonesia	New Zealand	Philippines	Vietnam
Philips	60% <sup>a</sup>	9 manufacturers account for 50% of sales <sup>b</sup>	30%	30%	NA	36%	16%
GE			4.5%		NA	24%	0.6%
Osram			16%	6%	NA	8%	1.1%
Other	40%		51%	44%	NA	32%	83%
<b>Total</b>	100%	100%	100%	100%	100%	100%	100%

#### Notes:

- a. 60% figure also includes Sylvania
- b. Based on data from China Association of Lighting Industry (CALI)
- c. NA=not available

#### SALES CHANNELS

Table 7 presents the various sales channels through which CFLs are distributed and sold to consumers. The typical CFL distribution channel follows this model: manufacturers and importers → wholesalers and/or distributors → end user. In spite of this generalized pattern, there are several permutations adopted by the seven economies. The market share of each sales channel is determined largely by the factors particular to each individual market.

**Table 7. Domestic Sales Channels for CFLs**

Economy	Sales Channels from Manufacturers/Importers	Market Share (%)
Australia	1. Wholesalers and distributors to large end users	20
	2. Retailers to small end users	60
	3. Direct sales from importers to large end users	20

<b>Economy</b>	<b>Sales Channels from Manufacturers/Importers</b>	<b>Market Share (%)</b>
	and energy utilities	
<b>China</b>	1. Supermarket to end user 2. Wholesalers and distributors to end users 3. Direct to engineering users	NA
<b>India</b>	NA	NA
<b>Indonesia</b>	1. Electronics store 2. Informal shops 3. Supermarket 4. Hypermarket 5. Haberdashery shop 6. Mini-market 7. Agent in traditional market 8. Modern grocery 9. Street vendor	35 18 12 11 8.5 7 4.5 2.5 3
<b>New Zealand</b>	1. Electrical wholesalers 2. Retail grocery chains 3. Lighting specialist retailers	NA
<b>Philippines</b>	1. Pre-qualified territorial distributors 2. Wholesalers 3. Registered retailers 4. Project end users 5. Energy service companies (ESCOs)	NA
<b>Vietnam</b>	1. Manufacturers and importers 2. Official distributors and company branches 3. Provincial distributors 4. District distributors 5. Retailers 6. End users	NA

**Note:** NA=not available

## MARKET CHARACTERIZATION

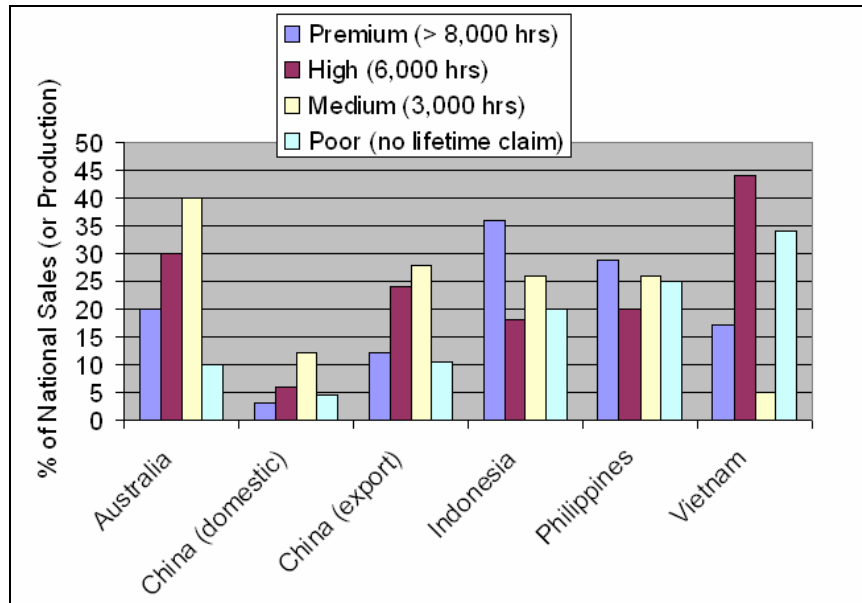
Particularly in the developing world, a substantial share of the vast number of CFLs manufactured and sold are of poor quality. The phenomenon can be seen at street stalls in developing countries of Asia, where non-branded CFLs can often be found selling for 50-60 US cents per lamp.

Meanwhile, few economies collect or publish detailed data on the quality and performance of CFLs sold in their domestic markets. Therefore, there exists no gauge by which to measure the proportion of poor quality products in any given market. Those economies that have no minimum quality or performance standards in place further exacerbate the problem by allowing these mediocre products to be traded freely.

In order to understand the extent of the “low-quality” CFL problem, we wanted to make informed estimates of the market share in each country comprised by models that are of inferior quality, with low lifetimes, and not made to international standards. In the absence of comprehensive market test data, we decided to use rated lifetime as a very approximate proxy for the quality of CFLs sold in a market. The four levels of “quality” in our rating are as follows:

- Premium Quality: 8,000+ lifetime hours;
- High Quality: 6,000+ lifetime hours;
- Medium Quality: 3,000+ lifetime hours;
- Poor Quality: non-branded, no claimed lifetime.

