Energy Efficient Lighting Programmes in Sri Lanka Past and Future

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#### **Presentation Coverage**

- Background
- Standards & Labeling
- Street Lighting
- Live Demonstrations
- Independent Laboratory
- Capacity Building

## Primary Energy Supply of Sri Lanka



## **Electricity Generation by Source**



## **Share of Electricity Consumption**



#### **Daily Load Curve**



## Lighting Products



### National Standards for Lighting Products

Product	Performance and Safety Standards	<b>Energy Labelling Standards</b>
Compact Fluorescent Lamps (CFLs)	SLS 1231:2002 Specification for Self ballasted lamps for General Lighting Services (Integral type compact fluorescent lamps)	SLS1225:2002 Energy efficiency rating for Self ballasted lamps (Integral type compact fluorescent lamps)
Tubular Fluorescent Lamps	SLS 566:1996 Tubular Fluorescent Lamps	Energy Efficiency Rating for Double capped Tubular Fluorescent Lamps (SLS number not yet given)
Ballasts	SLS 1150: 2011 Ballasts for Tubular Fluorescent Lamps	SLS 1200:2012 Energy Efficiency Rating for Fluorescent Lamp Ballasts
LED Lamps	IEC62560 Self Ballasted LED Lamps for General Lighting greater than 50 V – Safety Requirements (to be adopted as SLS standard)	Not yet done

### History of CFL Program in Sri Lanka

1995/1996

- (Pilot projet) CEB purchased 100,000 CFLs and sold at discounted price
- 1997/1999-Duty waiver for import of<br/>CFLs. Interest free loan<br/>from CEB

## **CFL Program in Sri Lanka**

2000/2002 - Interest free loan continued. Prepared EE rating standard for CFLs

2003-Launched EE label forCFL E labeling program<br/>commenced (Volunteer)

2004

- Set 3 stars as minimum EE rating, qualifying for CEB loan scheme

## Implementation of EE Labeling Program for CFLs

- **Key Participating Agencies** 
  - •SLSI
  - •CEB
  - •NERD Centre
  - SEA

## Implementation of EE Labeling Program for CFLs



## Salient Features of EE Rating Standard



## **Requirements of SLS 1225**

- Initial wattage ≤ 115% of rated wattage
- Rated average life 8000 hrs (minimum)
- **Power factor**  $\geq$  0.50
- **Initial luminous flux > 90% of rated value**

## Marking

Rated voltage<br/>Rated wattage<br/>Model No.<br/>Total luminous fluxon the lampRated average life<br/>Brand nameon the lamp or<br/>on the container

### **Performance Grading**

PG = 0.8 X Efficacy + 0.2 x Pf x 100

Efficacy =

#### **Measured Average Lumens**

**Measured Average Wattage of lamp** 

## **Determination of Star Rating**

PG Value	No. of Stars		
PV > 70	05 ****		
65 < PG ≤ 70	04 ****		
60 < PG ≤ 65	03 ***		
55 < PG ≤ 60	02 **		
50 < PG ≤ 55	01 *		

#### Amendments to SLS 1225 : 2002

**Amendment No. 1 – 2004** 

Introduced lumen maintenance test
 Switching cycle for life test is defined
 Efficacy calculation revised

Efficacy = <u>Measured average luminous flax</u> Rated wattage of lamp – 0.4w

#### Amendments No. 3 –2007

# Rated average life reduced from 8000 hrs to 6000 hrs.

#### Amendments No.4 –2008

Performance grading formula revised

PG = E x A + Pf x100xB + CCC A = 0.9 B= 0.1 CCC = Colour Correction Coefficient <3300K = 0 3300 - 5000 K = 2 >5000 K = 3

## **Star Rating**

PG	Star Rating	
PG >70	5	
65 <pg<= 70<="" td=""><td>4</td></pg<=>	4	
58 <pg<=65< td=""><td>3</td></pg<=65<>	3	
54 <pg<=58< td=""><td>2</td></pg<=58<>	2	
50 <pg<=54< td=""><td>1</td></pg<=54<>	1	

