



Mapping & Benchmarking of Linear Fluorescent Lighting

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- Introduction
- Policy and Market Mapping
- Lamp Testing
- Conclusions and Recommendations





Introduction



- Around 3 billion linear fluorescent lamps (LFLs) are manufactured each year
- LFLs responsible for producing around 58% of the world's artificial light (IEA 2006)
- LFLs have high efficacy and long life and are very cost effective
- LFLs still dominate the current landscape and are likely to remain a viable, cost-effective and energy-efficient option for some time



- This study relates primarily to general purpose double-capped linear fluorescent lamps and ballasts, and to a lesser extent luminaires
- Six major economies were selected:
 - Australia
 - Canada
 - China
 - Europe
 - India
 - USA
 - Limited information from Japan, South Korea, Mexico and Thailand
- A small number of lamps from China, Europe (UK), India and the USA were sampled and tested for insights into the performance of commonly available lamps in large economies

Objectives

- Map the policies for LFLs in key economies.
- Establish the basic characteristics of linear fluorescent lamp and ballast markets in key economies.
- Conduct independent testing of LFLs from four large economies, and make intra- and inter-economy comparisons of efficiency parameters.
- Develop high level conclusions regarding linear fluorescent lighting in the economies studied.

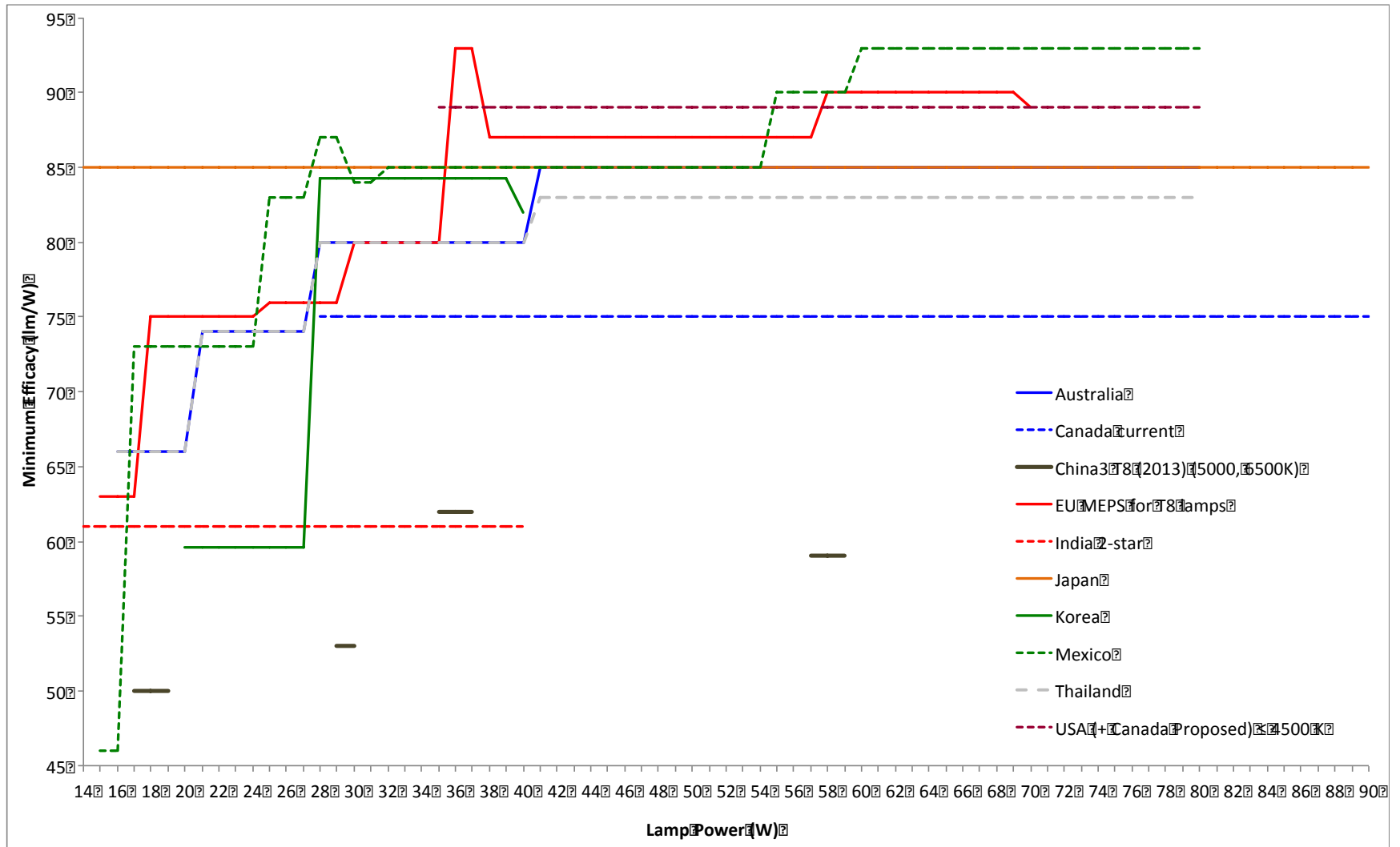




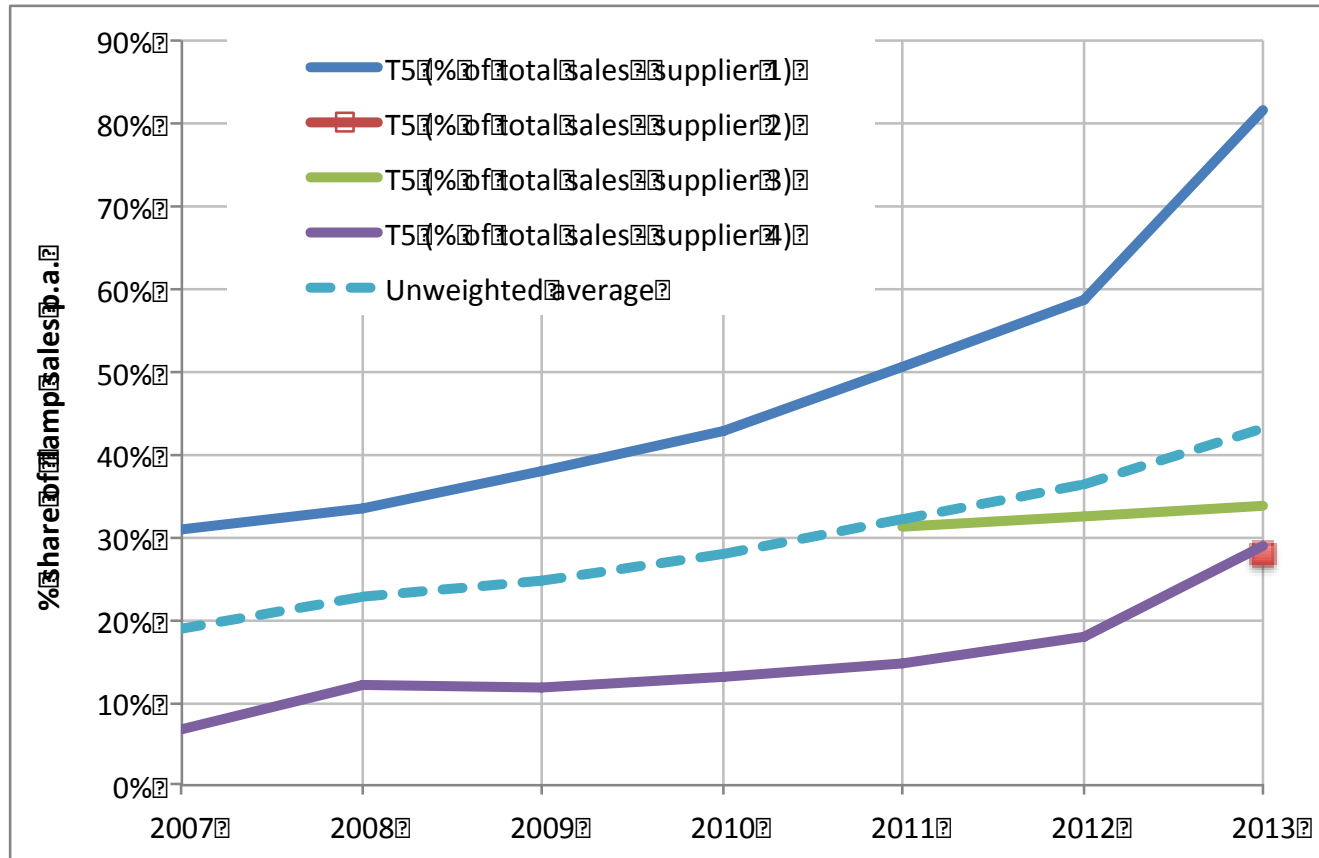
Policy and Market Mapping



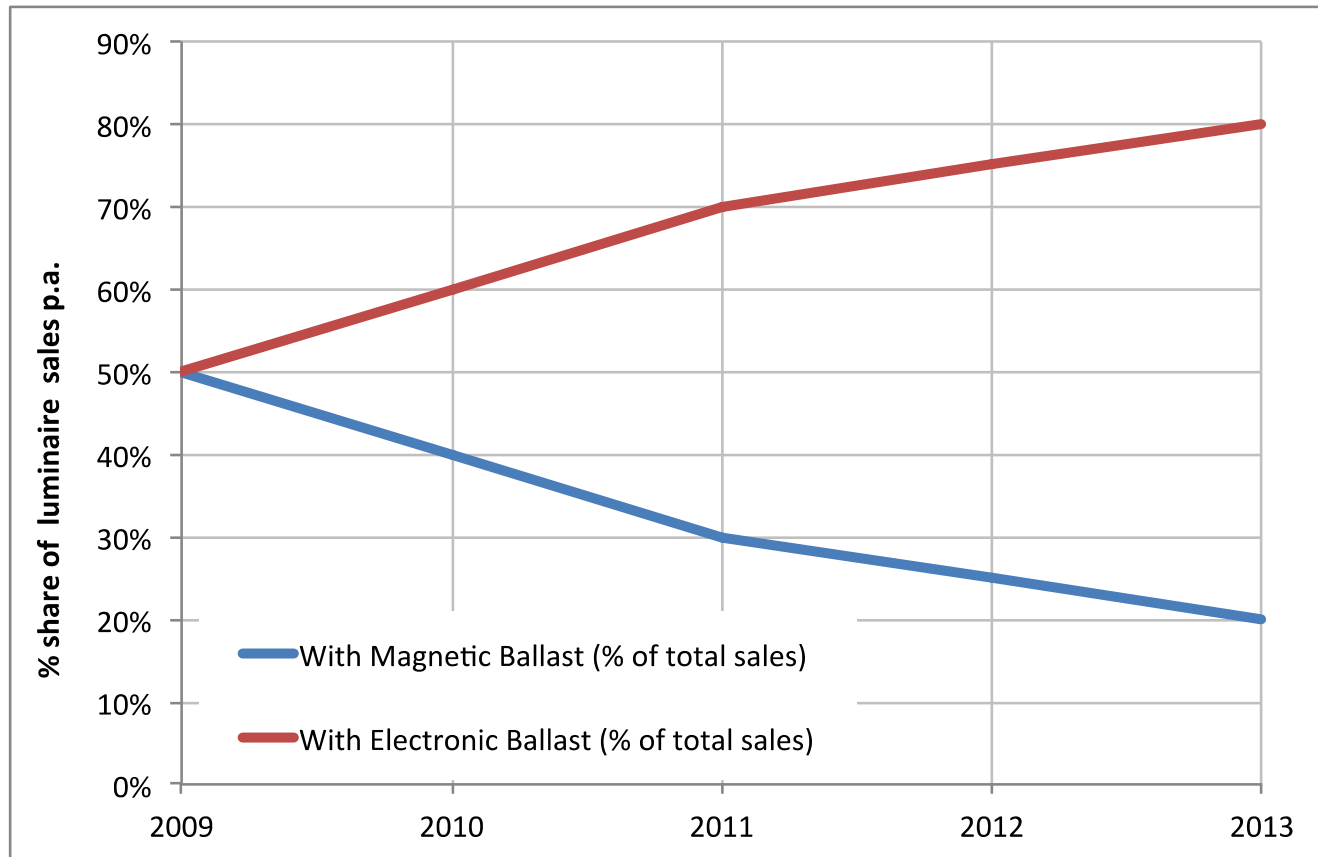
MEPS Comparison



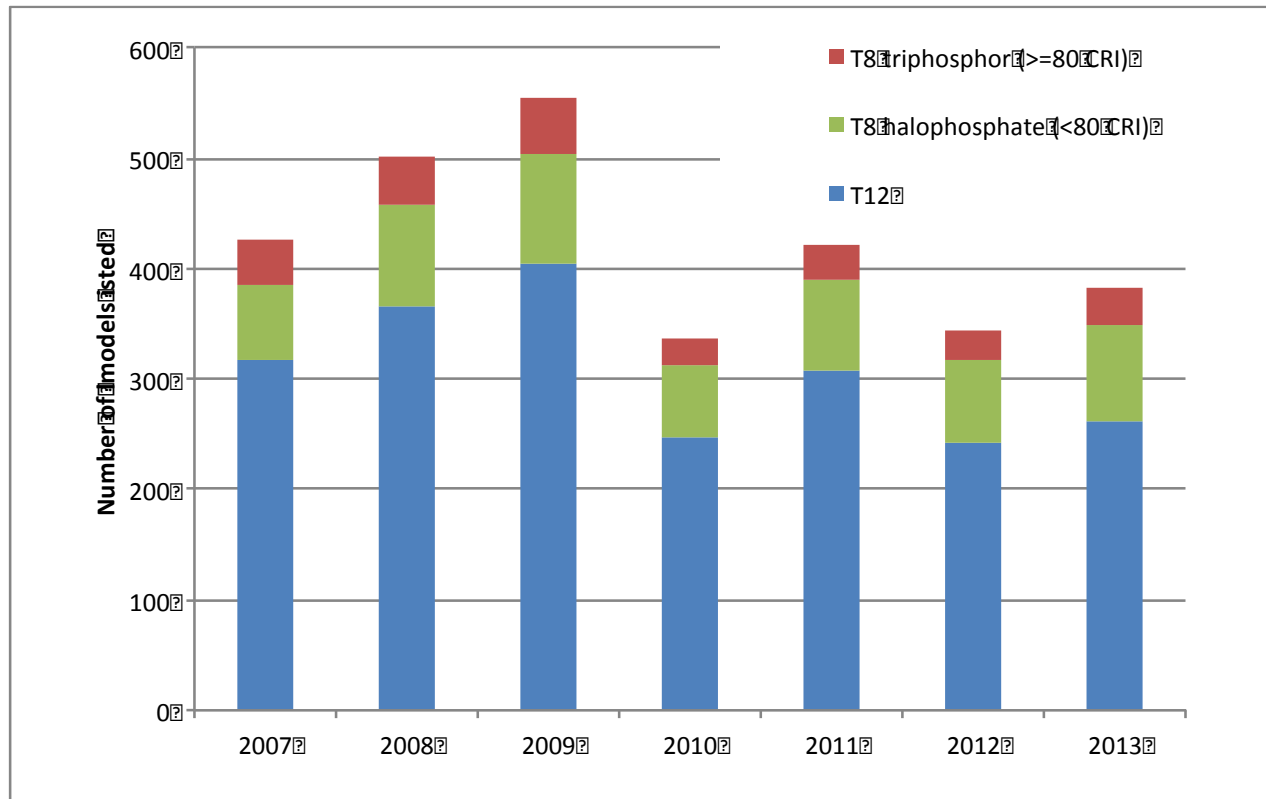
Australia - LFL Sales



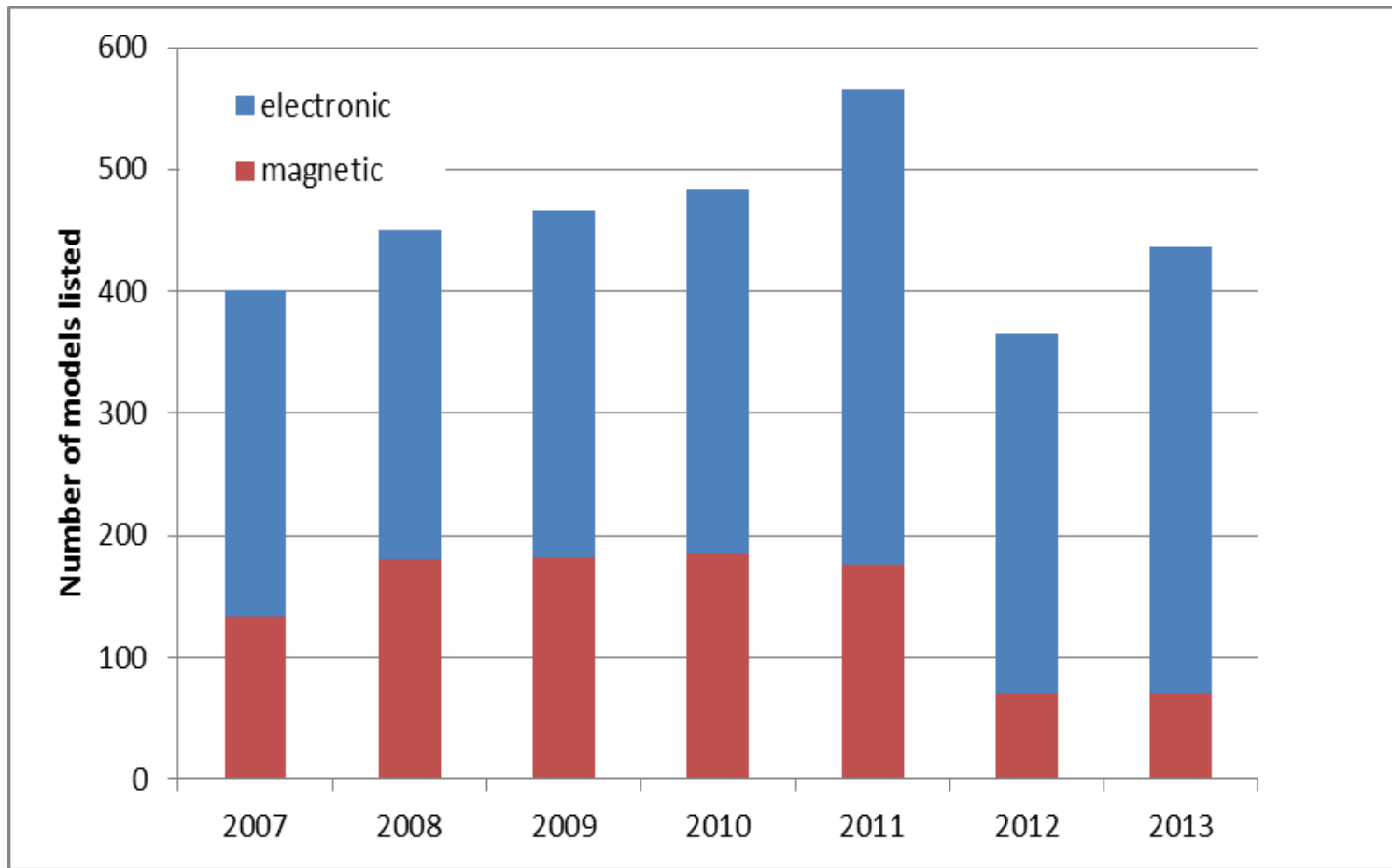
Australia - Ballasts Sales



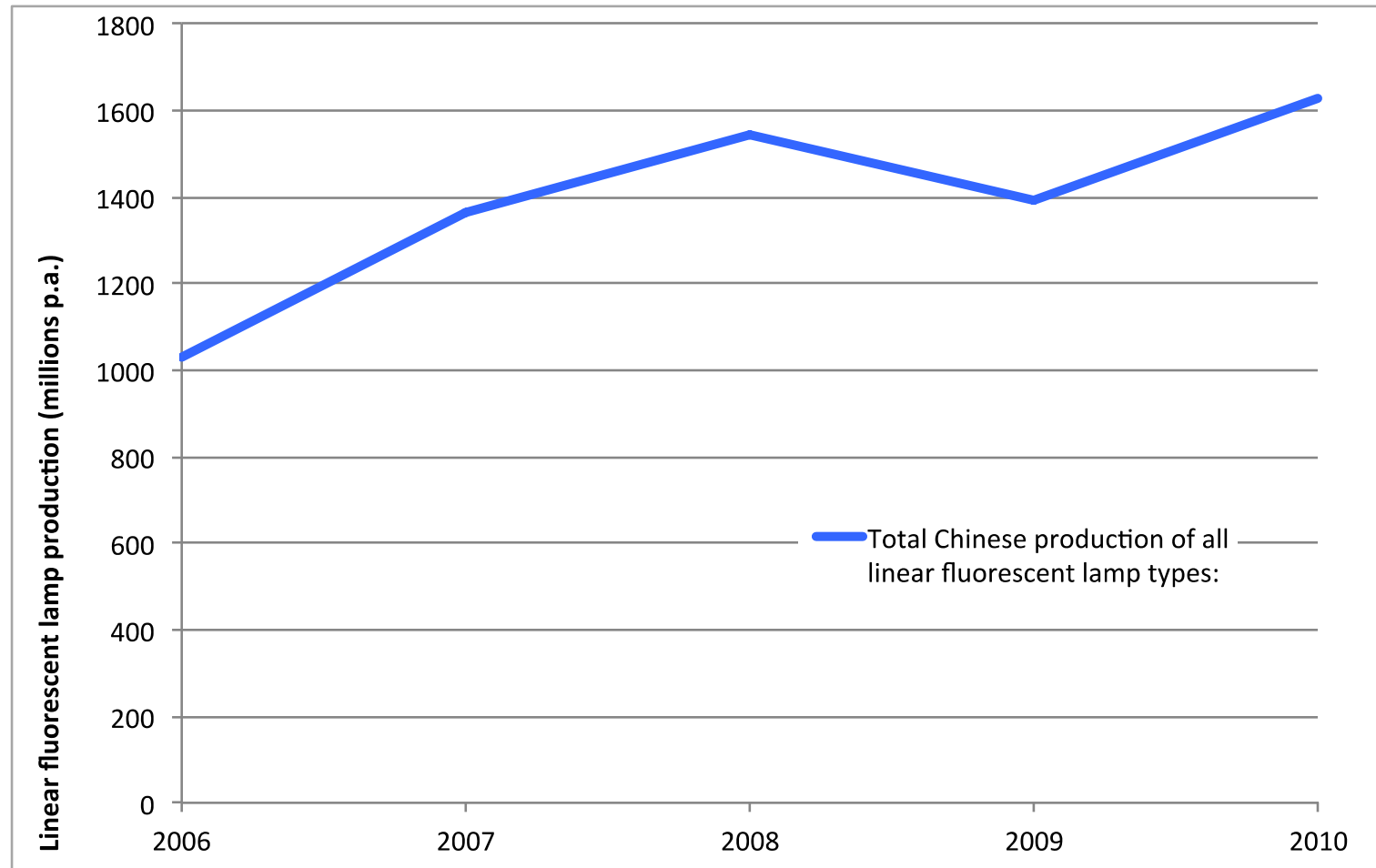
Canada - Number of lamp models listed for sale