Although these proxy indicators are clearly imperfect, we felt that the lack of any brand name and lifetime claim would be a reasonable proxy for poor quality CFLs, since this is a problem plaguing many developing economies. Each of the National Consultants was asked to obtain estimates of market share for the four quality levels, based on market surveys and interviews with domestic suppliers. The market shares of poor quality CFLs were quite substantial – ranging from 15% to as high as an estimated 34% of CFLs sold in the market (see Figure 5).



**Figure 5. Characterization of Domestic CFL Sales by Quality**

**Notes:** Characterization based on proxy indicators for quality of CFLs sold. Premium products have an 8,000+ hour lifetime. High-quality products have 6,000 hour lifetime. Medium-quality products have a 3,000 hour lifetime. Poor-quality products are non-branded and have no claimed lifetime. Philippines data is based on test results from a sample of 296 lamps tested by the government lighting laboratory. For China, the data are divided into CFLs produced for the domestic market and for export. All other data are based on surveys and interviews by National Consultants.

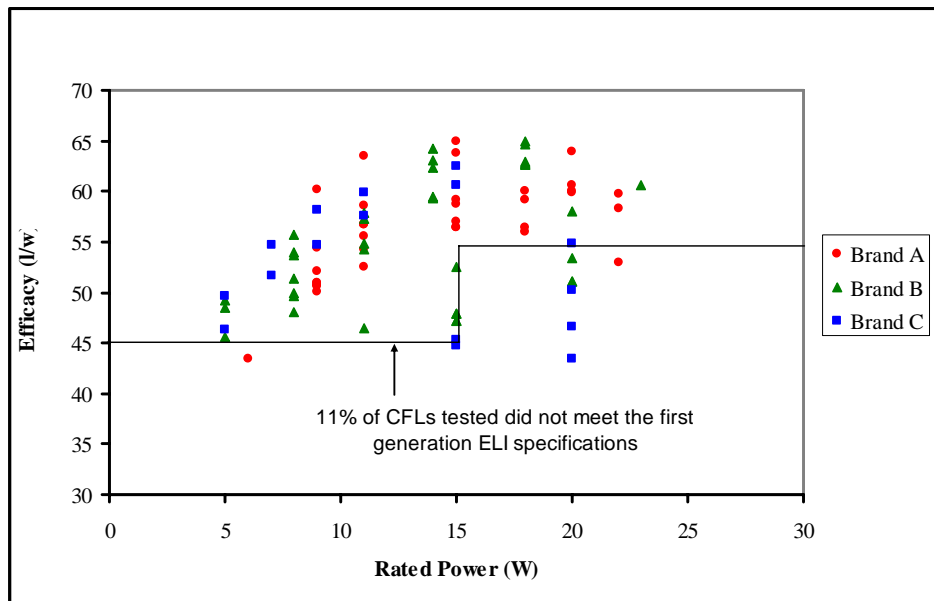
The percentages representing the data from the Philippines are numbers calculated by the Philippines Department of Energy (DOE), which ran tests on each CFL available on the market. Maintaining a national set of properly tested data allows government officials to benchmark the performance of CFLs in their economy against accepted regional, national and international thresholds. Additionally, it adds to a common set of data by which other governments can benchmark their CFL performance.

The Philippines DOE performed a lumen-maintenance test for 323 CFL models covering 27 brands during 2004 and 2005. The lumen-maintenance test determines whether a CFL can maintain 80% of its initial lumen output after 2,000 hours. As of September 2005, 296 of the 323 models had completed the test. The data for the Philippines in Figure 5 are drawn from these tests, and the table shows the percentage of models that fall into each quality category.

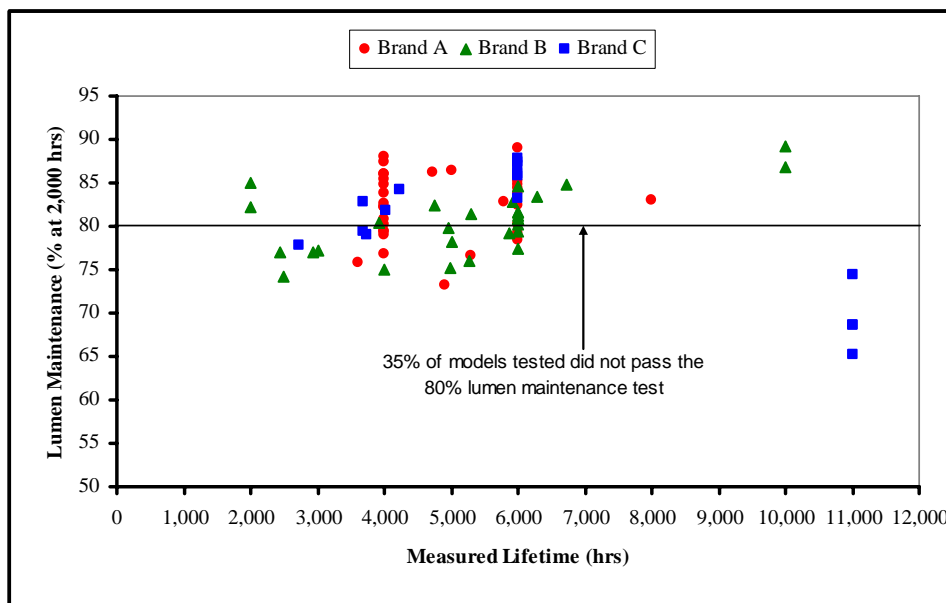
Figure 6 shows a scatter plot of three brands from the test comparing rated power (W) and efficacy (lumen/w). The plot shows that about 11% of the lamps tested—10 of 89—would not meet a voluntary international specification CFL quality.<sup>2</sup>