## **Our Experience**

- 1. EL scheme was implemented a as voluntary program
- 2. Interest of suppliers joining labeling scheme was low
- 3. CEB Loan Scheme (CFL) encourage the suppliers
- 4. Reputed brands got lower star rating compared to newly introduced brands



## **Our Experience Contd..**

- 5. Public awareness on EL Scheme was poor
- 6. Consumers are more concern about life than energy efficiency
- 7. Rated life was not tested. Many lamps failed prematurely
- 8. Many consumers were confused about star rating & quality



## **Our Experience Contd..**

- 9. When CEB Loan Scheme was withdrawn, no of suppliers joining declined
- 10. Voluntary scheme did not bring expected results
- 11. CFL was brought under compulsory Import Inspection Scheme
- 12. SEA Made CFL labeling program mandatory

#### **Make Mandatory of CFL EL Programme**

• Gazette in 22<sup>nd</sup> July 2009 – No 1611/10

• No person shall Manufacture, Import CFL Which does not conform to the Minimum PG

No person shall store, distribute, sell, offer for sale CFLs without a Energy Label issued by SLSI

### **Operation of EL Scheme**

- Sri Lanka Sustainable Energy Authority (SLSEA) implement the scheme
- Laboratory of the National Engineering Research and Development Centre (NERDC) of Sri Lanka and RCL carried out testing
- Sri Lanka Standard Institute (SLSI) operates the Scheme
- SLSEA conducts surveillance tests twice a year

#### **Energy Labeling in CFL**

- **Started in year 2000 Voluntary Basis**
- **Make Mandatory in Year 2009**
- **Reference Standard : SLSI 1225:2002**



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#### **Performance Grading (PG)**

#### **PG = Efficacy X 0.9 + PF X 100 X 0.1 +Color Correction**

<b>Color Temperature</b> (CT)	Color Correction	PG	Star Rating
	Coefficient	PG >70	5
< 3300K	0	65 <pg<-70< th=""><th>4</th></pg<-70<>	4
3300K <= CT =>	2	05 <1 0 <= 70	<u> </u>
5000K		58 <pg<=65< td=""><td>3</td></pg<=65<>	3
> 5000K	3	54 <pg<=58< th=""><th>2</th></pg<=58<>	2
Measi	1		

Efficacy

Rated Wattage (W) - 0.4

#### Standard :- SLS 1225:2002

#### Requirements

- Initial Wattage shall not exceed 115% rated value
- Rated average life Not less than 6000 hrs
- **Power factor Greater than 0.5**
- Initial Luminous flux not less than 90%
  of rated value
- After 2000 hr Lumens maintenance shall be not less than 80% of the initial value <sup>29</sup>

## Street Lighting

- Specifications & Guidelines already prepared.
- A Pilot project done
- Phase II in progress USD 4.2 million

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### Live Demonstrations

- Replacement with energy Efficient lighting
- Use of Day lighting
- Monumental lighting
- Business lighting
- Household lighting
- Street Lighting

### Product Testing and Quality Control

- State of the art Photometry Laboratory catering to the needs of manufacturers, dealers, users and policy makers
- Support qualification testing and quality labeling programs
- Ensure compliance with standards
- Offer testing services for grid and off-grid lighting







### Product Testing and Quality Control

# The LRC is working with the RCL to establish the LED testing .

- •Equipment procurement
- •Lab set-up
- •Supplying test development procedures
- •Educating personnel on test methods
- •Working toward accreditation



#### **Training, Education and Exhibition**

#### **Capacity building activities**

 University affiliated formal educational courses in collaboration with the University of Moratuwa, Sri Lanka.



 Short courses, seminars etc. and exposure for Academic staff and lighting professionals





## **Establishing Partnerships**

Efforts will focus on establishing partnerships with global and regional manufacturers to promote:

•Promotion of regional production leading to creation of jobs

- •Quality-controlled products entering the market
- •Sustainable lighting that's affordable
- •Improved lighting design

Thus, achieving sustainable lighting.



#### **Thank You**