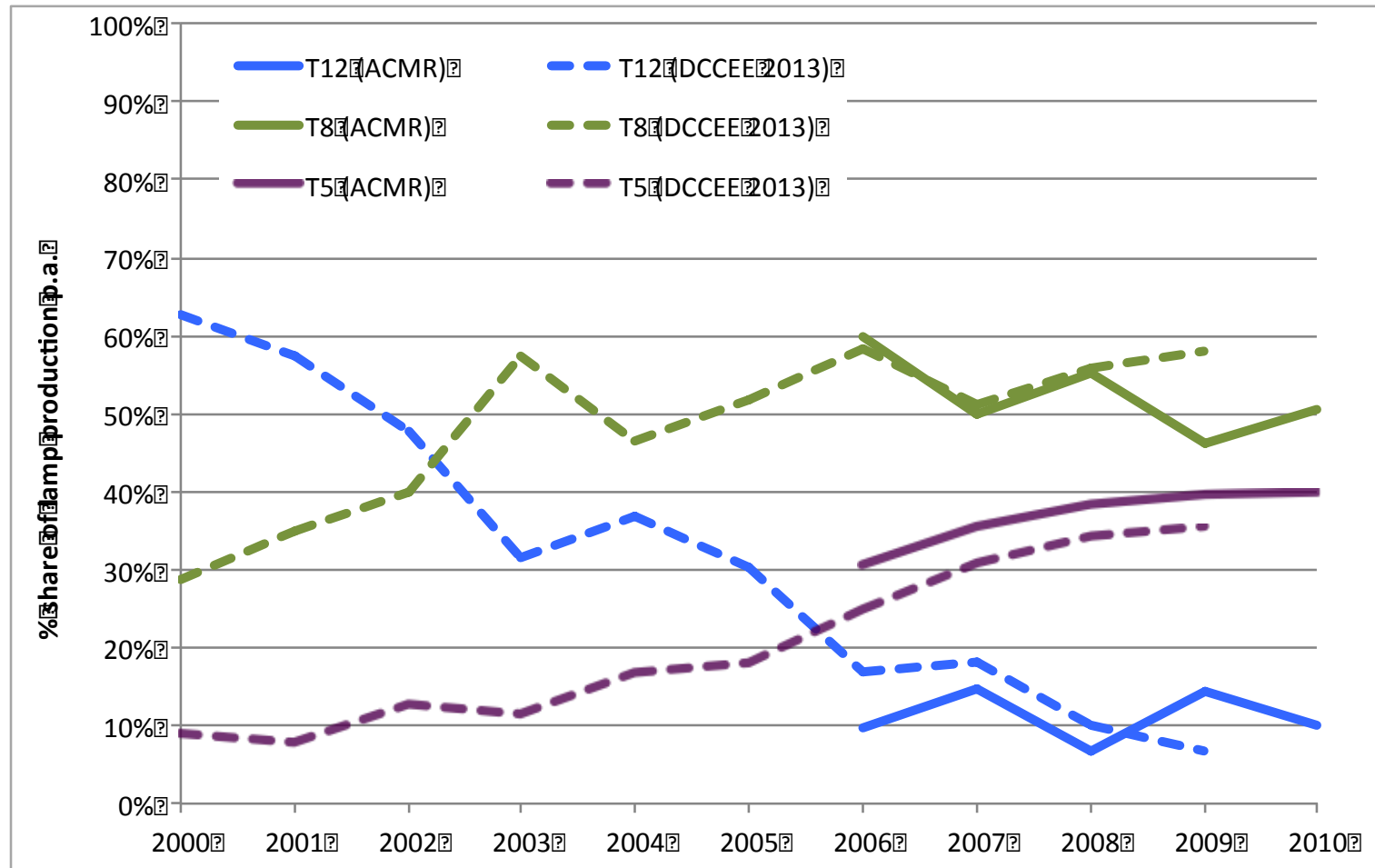
Canada - Number of ballasts models listed for sale