<sup>2</sup> The benchmark specification is the first generation specification for CFLs of the Efficient Lighting Initiative (ELI), which was effective through the end of 2005. ELI specifications are an important reference guideline in the Philippines, since the Philippines participated in the ELI program during its initial phase, and Philippines suppliers are aware of, and for the most part support, the ELI specifications. More information about ELI can be found at [www.efficientlighting.net](http://www.efficientlighting.net).

Figure 7 shows a scatter plot of the same three brands plotted on a scale of measured lifetime vs. lumen maintenance score. More than one-third (35%) of the lamps tested failed to meet the 80% lumen maintenance test at 2,000 hours.



**Figure 6. Rated Power vs. Efficacy for Philippines CFLs**  
(Source: Philippines Department of Energy)



**Figure 7. Measured Lifetime vs. Lumen Maintenance for Philippines CFLs.**  
(Source: Philippines Department of Energy)

## 4. REVIEW OF CFL STANDARDS

### **Testing Protocol of CFLs**

Six of the seven economies in this study use a national testing protocol for CFLs. Vietnam alone has no national testing protocol, but it maintains a generally applied standard for electrical lamps. Each of these economies bases its national standard on the same reference standards—IEC 60968 and IEC 60969. Five economies have imposed IEC 60968, the safety requirement standard for CFLs, as a mandatory standard, while India and Vietnam employ it as a voluntary standard. Only the Philippines utilizes IEC 60969, the performance requirement standard, as a mandatory standard. Five economies employ this standard as a voluntary measure, and Indonesia has no program in place. Indonesia, though, does require additional testing: a Goods Registration Number (NPB) for imported products and Batch Compliance Testing. New Zealand as well uses another standard, AS/NZS CISPR 15: 2002, to test for the Limits and Methods of Measurement of Radio Disturbance Characteristics of Electrical Lighting and Smaller Equipment.

### **Safety and Basic Product Quality Standard of CFLs**

Six economies employ a safety requirement standard, all of which use IEC 60968 as a reference standard. Vietnam has no specific safety standard. This standard is mandatory in five of these six economies and voluntary in India. Four economies employ a performance requirement standard, all of which use IEC 69069 as a reference standard. In each of these four economies, the program is voluntary. Indonesia, the Philippines and Vietnam either have no specific safety standard or have provided no information. Additionally, both Indonesia and New Zealand require further testing. Indonesia requires an SNI Marking Certificate for both domestic and imported CFLs. New Zealand requires its AS/NZS CISPR 15: 2002 test standard.

### **Minimum Energy Performance Standard (MEPS)**

Of the seven economies studied, only the Philippines has a stringent, mandatory MEPS program in place. China also has a mandatory MEPS program, but it only establishes limits for values of energy efficiency and a rating criteria for self-ballasted lamps. Three economies are in the process of developing a minimum standard for CFLs. Vietnam has a program under consideration, while Australia and New Zealand are developing their respective programs in unison to be based on the Chinese model and to be harmonised with the International CFL Harmonisation Initiative.

### **Energy Labelling**

Only the Philippines has a mandatory labelling program. Four economies employ voluntary labelling programs. Both China, India and Australia have voluntary programs, while Indonesia uses a comparative labelling program that tracks the energy efficiency of home electrical appliances or efficacy of CFLs. Additionally, Australia, as well as India, is developing its labelling program further to harmonise with the International CFL Harmonisation Initiative. Neither Vietnam nor New Zealand have implemented a CFL labelling system.

Table 8 summarizes the status of CFL testing protocols; safety and basic product quality specifications; minimum energy performance standards (MEPS); and energy labelling standards in the seven study economies.

**Table 8. Summary of CFL Testing Standards in 7 Economies**

	<b>CFL Test Protocol</b>	<b>Safety and Basic Quality Standard</b>	<b>Minimum Energy Performance Standard</b>	<b>Energy Label</b>
<b>Australia</b>	Yes	Yes	No	No
	Mandatory	Mandatory	Program under development	Program under development
<b>China</b>	Yes	Yes	Yes	Yes
	Mandatory	Mandatory	Multi-tiered mandatory and voluntary program <sup>a</sup>	Voluntary
<b>India</b>	Yes	Yes	Yes	No
	Voluntary <sup>b</sup>	Voluntary <sup>b</sup>	Voluntary <sup>b</sup>	Labelling program under development
<b>Indonesia</b>	No	Yes	No	Yes
		Mandatory		Voluntary
<b>New Zealand</b>	Yes	Yes	No	No
	Mandatory	Mandatory	Under development	
<b>Philippines</b>	Yes	Yes	Yes	Yes
	Mandatory	Mandatory	Mandatory	Mandatory
<b>Vietnam</b>	No	No	No	No

**Note:**

- a. Has mandatory and voluntary elements
- b. Mandatory beginning in 2007

## 5. REVIEW OF CFL TESTING PROGRAMS

Table 9 summarizes information on CFL testing programs in the seven economies, including information on the agency responsible for CFL testing; the purpose of CFL testing; test laboratories participating in the testing; the period of CFL testing; the number of CFL models tested; the number of CFL suppliers; and the test results.

