

# CFLi Key Trends and Challenges

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**Gao Ming**

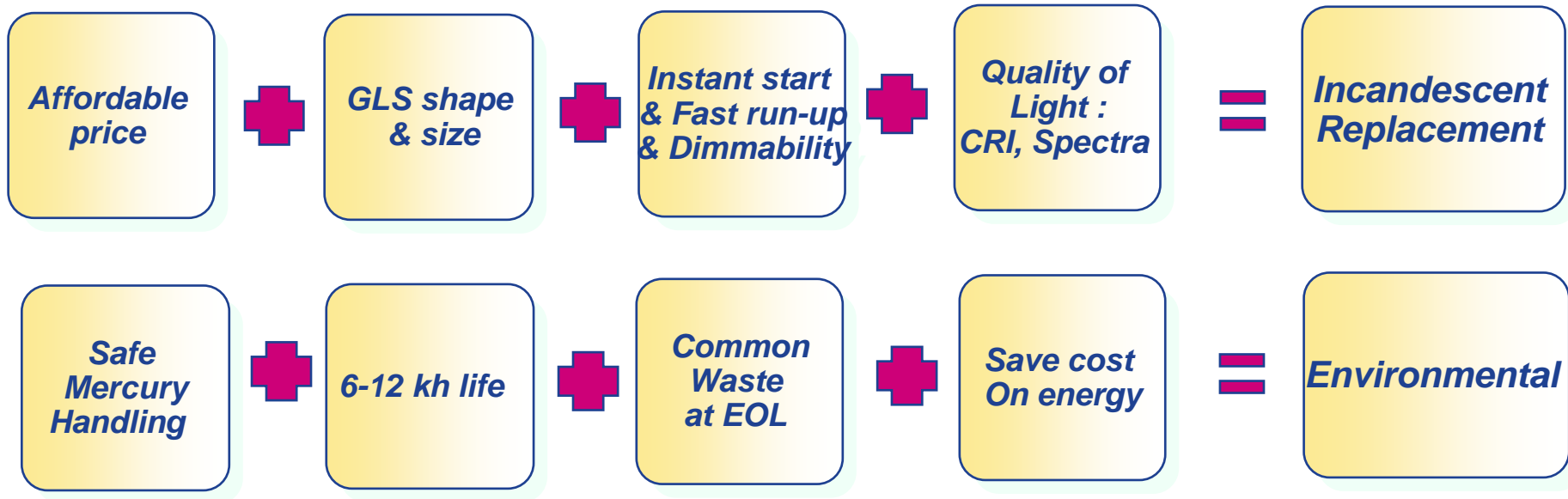
**GE Industrial**

**Manila, June 5, 2008**



imagination at work

# Consumer wants



***Multiple Technologies now competing for the same socket***

# Directions to improve CFLi

## -Health hazard:

- reduce Mercury content
- remove other hazardous materials (Pb ,Sb, Ta, As, Deca BDE)
- reduce UV output, flickering
- End of Life protection

## -Quality of light

- fast run-up/ instant start
- Improved color stability, rendering(CRI)