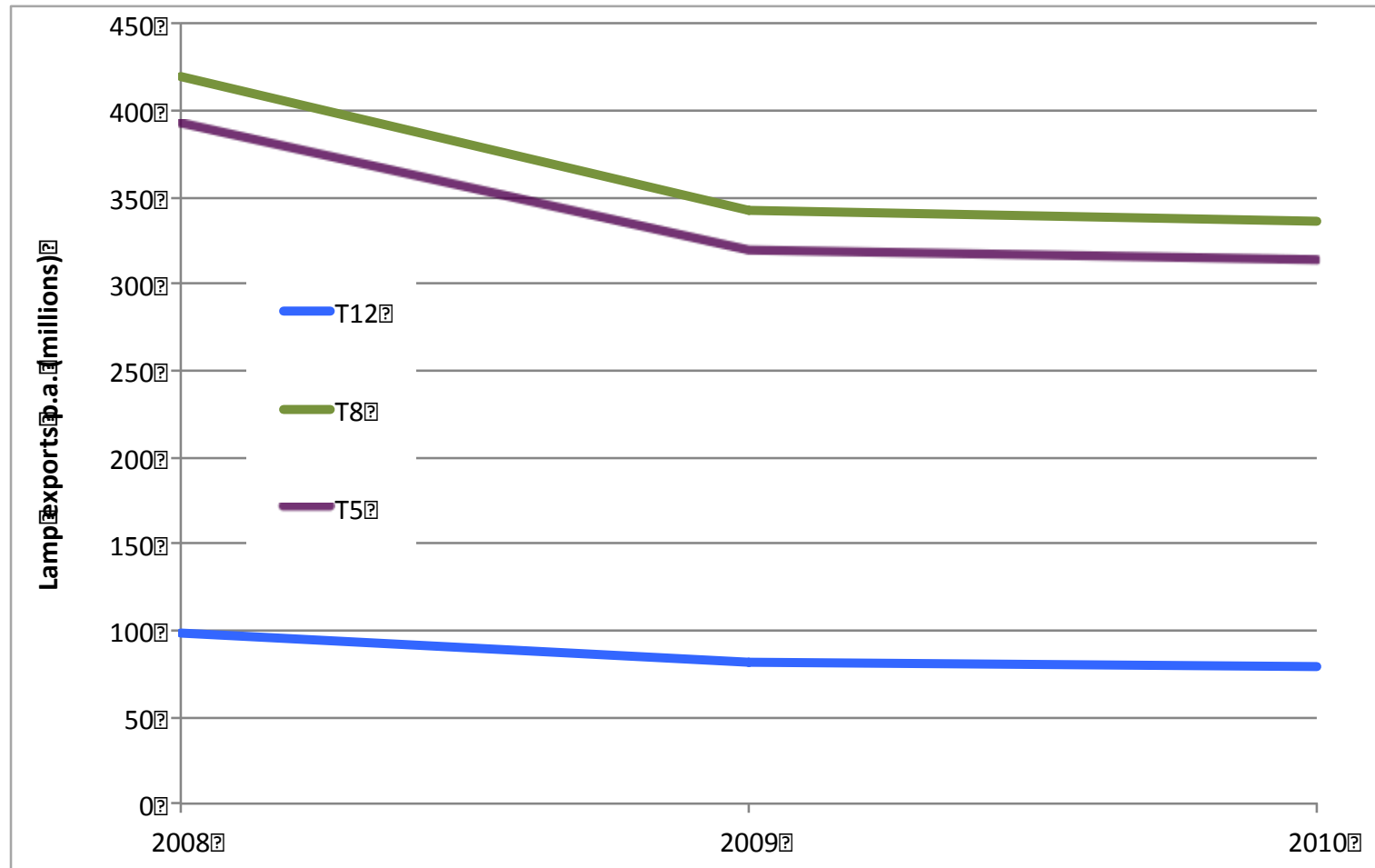
China - Total LFL production



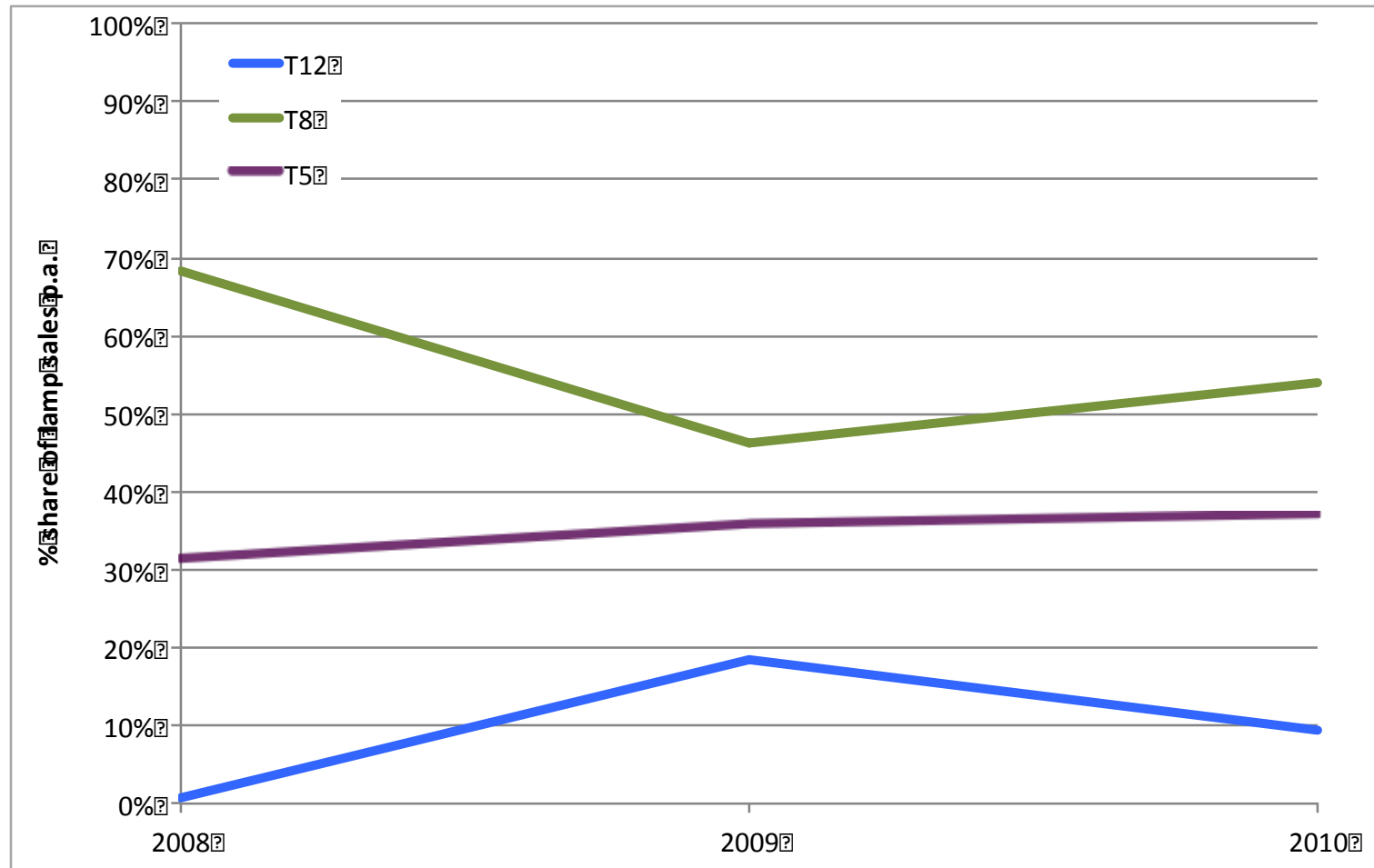
China - LFL production



China - LFL export



China - Domestic sales

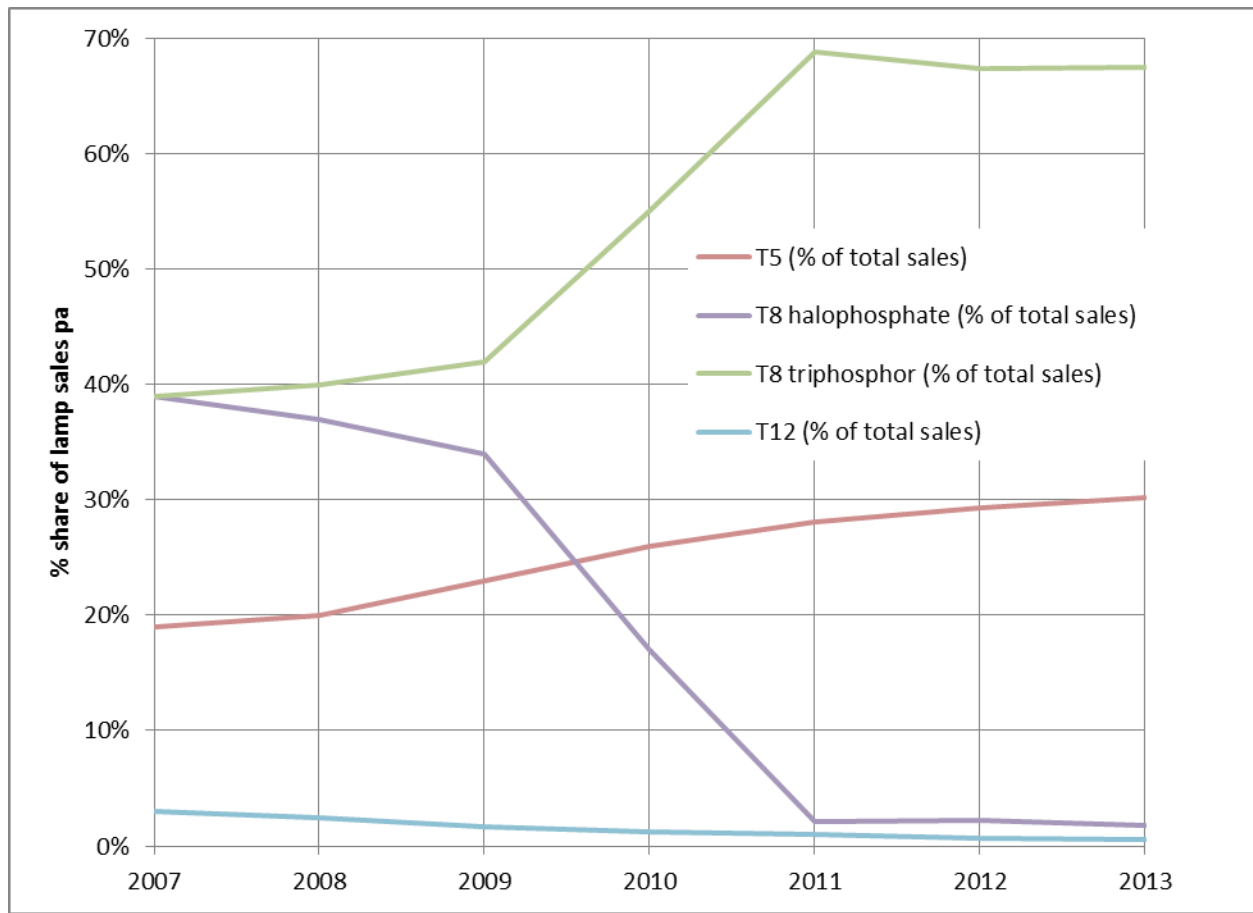


China - Ballast Market

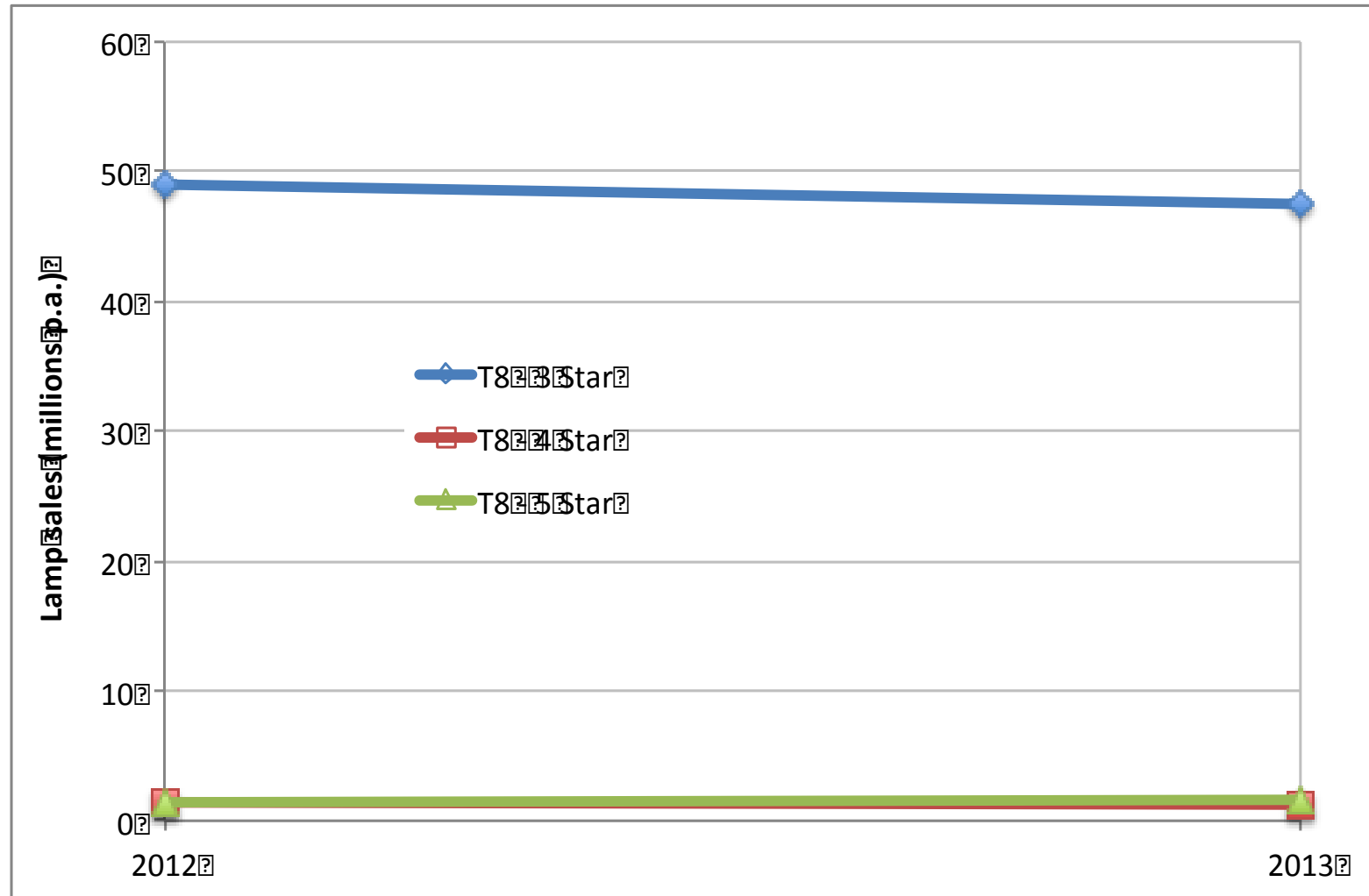
- Scarce data available (only exports), but a MEPS is in place
- CALI (Chinese Lighting Industry Association) estimated ballast export at 0.38 billion for 2010 and for 2011, and 0.32 billion for 2012
- No breakdown by magnetic / electronic ballast type was available.