Currently there exists no systematic or harmonised test procedure for CFLs. Although most economies use a variation of the two IEC standards for performance and safety, even these permutations can vary significantly. Furthermore, many of the economies that have in place, or who are designing, CFL programs are not using a quality test procedure as the basis for the program. Without testing, it is impossible to distinguish between products, aside from brand recognition, and consumers cannot separate a good quality from a poor quality CFL. Additionally, a lack of testing then makes it difficult for policymakers and regulators to certify and track product quality in the market.

**Table 9. Summary of CFL Testing Programs in 7 Economies**

<b>Economy</b>	<b>Agency Responsible for CFL Testing</b>	<b>Purpose of CFL Testing</b>	<b>Test Laboratories Participating in the Test</b>	<b>Period of CFL Testing</b>	<b>Number of CFL Models Tested and Number of CFL Suppliers</b>	<b>Results of Testing</b>
<b>Australia</b>	Australian Greenhouse Office	To analyze mercury content in a sample of widely available CFLs	Advanced Analytical Australia	March 2005	14 CFL models and 5 suppliers	Mercury content ranged from 1.5-44.0 mg/lamp for 14 samples
<b>China</b>	NA	NA	NA	NA	NA	NA
<b>India</b>	Accredited CFL test laboratories	Certification by the Bureau of Indian Standards (BIS) for energy labelling by the Bureau of Energy Efficiency (BEE)	Four laboratories (ERDA, CPRI, CETL and NPL)		One size CFL (15W) from 14 suppliers	BIS standards for CFLs are voluntary at present. Will become mandatory in 2007.
<b>Indonesia</b>	NA	To issue the SNI 04.6504. 2001 certificate of imported CFL products	Four certified laboratories	NA	NA	NA
<b>New Zealand</b>	The only agencies are for specific research purposes	Only for a specific research purpose	Ten qualified testing stations	The Consumers' Institute has recently tested several brands.	A number of 20-watt lamps were purchased for testing. <sup>a</sup>	NA

<b>Economy</b>	<b>Agency Responsible for CFL Testing</b>	<b>Purpose of CFL Testing</b>	<b>Test Laboratories Participating in the Test</b>	<b>Period of CFL Testing</b>	<b>Number of CFL Models Tested and Number of CFL Suppliers</b>	<b>Results of Testing</b>
<b>Philippines</b>	Lighting and Appliance Testing Laboratory (LATL) of the Bureau of Product Standards (BPS)	Assess compliance with PNS specifications for product safety, quality, energy performance <sup>b</sup>	BPS Testing Center tests CFL for product safety and quality. LATL measures energy performance.	Ongoing, as CFL testing is mandatory for CFLs sold in the Philippines.	Total of 323 CFL models and total 27 CFL suppliers	See Annex with Philippines market report
<b>Vietnam</b>	NA	NA	NA	NA	NA	NA

**Notes:**

- a. These lamps were purchased from 23 outlets in Auckland, Wellington and Christchurch. They ranged in price from US\$ 2.80 to 10.50.
- b. Also, to verify manufacturer claims on input power, light output, efficacy and average life.
- c. NA=not available

## 6. SURVEY OF MANUFACTURER TESTING AND COMPLIANCE COSTS

The National Consultants interviewed 27 manufacturers in the seven economies to learn about testing and compliance costs. The objective was to understand the potential benefits of an international initiative to harmonise test procedures and technical specification for CFLs. The interviews were conducted using the questionnaire attached in Appendix C.

Nearly two-thirds of the companies surveyed were aware of the CFL Harmonisation Initiative, and 93% indicated that they support the objectives of the initiative.

Table 10 shows the manufacturers' rankings of how their production costs would be affected if there were a single, harmonised international test procedure for CFLs. The responses clearly indicate that suppliers view the certification and compliance costs as significant:

- 16 of 23 suppliers reported that a harmonised CFL test procedure would result in *at least* a substantial reduction in compliance costs.
- those suppliers that expected no reduction operate in an economy (Vietnam) that enforces no testing or certification regulations for CFLs. Thus, the introduction of a harmonised test procedure –and certification process -- would *add* to their operational costs. These results in no way point to a shortcoming of CFL harmonisation, but rather to an existing absence of a quality certification process.

**Table 10. Scale of Cost Reduction**

	Reduction in testing and compliance costs (No. of respondents)				
	1	2	3	4	5
	No reduction	Small reduction	Substantial reduction	Large reduction	Very large reduction
For domestic CFL sales	3 <sup>a</sup>	2	2		2
For export sales of CFLs		1	4	1	
For registration for energy-efficiency standards and labelling programs		1	5	1	1

- a. Suppliers that reported no reduction in compliance costs are not required by economy regulations to test or certify CFLs. For these suppliers CFL Harmonisation would add to their costs of compliance.