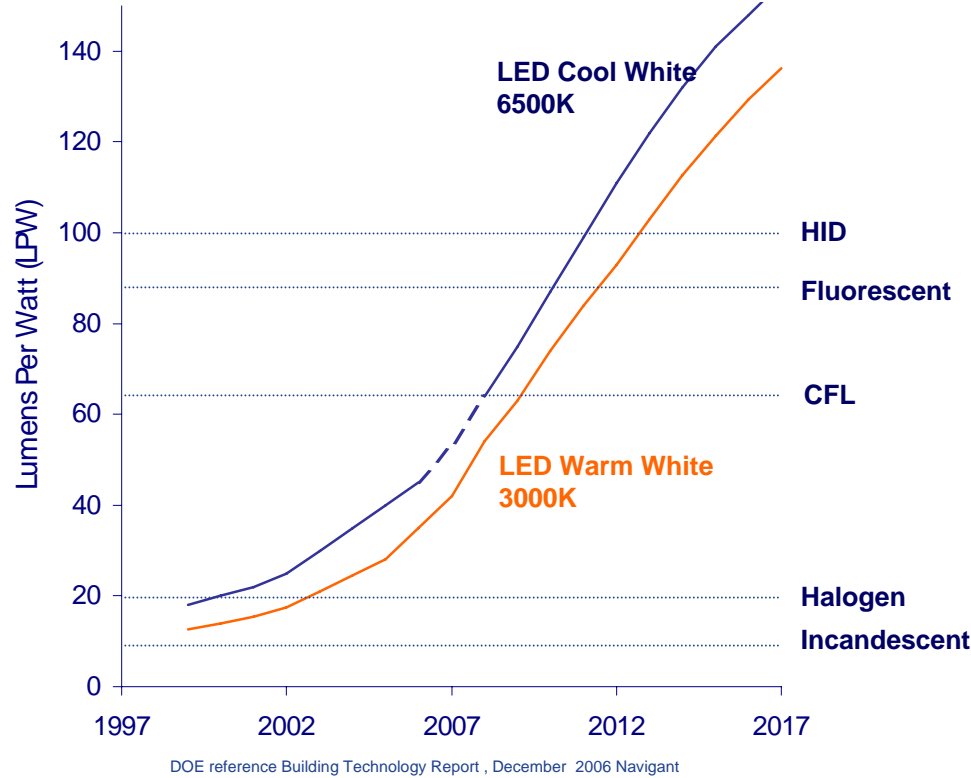
## -Incandescent replacement

- full dimmability/ dimmer compatibility
- High Power Factor electronics



# The LED Challenge

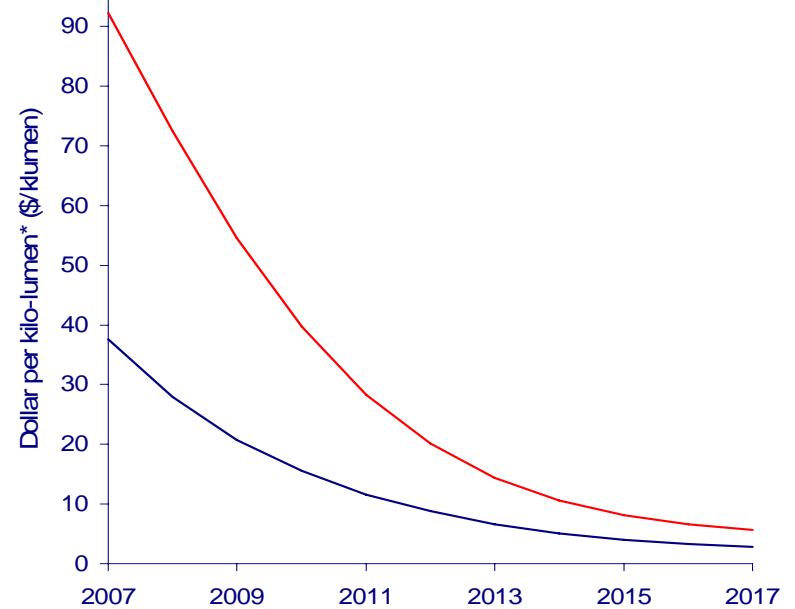
## LED Efficiency Evolution



**Efficiency approaching CFL**



## Cost / Performance Trajectory



Warm White	lpw	Incumbent Efficiency vs. LED	\$/k-lm System*	LED Cost vs Incumbent
LED 2007	40		\$95	
INC	14	~60% less	\$0.30	~300x more
CFL	63	~150% more	\$3	~30x more
LED	110		\$10	