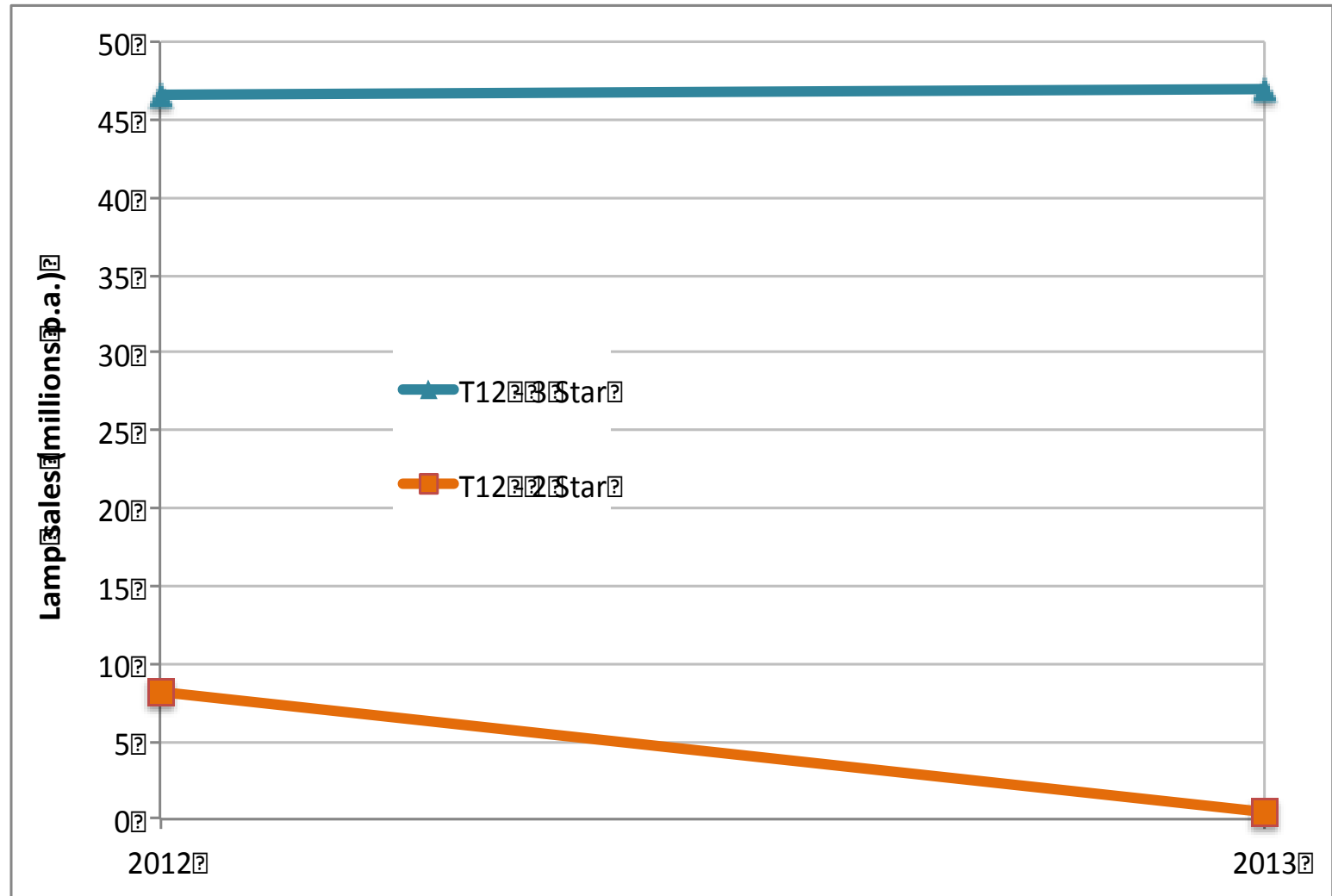
EU - Estimated lamp shares



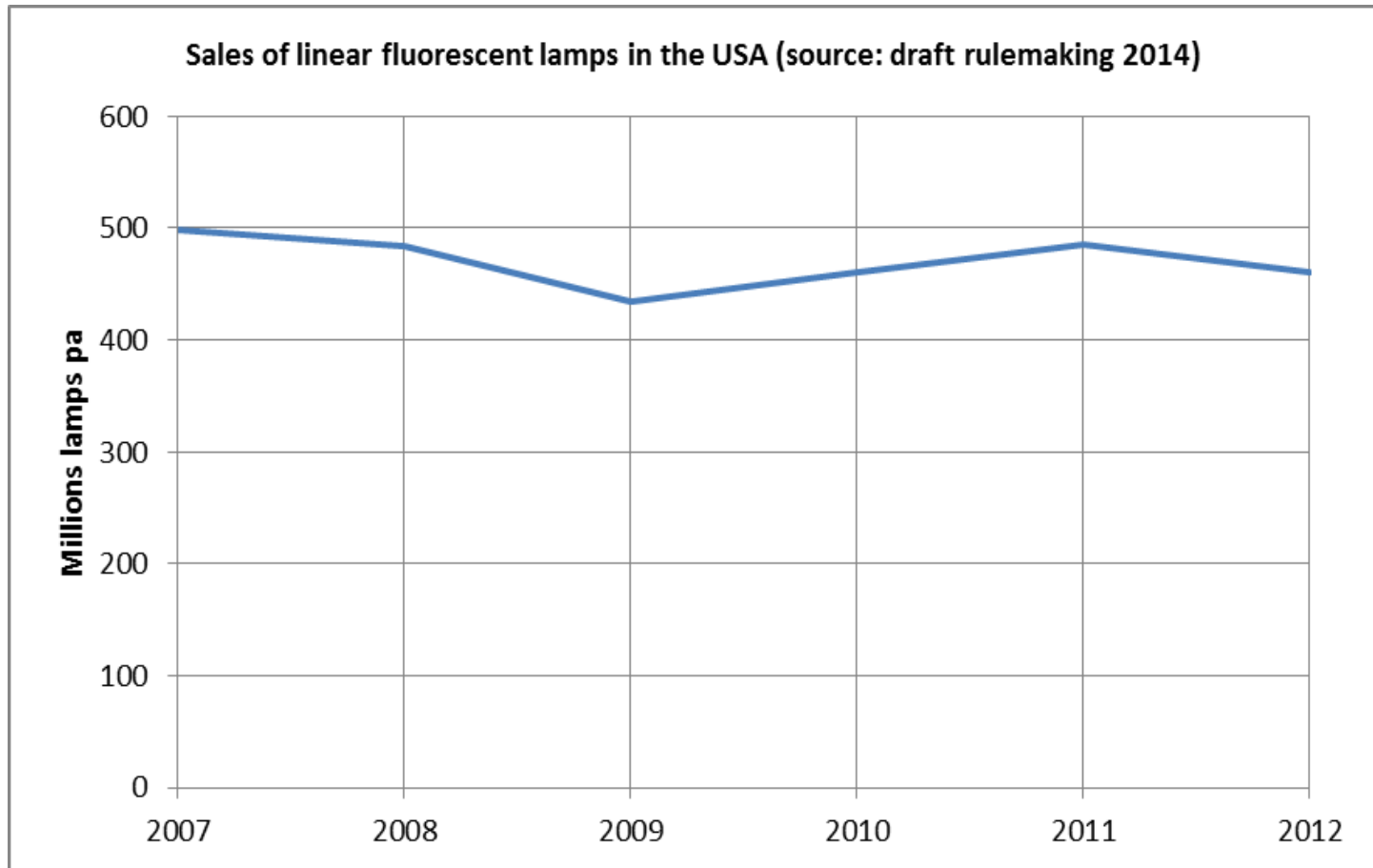
India - Annual sales of 4-foot T8 lamps



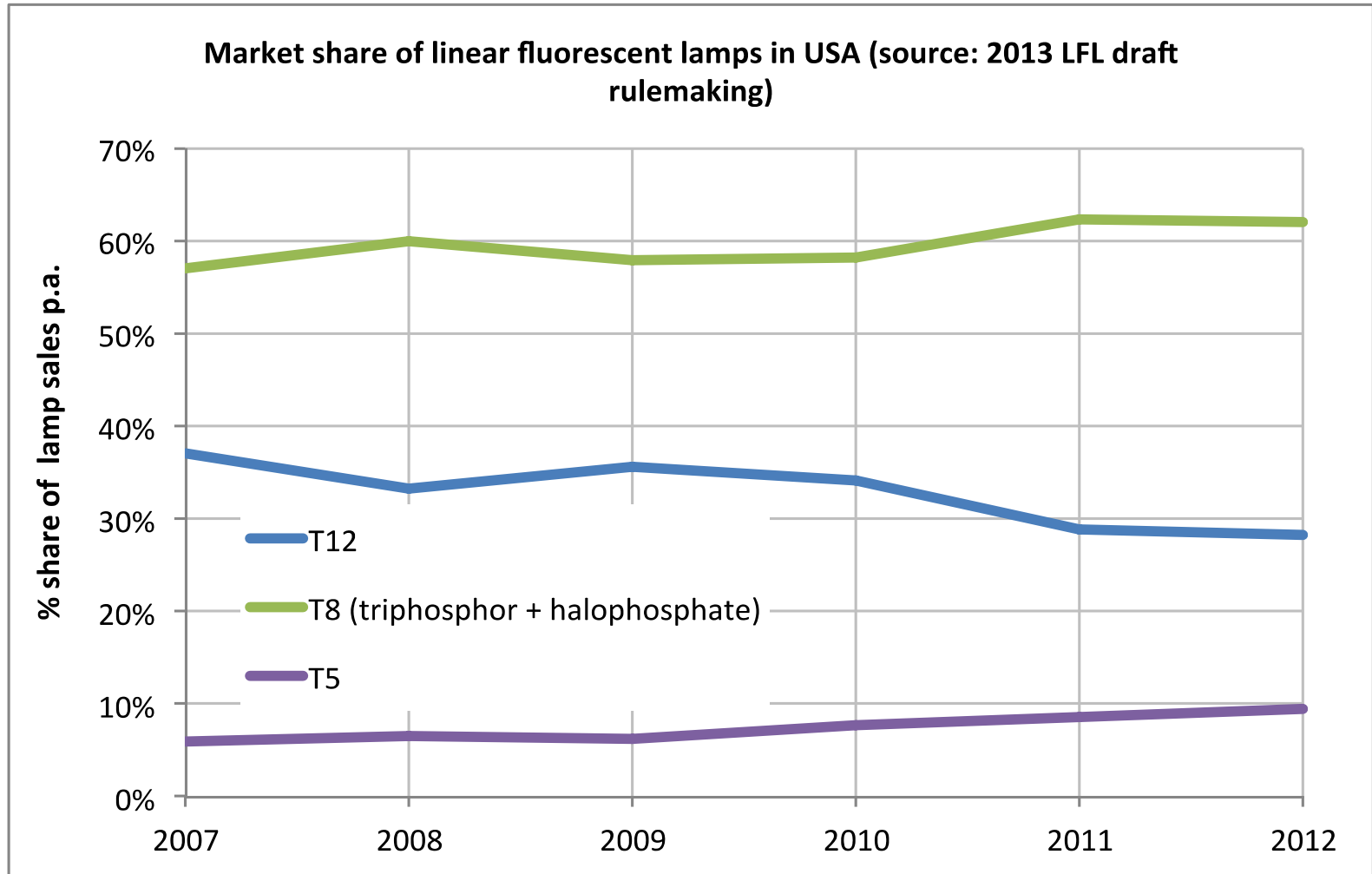
India - Annual sales of 4-foot T12 lamps