Table 11 shows supplier estimates of annual compliance costs for their CFL operations – both in US\$, and as a percentage of their production costs. Suppliers reported that these costs range as high as a few percent of production costs for domestic sales, and an even greater percentage for exports. Manufacturers and suppliers indicated that they support the aims of the International CFL Harmonisation Initiative because a harmonised test procedure virtually eliminates excessive certification costs, thereby bolstering a supplier's bottom line and translating into increased sales. Although the absolute compliance costs for each supplier listed in the table below are not prohibitive in and of themselves, they represent the cost *to only a single supplier*. When these costs are multiplied across the full range of CFL suppliers across the world, they accumulate to tens of millions of dollars a year in unnecessary retesting and certification costs. In China alone, where the vast majority of the world's CFLs are produced, there are more than 150 suppliers. Each of these will see marked reductions in compliance costs of the scale shown below.

**Table 11. Summary of Survey on Manufacturer Testing and Compliance Costs**  
 (Note that the compliance costs shown are per single supplier and the total costs will be many times higher in each economy.)

Economy	Estimated Compliance Costs <u>per Supplier</u>	
	Approximate Annual Costs	Costs as % of Production Costs
<b>Australia</b>	USD\$3,000-5,000	Up to 1%
<b>China</b>	USD\$20,000-50,000 (domestic)	0.2-11.2%
	USD\$50,000-150,000 (export)	0.2-4.4%
<b>India</b>	USD\$30,000-60,000 (domestic)	Up to 1%
	USD\$25,000-60,000 (import)	Up to 1%
<b>Indonesia</b>	Not available	Not available
<b>Philippines</b>	USD\$10,000-92,000 (domestic)	1.2-2.0%
	USD\$25,000 (export)	Not available
<b>Vietnam</b>	Not available	Not available

## 7. CONCLUSIONS

### Problems in the CFL Market

The current climate of CFL production and distribution creates two problems, both of which the International CFL Harmonisation Initiative aims to tackle:

- *First, an abundance of poor-quality CFLs are entering the markets of economies either importing CFLs or manufacturing their own.* This is largely due to the fact that there exists no international quality mark, or minimum level of quality, for CFL lamps. Moreover, each economy maintains largely different standards of expected quality, or no standard at all. This proves to be problematic, as it leaves consumers to distinguish between products with no set of guidelines on which to base their CFL purchase. Without any universal quality guidelines, the consumer is attracted to cheaper, lower-quality products.
- *Second, CFLs are increasingly manufactured in a centralized location but regulated by no centralized or common set of standards.* Although nearly all CFLs are produced in China, each economy maintains different test procedures, specification levels, and minimum energy performance standards, if any at all. And many economies have in place neither the technical standards nor the method and means of testing CFL quality. In short, there is a lack of a common approach to regulating and certifying the quality of this globalised product.

### Proliferation of National Standards

A global search found more than 33 different national standards and labeling schemes for CFLs in place, and four under consideration.

- 9 economies have a MEPS program, and eight of these are mandatory;
- 4 economies are considering MEPS for currently under consideration; and
- 24 economies operate a labelling scheme for CFLs, although only three of these are mandatory. The remaining 21 are voluntary, and one more program is currently under consideration.

### Comparison of CFL Quality across Economies

In order to understand the extent of the “low-quality” CFL problem, we estimated the market share in each country comprised by models that are of inferior quality, with low lifetimes, and not made to international standards. Each of the National Consultants was asked to obtain estimates of market share for four different quality levels, based on market surveys and interviews with domestic suppliers. The market shares of poor quality CFLs were quite substantial – ranging from 15% to as high as an estimated 34% of CFLs sold in the market.

### Lack of a Harmonised Test Procedure

Currently there exists no systematic or harmonised test procedure for CFLs. Although most economies use a variation of the two IEC standards for performance and safety, even these permutations can vary significantly. Furthermore, many of the economies that have in place, or are planning, CFL programs are not using a quality test procedure as the basis for the program. Without testing, it is impossible to distinguish between products, aside from brand recognition, and consumers cannot separate a good quality from a poor quality CFL. Additionally, a lack of testing then makes it difficult for policymakers and regulators to certify and track product quality in the market.

### Minimum Energy Performance Standard (MEPS)

Of the seven economies studied, only the Philippines has a stringent, mandatory MEPS program in place. China also has a mandatory MEPS program, but it only establishes limits for values of energy efficiency and a rating criteria for self-ballasted lamps. Three economies are in the process of developing a minimum standard for CFLs. Vietnam has a program under consideration, while Australia and New Zealand are developing their respective programs in unison to be based on the Chinese model and to be harmonised with the International CFL Harmonisation Initiative.

### **Energy Labelling**

Only the Philippines has a mandatory labelling program. Four economies employ voluntary labelling programs. Both China, India, and Australia have voluntary programs, while Indonesia uses a comparative labelling program that tracks the energy efficiency of home electrical appliances or efficacy of CFLs. Additionally, Australia, as well as India, is developing its labelling program further to harmonise with the International CFL Harmonisation Initiative. Neither Vietnam nor New Zealand have implemented a CFL labelling scheme.