**Significant cost reductions needed**

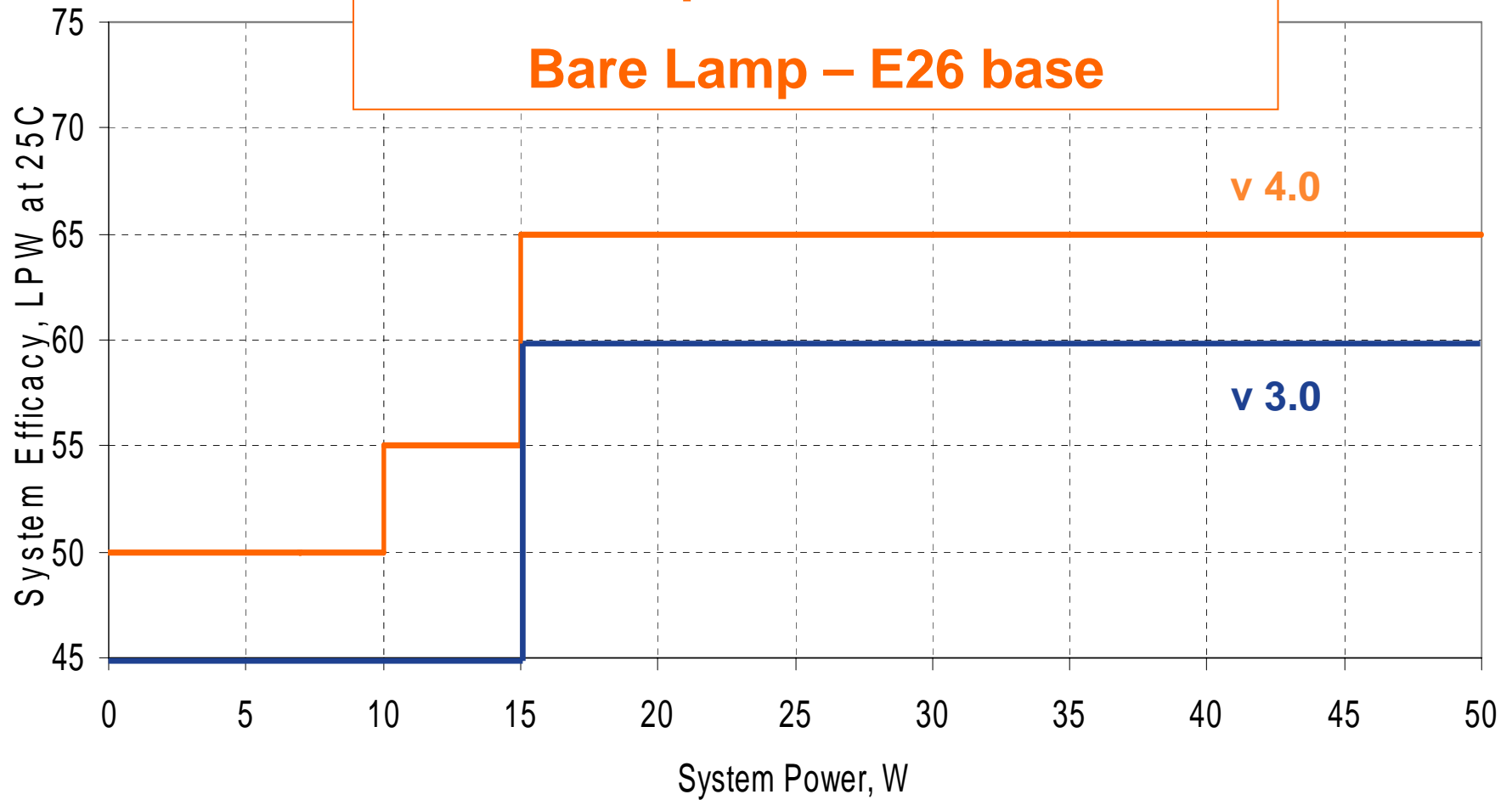
# CFL Regulatory Overview

## North America

	USA	CANADA	MEXICO
<b>SAFETY</b>	UL 1993, 2 <sup>nd</sup> Edition  Harmonized version coming ~ 2009	CSA TIL B-36B	(NOM-017) - Pending
<b>ENERGY EFFICIENCY/ PERFORMANCE</b>	ENERGY STAR - E26/E12 base - GU24 base  EPACT 2005 10CFR – Part 430  ANSI C78.5 – 1997*	CAN/CSA - C861-95  CAN/CSA – C861-06	(NOM-017) - Pending
<b>EMI</b>	FCC 47CFR – Part 18	Industry Canada ICES-005, Issue 2	NMX-J-599/1 ANCE 2007