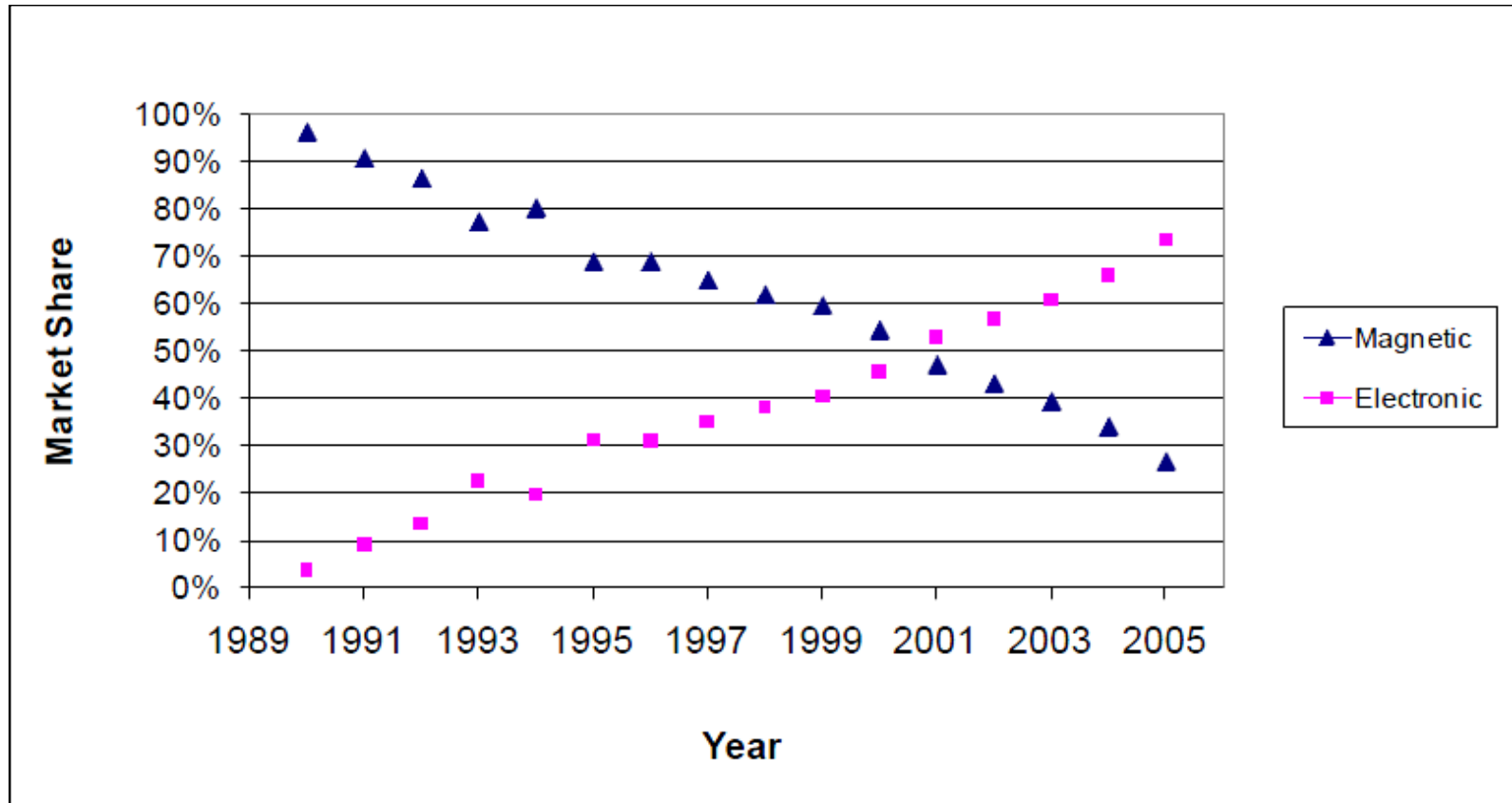
US - LFL sales



US - Lamp market shares



US - Ballasts market share





Lamp Testing



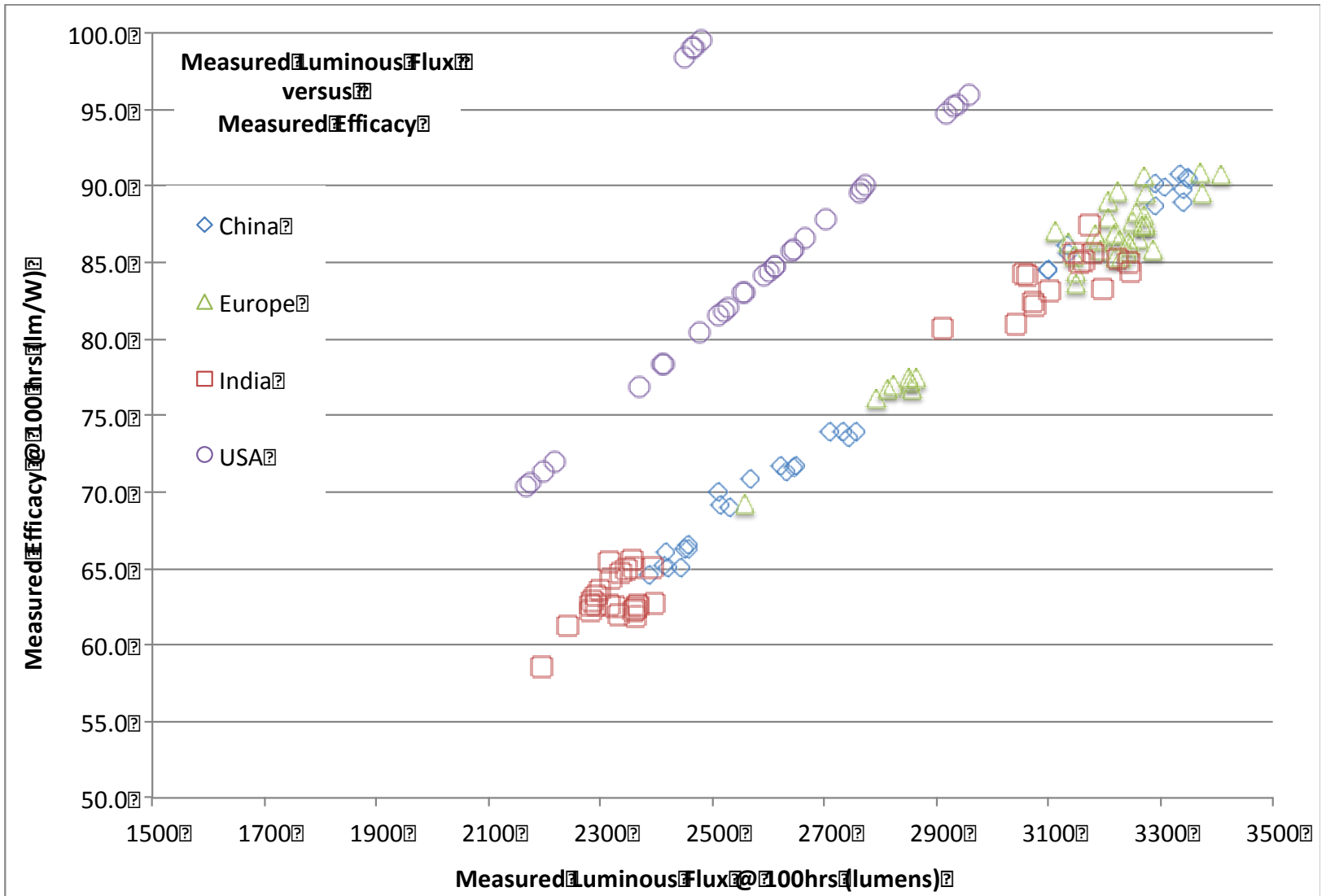
- Samples purchased from retail locations and online suppliers in China, Europe (United Kingdom), India and the USA
- Lamps were 4-foot T8 lamps targeting the most popular color temperature and lamp power for each economy
- As many different brands and models were sampled as possible (within budget constraints) ranging from lower-cost, lesser known brands to higher-cost, well known brands
- Around 12 samples of each model were purchased and shipped to accredited laboratories to conduct LFL testing



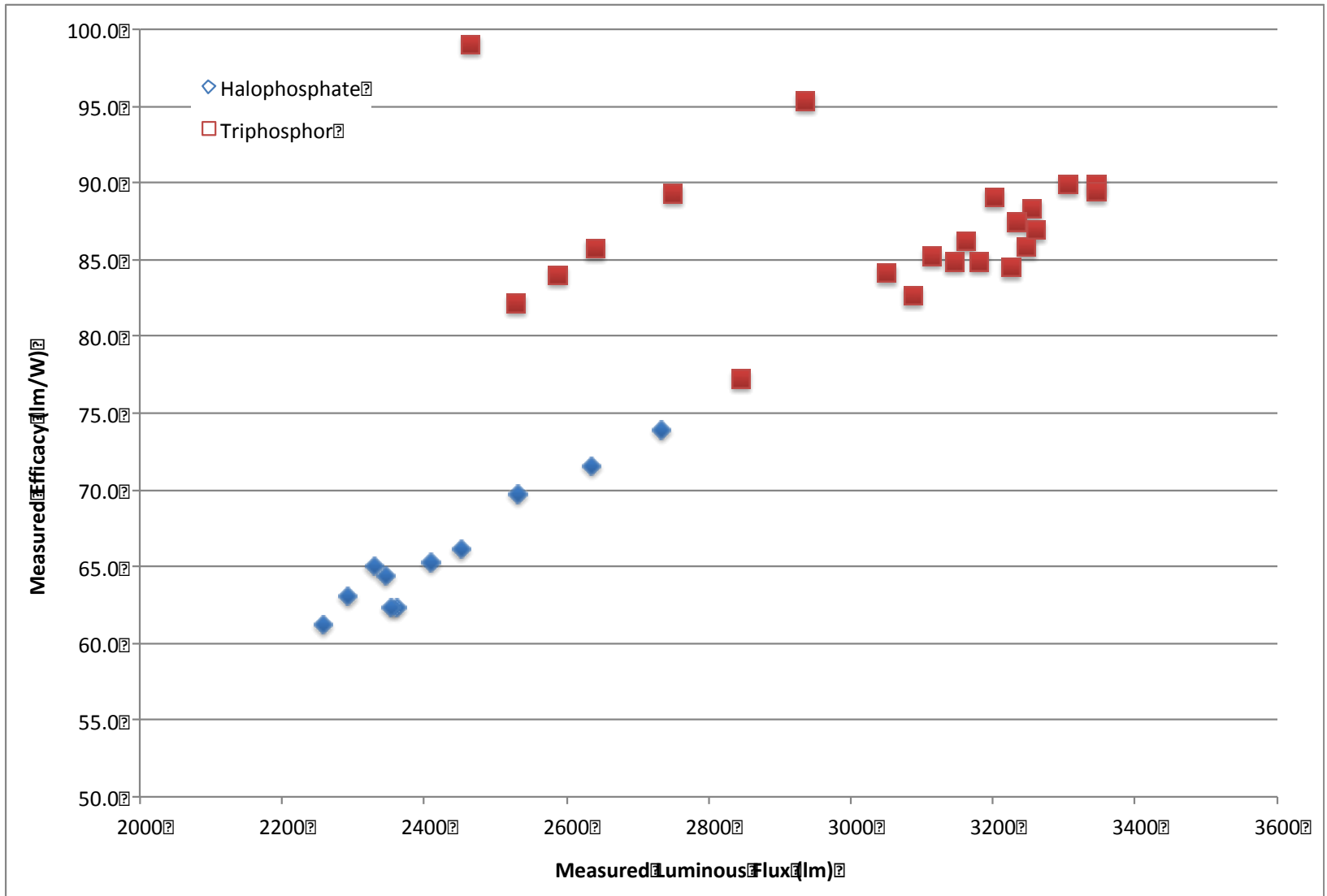
Test Procedures

Lamp Samples from Country	Location of Test Laboratory	Test Procedure
China India UK USA	China	IEC 60081
	India	IEC 60081
	India	IEC 60081
	USA	IES LM-9