### **Benefits of a CFL Harmonisation**

The responses clearly indicate that suppliers view the certification and compliance costs as significant: 16 of 23 suppliers reported that a harmonised CFL test procedure would result in *at least* a substantial reduction in compliance costs. Suppliers also reported that testing and compliance costs range as high as a few percent of production costs for domestic sales, and an even greater percentage for exports. Although the absolute compliance costs for each supplier are not prohibitive in and of themselves, they represent the cost *to only a single supplier*. When these costs are multiplied across the full range of CFL suppliers across the world, the costs accumulate to tens of millions of dollars a year in unnecessary retesting and certification costs.

## APPENDIX A: LIST OF INTERVIEWS

### Australia

- In October 2005, surveys and telephone interviews were conducted with the five following Australia lamp importers: Philips, GE Lighting, Osram, Sylvania Lighting Australia and Nelson Lamps Australia.

### China

- Xiamen TopStar Lighting Ltd.
- Tospo lighting Ltd.
- Bright Star Light & Electricity CO., Ltd.
- Zhejiang Yankon group Ltd.

### India

- Havells India Limited
- Indo Asian Fusegear Ltd.

### Indonesia

- PT Osram Indonesia
- PT Gunawan Elektrindo
- Chairman of the Indonesian Electrical Lighting Industry Association
- Center for Standardization and Accreditation

### Philippines

- Philips Electronics and Lighting Inc.
- GE Lighting Philippines, Inc.
- Osram Philippines Ltd Corp
- Gartim Lighting
- Yatai International Corp

### Vietnam

- Directorate for Standards and quality
- Lighting Department- Institute of Labor Protection Science and Technology
- Military Measurement Centre
- Rang Dong Lamps and Thermos Joint Stock Company
- Dien Quang Lighting Joint Stock Company
- Philips Vietnam
- Osram Representative Office in Vietnam
- GE Representative Office in Vietnam
- Phuoc Thanh Company
- Hong Phuc Electronic Equipment and Lighting Company
- Viet Hung Company

## APPENDIX B: TERMS OF REFERENCE

### Terms of Reference

#### International CFL Review: Market Comparison of 7 Asia-Pacific Economies

5 September 2005

##### 1) Introduction

Danish Energy Management A/S (DEM), an international consulting firm, with an Asia Regional Office in Bangkok, is carrying out an International CFL Market Review to support the International CFL Harmonisation Initiative ([www.apec-esis.org/cfl](http://www.apec-esis.org/cfl)). This initiative, which was launched in May 2005, has already gained the support of more than 22 international governments, private-sector companies, and non-governmental organizations worldwide. The purpose of the CFL Harmonisation Initiative is:

- To create a uniform international testing method, covering the performance features of self-ballasted CFLs, suitable for submission to national and international standard bodies to measure CFL performance;
- To identify a number of performance specifications for self ballasted CFLs to facilitate testing comparisons and possible rationalisation of CFL performance requirements;
- To propose these initiatives to the wider international lighting community; and to implement them within a three-year time frame (by mid-2008).

In support of this CFL Harmonisation Initiative, DEM is carrying out an **International CFL Market Review in 7 Asia-Pacific Economies**. The CFL market review will support the overall goals of the global CFL Harmonisation Initiative by collecting and analyzing market data on CFLs from 7 economies: Australia, China, India, Indonesia, New Zealand, the Philippines, and Vietnam.

##### 2) Objectives

The primary objectives of this international CFL market review study are to:

3. Gather and compare CFL market information from 7 economies in Asia-Pacific in order to analyze and understand key market issues and trends related to the regulation, trade, and quality of CFLs
4. Conduct a manufacturer survey on testing and compliance costs for CFLs

##### 3) Data Collection

Sub-contracted national consultants (one for each economy) shall gather data of CFLs according to the following tasks:

###### 3.1) Task 1- Market Overview

Market overviews shall be carried out through a review of available market studies, statistics, analyses, and reports (including the Proceedings of Right Light 6); interviews and surveys of the major manufactures, importers and suppliers of CFLs (at least the 5 largest); collect available import and export statistics.

This will result in 5-8 pages overview of CFLs market in the economy. The overview shall include the following information:

- 1.1. **Market size.** Production of CFLs (number of units sold and value) in the past 3 years, and approximate increase in annual sale;
- 1.2. **Manufacturers and suppliers.** Total number of manufacturers, importers, and suppliers;
- 1.3. **Market share.** Market share of the largest manufacturers (brands), covering at least 75% of the total market;
- 1.4. **Sales channels.** Primary sale channels (i.e. bulk purchases, project sales, consumer sales, and distribution mechanisms, etc);
- 1.5. **Market characterization.** Based on the following criteria, and interviews with key manufacturers and experts, an approximate breakdown of the CFL market.