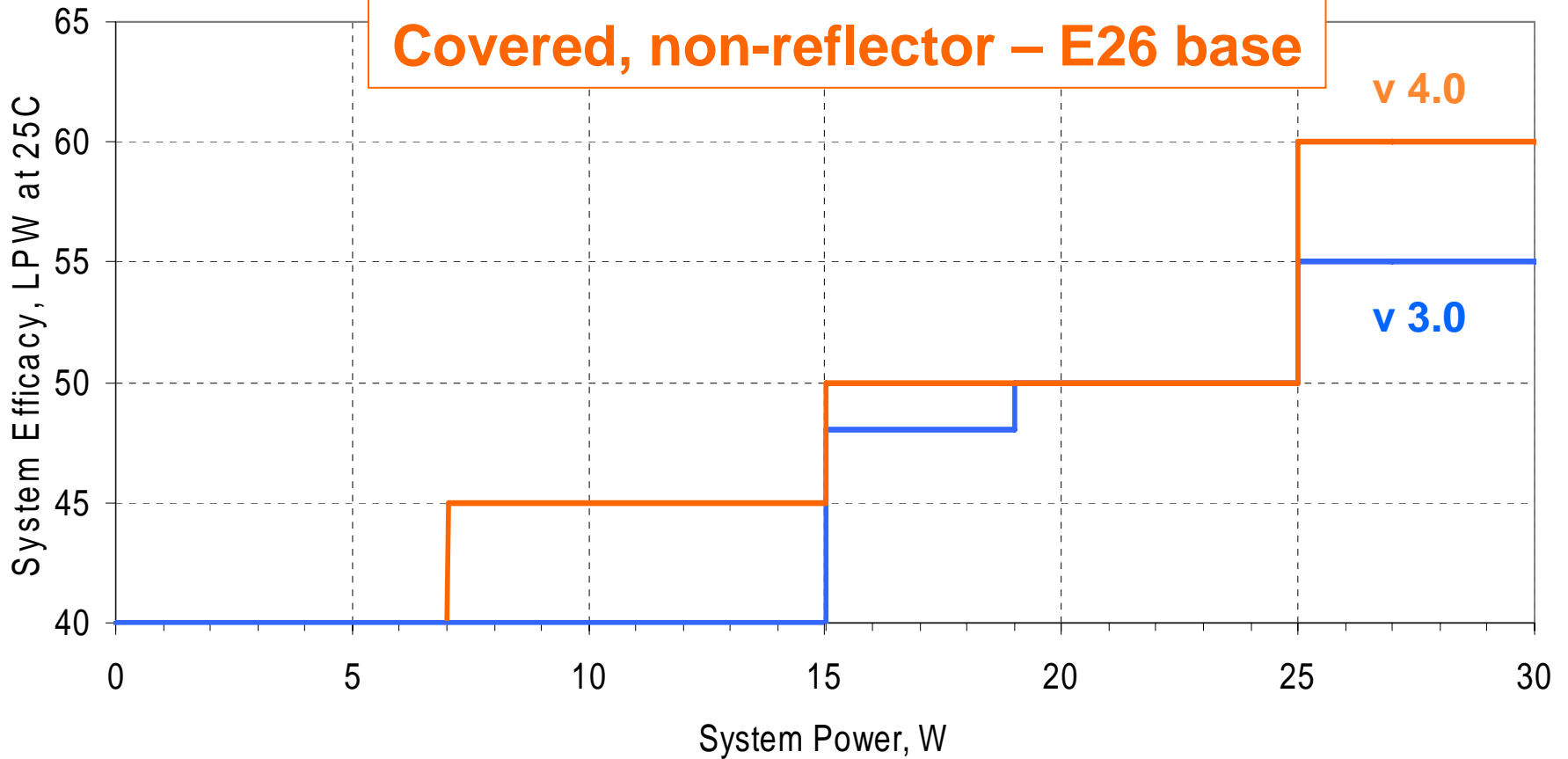
# ENERGY STAR

## LPW Comparison v3.0 vs. v4.0 Bare Lamp – E26 base



# ENERGY STAR

**LPW Comparison v3.0 vs. v4.0**  
**Covered, non-reflector – E26 base**



# CFL Obligatory Regulatory

## Europe

legal requirement	Eu directive	standard	certificate	testing house
CE mark	98/34/EC	LVD and EMC and Qual Man	(self) Declaration of Conformity	
Quality Management system		ISO 9001	3rd party	IMQ, CQC, etc
Low Voltage Directive (LVD)	2006/95/EC	EN 60968 self-ballasted safety	3rd party	MEEI, SEMKO, etc
		EN 61199 single capped safety	3rd party	MEEI, ITS SEMKO etc
Electromagnetic Compatibility (EMC)	2004/108/EC	EN 61547, EN 55015, EN 6100-3	3rd party	MEEI, VDE, ITS SEMKO, etc
Energy labelling	1998/11/EC	EN 50285 Energy efficiency of household lamps	self certification if requested	
		EN 60901 single capped performance	self certification if requested	
		EN 60969 self-ballasted performance	self certification if requested	
Waste Electrical and Electronic Equipment (WEEE)	2002/96/EC		self certification if requested	
Restrictions of the use of certain Hazardous Substances (RoHS)	2002/95/EC		self certification if requested	

## Other poles

Program	Market	Scope	Certificate
China Energy label	China	screw-in CFL/HPS	self certificate
CNS	Taiwan	screw-in performance	3rd party
Chile	Chile	screw-in performance	self or 3rd party
Israel	Israel	screw in safety	Israel 3rd party
Ghana, Korea, Philippines, Thailand, Columbia etc..			