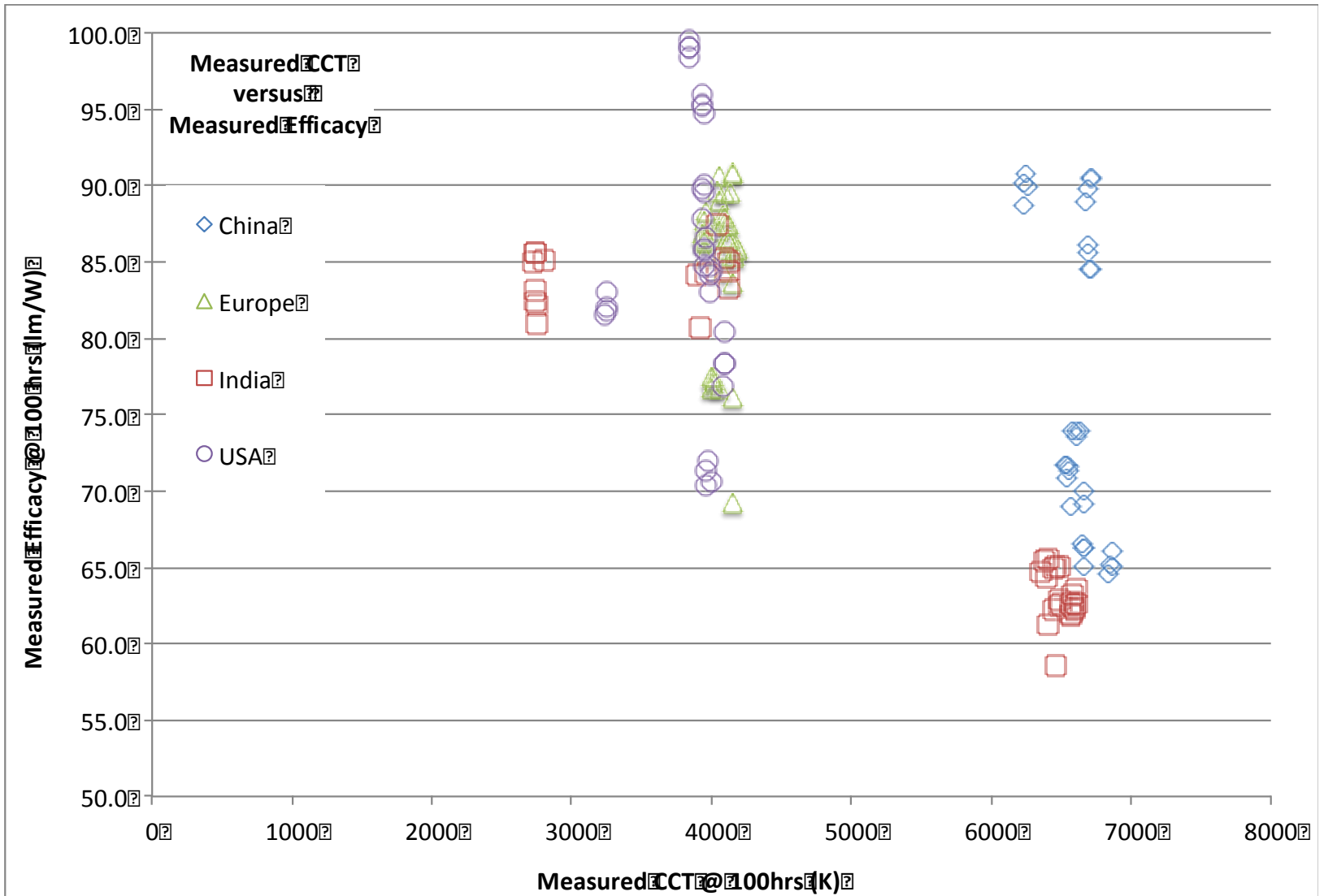
Results - Measured luminous flux VS. measured efficacy



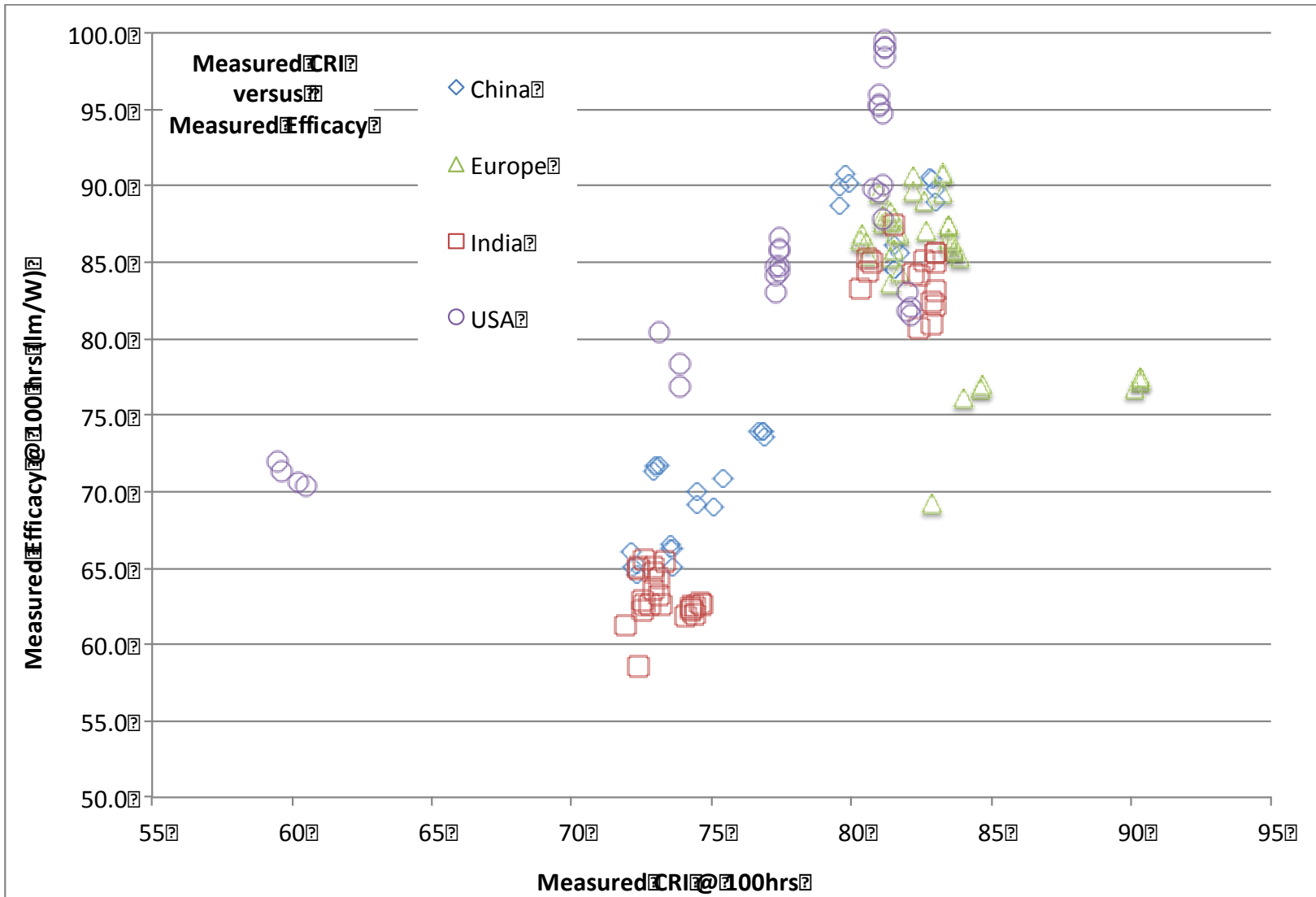
Results - Efficacy of halophosphate and triphosphor lamps