Approx. % of Production		Market category	Description of market category
Domestic	Export		
		International brands	Well-known name brands, such as Osram, Philips, National/Panasonic, GE, etc.
		High-quality	<ul style="list-style-type: none"> <li>• Not well-known name brands</li> <li>• ≥ 6,000 hour lifetime</li> <li>• evidence of testing and/or quality registration</li> </ul>
		Medium quality	<ul style="list-style-type: none"> <li>• Not well-known name brands</li> <li>• ≥ 3,000 hour lifetime</li> <li>• evidence of testing and/or quality registration</li> </ul>
		Poor quality	<ul style="list-style-type: none"> <li>• Not well-known name brands</li> <li>• No claimed lifetime</li> <li>• No evidence of testing and/or quality registration</li> <li>• Typically &lt; US\$1 in the market</li> </ul>

- 1.6. **Import-Export Data.** Primary export markets and import sources (number of units and values), covering at least 75% of export markets and import sources (use attached **CFL Import-Export Data Form** provided by DEM);

### 3.2) Task 2 – Review of CFL Standards

Review and describe the requirements relating to the sale of CFLs in the economy:

Regulation	Information	Comments
Testing Protocol	<ul style="list-style-type: none"> <li>• Name and number of national testing standard</li> <li>• Name and number international reference testing standard (e.g., IEC)</li> <li>• Responsible agency(ies) (e.g., national standards)</li> </ul>	<ul style="list-style-type: none"> <li>• Voluntary or mandatory?</li> </ul>

	authority) <ul style="list-style-type: none"> <li>List of accredited CFL test laboratories in the economy</li> </ul>	
Standards for safety and basic product quality	<ul style="list-style-type: none"> <li>Name and number of national standard</li> <li>Name and number of international reference standard (e.g., IEC)</li> <li>Responsible agency(ies) (as above)</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary or mandatory?</li> <li>Any standards existing or under development.</li> </ul>
Minimum energy performance standard (MEPS)	<ul style="list-style-type: none"> <li>List of specific performance specifications and criteria</li> <li>Responsible agency</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary or mandatory?</li> <li>Any standards existing or under development.</li> </ul>
Energy Labelling	<ul style="list-style-type: none"> <li>Description of labelling program and performance steps/thresholds on label</li> <li>Responsible agency</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary or mandatory?</li> <li>Endorsement, comparison, or both?</li> <li>Any standards existing or under development.</li> </ul>

As a start, the Consultant should review the information in the Global Energy Standards and Labelling Database ([www.apec-esis.org](http://www.apec-esis.org)), which maintains a database of testing and efficiency standards. However, the Consultant should review and provide the most up-to-date information from its own in-economy contacts and knowledge.

This review should also provide background information on the development of CFL MEPS and labelling programs in the economy as well as anticipated future development.

### 3.3) Task 3 - Review CFL Testing Programs

Describe any testing programs that have been carried on CFLs, and review results available of test databases. Information should include:

- Agency responsible for CFL testing
- Purpose of CFL testing
- Test laboratories participating in the testing
- Period of CFL testing (dates and duration, or if ongoing)
- Number of CFL models tested and number of CFL suppliers
- Results of testing:
  - ⇒ Summary text description of main results and outcomes, with regard to CFL quality and energy performance
  - ⇒ Data table, if available, from test results, showing brand and manufacturer name (if available), model number if available), range of voltage used, type of integrated ballast (magnetic or electronic), luminous flux (lumens), rated power consumption (watts), efficacy (lumen/watt), lifetime (hours), power factor, etc.
  - ⇒ If available, data from test results shall be entered into the **CFL Test Data Form** provided by DEM.
  - ⇒ Note that the test data will be made publicly available, in a blind format. This means that we will not disclose the manufacturer or brand names of any of the products. on brand name will be made publicly available

### 3.4) Task 4 –Survey on Manufacturer Testing and Compliance Costs

Consultant shall carry out survey of manufacturers/suppliers to understand the costs for testing and certifying their CFL lamps for sale in economy, and for export. This survey will be combined with surveys done in the other 7 target economies in order to understand the benefits of an international initiative to harmonise test procedures and technical specifications for CFLs (see [www.apec-esis.org/cfl](http://www.apec-esis.org/cfl)).

The **Survey Questionnaire on Manufacturer Testing and Compliance Costs** is attached to these Terms of Reference.

#### 4) Timing

The time schedule for task 1-3 is as follows:

Deliverable	Deadline	Responsible
Draft report of Task 1-4	7 October 2005	Consultant
Comments on report	14 October 2005	DEM
Final report	21 October 2005	Consultant

#### 5) Reporting

The report will consist of the following sections:

- CFL market overview (Task 1)
- review of CFL standards (Task 2)
- review of CFL testing programs (Task 3)
- results of Survey of Manufacturer Testing and Compliance Costs (Task 4)

DEM will comment on the draft report, and the consultant shall incorporate the comments in the final report.

The report and supporting documentation shall be in English.

*All reporting and spreadsheets* will be submitted electronically in the attached MS Word template (**CFL Report Template**) provided by DEM.