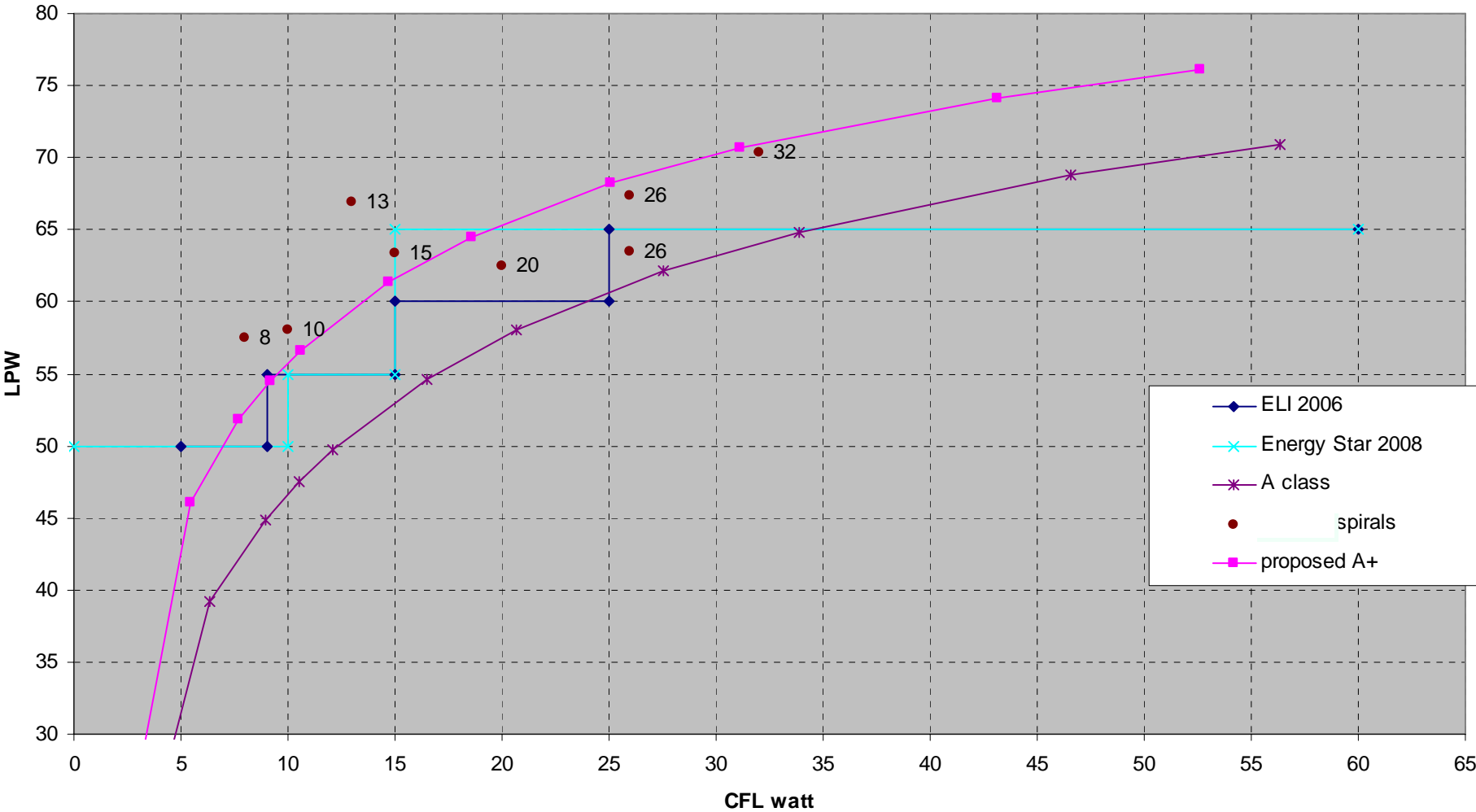
# Voluntary Programs - labelled

program	market	scope	certificate
Energy Saving Trust (EST)	UK	screw-in, plug-in (also LFL, HID, HAL)	3rd party
Eu Quality Charter	EU (e.g. Denmark)	screw-in	self and 3rd party
Ecolabel	EU (e.g. Italy)	screw-in, plug-in (also LFL)	3rd party
ELI	world developing countries	screw-in	accredited
EMSD	Hong Kong	screw-in	accredited
ENCE	Brazil, Argentina	screw-in	3rd party
etc...	Ghana, Korea, Singapore, Thailand	screw-in	

## Harmonization Effort

initiated by	scope	affects
Australia	world: testing and performance levels	IEC 60969 revision
EcoAsia	Asia: testing and performance level	????
European Union Ecoprofile	minimum performance	CFL, LFL, HID
European Union Enerlin	quality performance	Eu Quality Charter
European Union DIM	ban INCA	energy labelling

# Min. LPW requirements



# Summary

- CFL Technology Trend: reduce health hazardous substance, improve light quality and GLS replacement.
- LED efficacy is approaching or exceeding CFL but need significant cost reduction.
- CFL regulatory harmonization should be technically feasible, cost affordable, and consistent with ongoing international efforts.