Results - CCT VS. measured efficacy

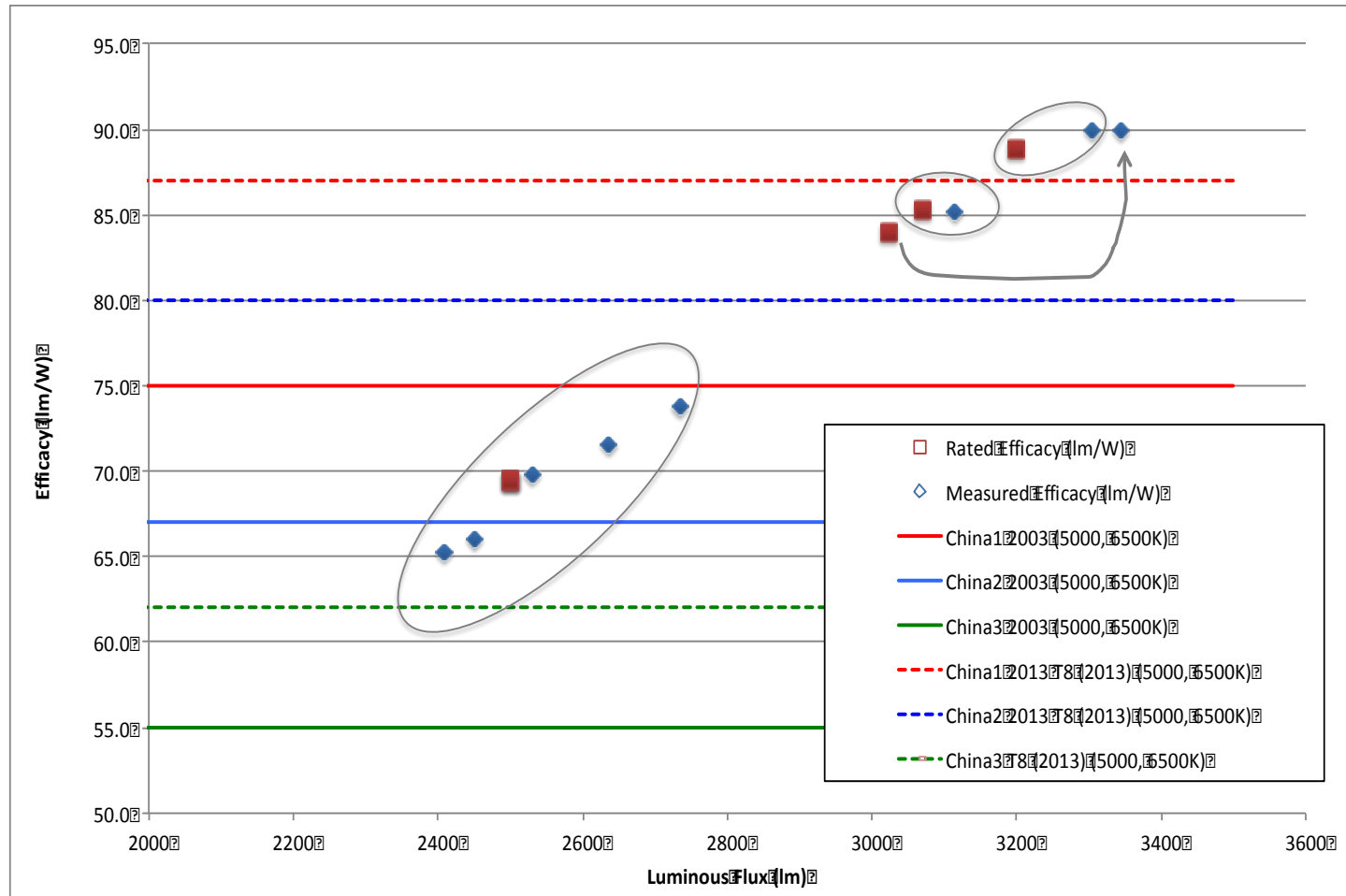


Results - CRI VS. Efficacy



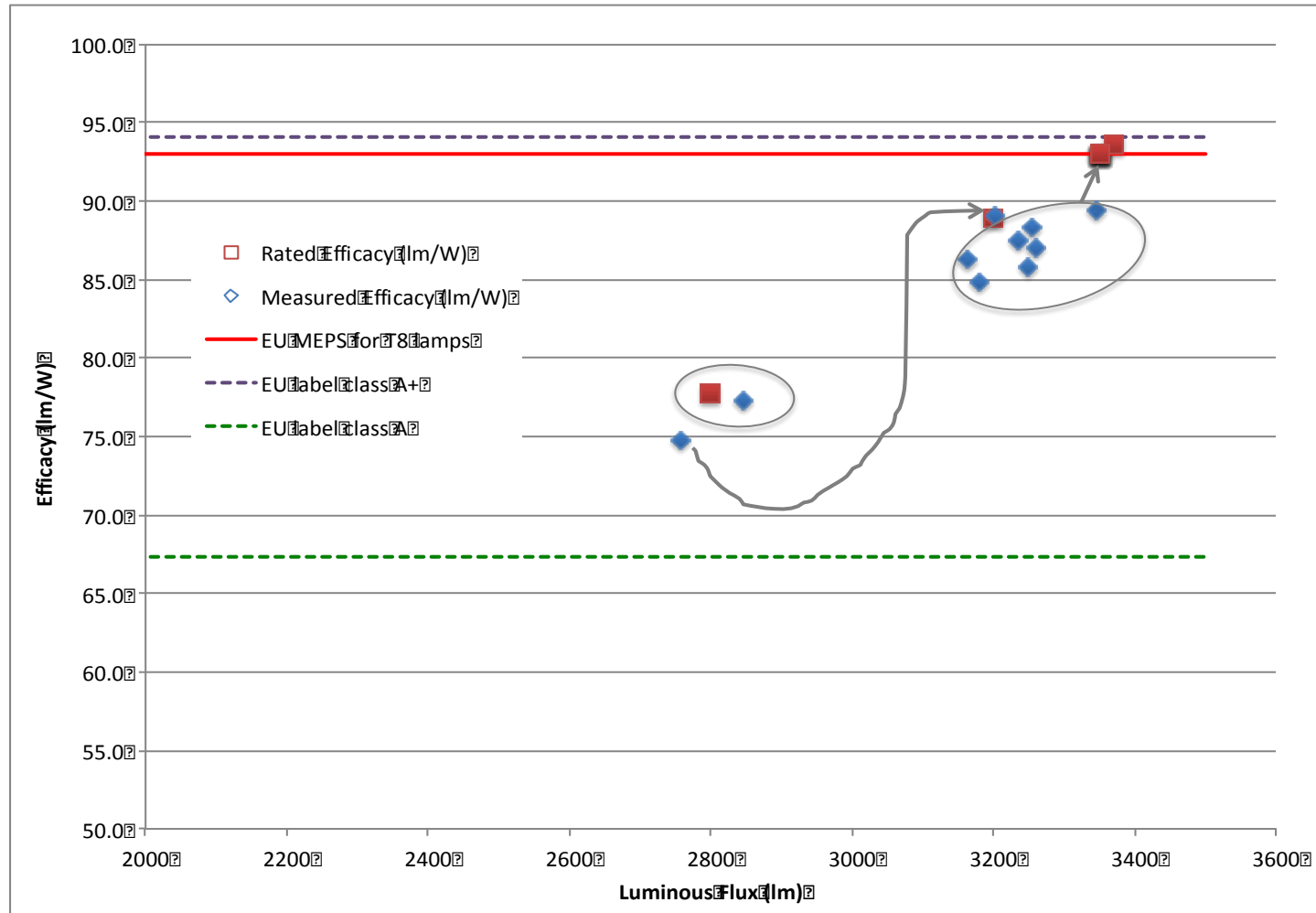
Results - Comparison of Test Results with MEPS and Labeling Requirements

- China



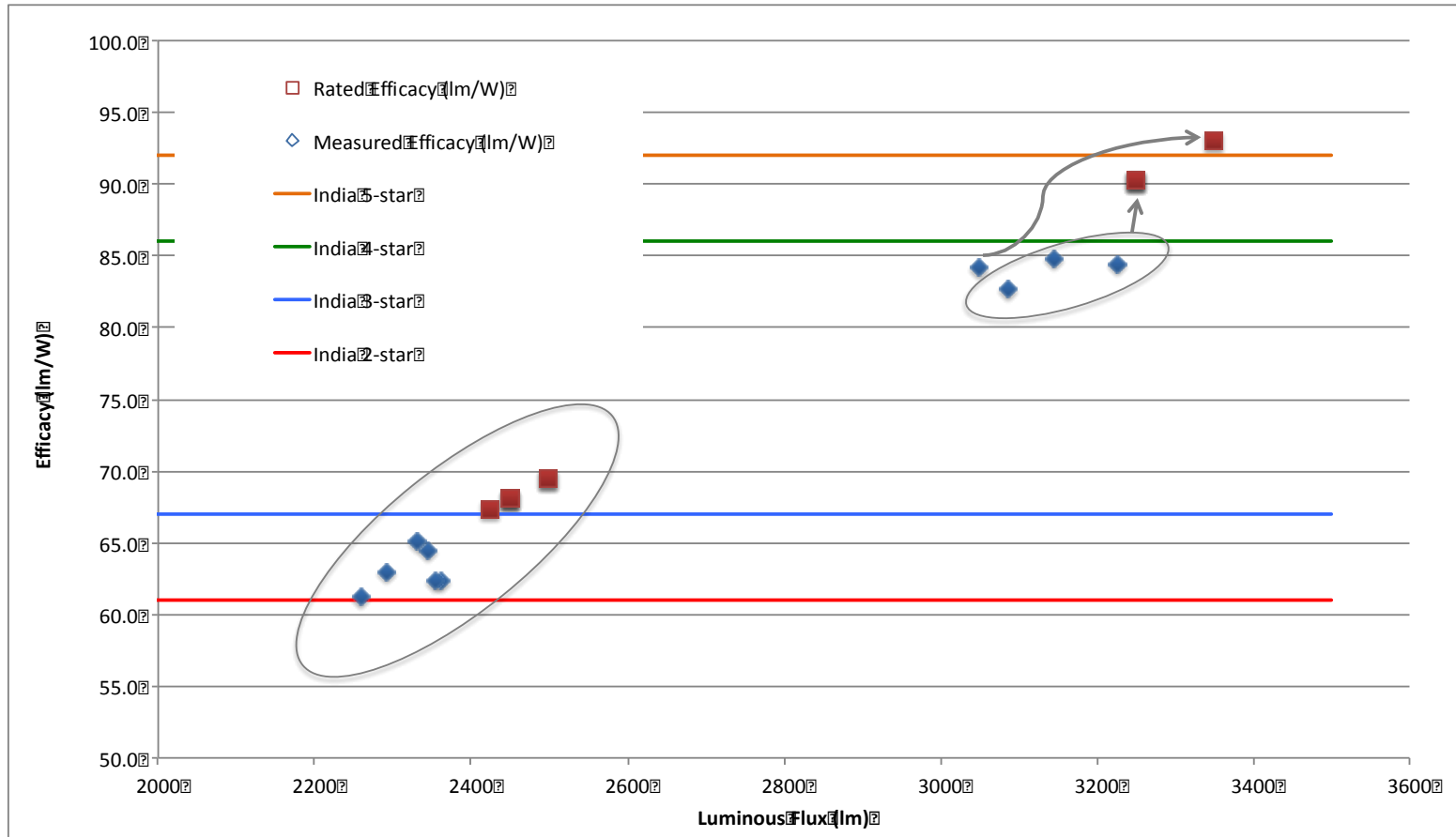
Results - Comparison of Test Results with MEPS and Labeling Requirements

- EU



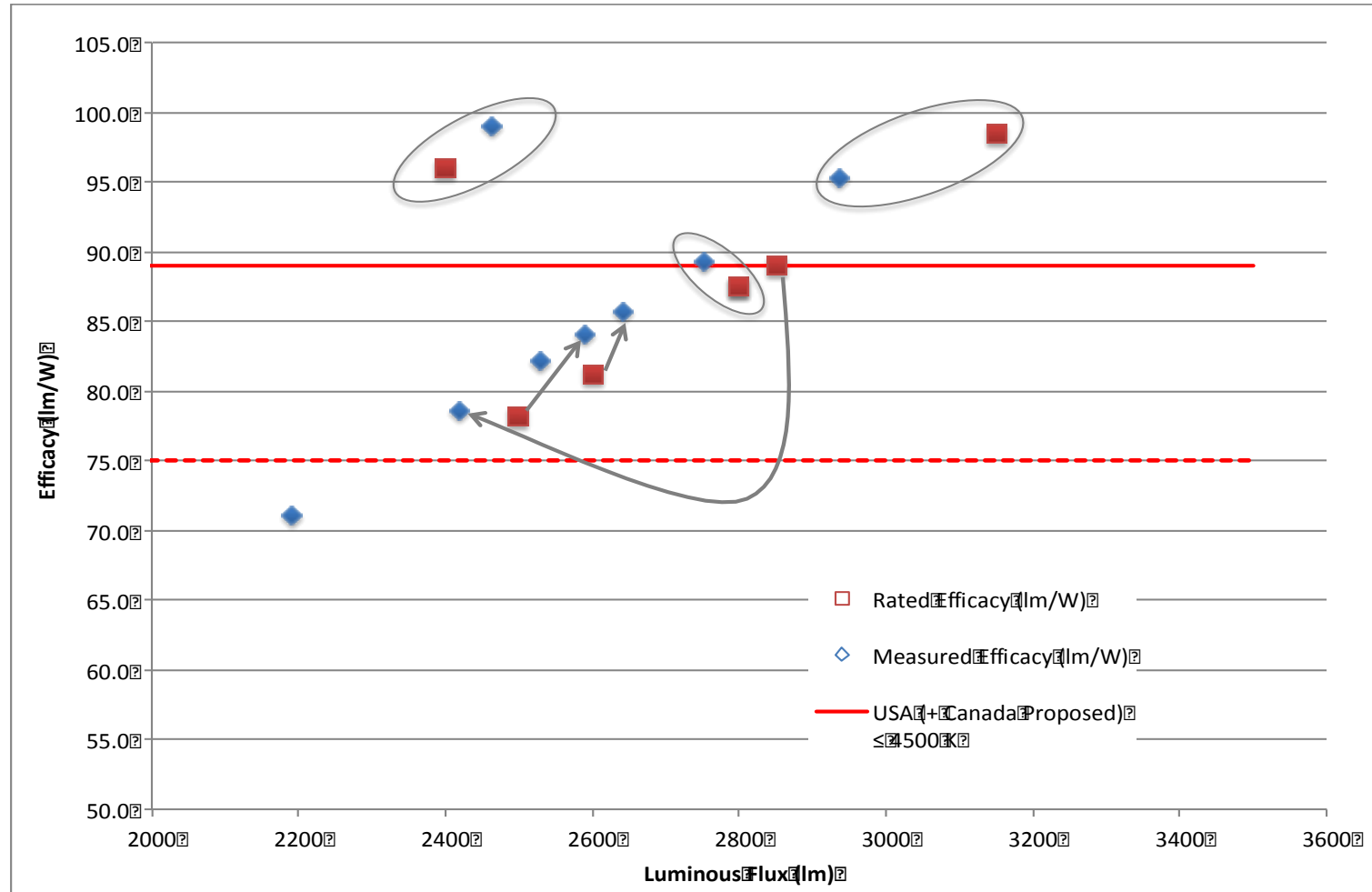
Results - Comparison of Test Results with MEPS and Labeling Requirements

- India



Results - Comparison of Test Results with MEPS and Labeling Requirements

- USA



Conclusions and Recommendations



Policy Recommendations (1)

- Countries should mandate triphosphor lamps and electronic ballasts to maximize energy savings from LFLs.
- A global effort to eliminate magnetic ballasts from the marketplace would contribute to large energy savings, perhaps modeled after the UNEP en.lighten initiative.
- Alignment of ballast test procedures, efficiency metrics and MEPS could be considered to complete the transition of the international fluorescent ballast market to electronic ballasts.



Policy Recommendations (2)

- The IEC and IES test procedures for LFLs could incorporate multiple tiers for MEPS
 - Allow countries to choose from a set of “high” MEPS limits (mandating triphosphor lamps) or a single “low” MEPS limit (allowing halophosphate or triphosphor lamps).
- Countries with “low” MEPS should improve stringency to relatively more efficient levels (e.g., 75 lm/W rather than 55 lm/W).
- Countries should strengthen monitoring, verification and enforcement of LFLs.

Thank you!

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with any questions or comments