#### 6) Attachments

- **CFL Import-Export Data Form**
- **CFL Test Data Form**
- **Survey Questionnaire for Manufacturers/Suppliers**
- **CFL Report Template**

**Manufacturer and Supplier Survey:  
Testing and Compliance Costs for CFLs**

At the sixth International Conference on Energy Efficient Lighting (*Right Light 6, Shanghai China - 10 May 2005*), more than 80 delegates participated in a special-session debate about compact fluorescent lamps (CFLs). Out of this meeting, an international initiative has begun to work towards international harmonisation of CFL testing and specifications. The purpose of the **CFL Harmonisation Initiative** ([www.apec-esis.org/cfl](http://www.apec-esis.org/cfl)) are:

- To create a uniform international testing method, covering the performance features of self-ballasted CFLs, suitable for submission to national and international standard bodies to measure CFL performance;
- To identify a number of performance specifications for self ballasted CFLs to facilitate testing comparisons and possible rationalisation of CFL performance requirements;
- To propose these initiatives to the wider international lighting community; and to implement them within a three-year time frame (by mid-2008).

In support of this CFL Harmonisation Initiative, we are carrying out the following Manufacturer Survey in economies around the world. The objectives of the survey are:

1. To get feedback from manufacturers on their support for the CFL Harmonisation Initiative, and the perceived benefits of the initiative.
2. To understand the costs for CFL manufacturers of testing and certifying their products for sale in their economy and for export to other economies:
  - In absolute money terms (i.e. U.S. dollars per year, etc.)
  - As a percentage of their production costs (i.e. the % of the cost of producing a CFL)
3. To get estimates from the manufacturers, on the potential monetary benefits (i.e. reduction in costs for testing and compliance) of having a harmonised international test procedure and common performance specifications. (Note: the actual performance levels required would vary by economy, but there would be a limited number of performance thresholds based on the CFL performance test).

The results of this survey will be presented at the next International Workshop on the CFL Harmonisation Initiative, which will be held on 1 November 2005 in Seoul, Korea (<http://www.apec-esis.org/cfl/event1.htm>)

## Survey Questionnaire:

### Manufacturer/Supplier Testing and Compliance Costs for CFLs

#### Background Information

1. Contact Information:

Data on person responding to Survey	
Name	
Title	
E-mail contact	
Company	
Location (City, Economy)	

2. CFL production and sales data:

	No. lamps	Value (US\$)
Annual production or sales		

	Domestic (% of sales)	Export (% of sales)
Breakdown of sales		

#### Questions on Testing and Compliance

3. Have you heard of the International CFL Harmonisation Initiative?

YES

NO

If YES, from what source:

- Internal company communication
- Right Light 6 Conference in Shanghai (May 2005)
- Publication, newsletter
- Other \_\_\_\_\_

4. Do you support the objectives of the International CFL Harmonisation Initiative? ([www.apec-esis.org/cfl](http://www.apec-esis.org/cfl))?

YES     NO

Please explain:

5. What are your approximate current annual costs for testing and certification of CFL lamps that you produce? (Including costs for registering products for minimum energy standards and energy labelling programs?)
- Estimated annual budget (US\$ per year) for testing and certification
    - For domestic CFL sales
    - For export sales of CFLs
  - Estimate costs for testing and compliance as percentage of your unit CFL production costs (i.e. the % of the cost of producing a CFL)
    - For domestic CFL sales
    - For export sales of CFLs
6. What is the relative breakdown of your company's certification and compliance costs?

Item	% of compliance costs	
	Domestic Market	Export market
Testing and certification for safety and quality		
Testing and certification for energy performance		
Other _____		

7. If there were a single, harmonised international test procedure for CFLs, provide an approximate estimate of how much would this reduce your annual testing and compliance costs?

Item	Reduction in testing and compliance costs				
	1	2	3	4	5
	No reduction	Small reduction	Substantial	Large reduction	Very large
For domestic CFL sales					
For export sales of CFLs					
For registration for energy-efficiency standards and labelling programs?					

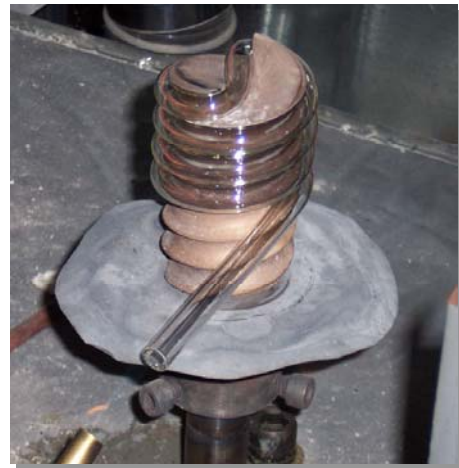
8. Are there any other people within your organization that should be aware of the CFL Harmonisation Initiative? Please provide information below:

Referral for Manufacturer/Supplier Survey	
Name	
Title	
E-mail contact	
Name	
Title	
E-mail contact	

9. Do you have any other suggestions or comments on the CFL Harmonisation Initiative?

*Thank you for cooperating with this survey. We will share with you a copy of the International CFL Review, when it is completed in November 2005.*

\* \* \* Thank you! \* \* \*



+ Prepared by



---

## CFL Harmonisation Initiative

Coordinator of CFL Harmonisation Initiative: Stuart Jeffcott

[Stuart@Jeffcott.fsworld.co.uk](mailto:Stuart@Jeffcott.fsworld.co.uk)

Website of CFL Harmonisation Initiative: [www.apec-esis.org/cfl](http://www.apec-esis.org/cfl)