Update on Australian Efficient Lighting Initiatives

David Boughey

Department of Climate Change and Energy Efficiency

lites.asia

Background

- Australian Government announced Phase-out of Inefficient Incandescent Lamps in February 2007.
- Phase-out commenced 2009.
- Import restriction on tungsten filament GLS incandescent lamps <150W.
- Point of sale Minimum Energy Performance Standards put in place in a staged approach as effective and efficient alternatives were available.

Current Position

Lighting MEPS specify efficacy levels for lamps in lumens/watt, + performance requirements:

- Incandescent lamps (tungsten filament and halogen)
- Compact Fluorescent Lamps (integrated)
- Linear Fluorescent Lamps
- Ballasts for Linear Fluorescent Lamps
- Transformers and Converters for Halogen Lamps

Incandescent lamp timetable

- *MEPS currently in force for :*

  - General Lighting Service(GLS) tungsten filament lamps <150 W

  - Extra low voltage (ELV) halogen lamps (reflector and non-reflector)

  - Mains voltage halogen non-reflector

  - >25W candle, fancy round, globe and decorative tungsten filament lamps

Incandescent lamp timetable

- October 2013 - Mains voltage reflector lamps including halogen (shapes PAR, ER, R, etc)
- Does not include: coloured lamps, crown-reflector lamps and special purpose and automotive lamps:
  - Lamps intended for traffic signals - AS 4113
  - Very long life lamps intended for sea or air navigation purposes
  - Lamps with a temperature rating greater than 300°C intended for use in ovens
  - Infra-red lamps
  - Reinforced construction (rough use or vibration) lamps
  - Packaging must state not intended for general purpose illumination

Incandescent Lamps Requirements

- Minimum Efficacy (in lumens per Watt). When tested in accordance with AS/NZS 4934.1 the required minimum initial lamp efficacy (in lm/W) is given by the formula:
  - Initial efficacy: Average value shall be ≥ (2.8 ln (*L*) − 4.0)
  - Where ln (*L*) is the natural logarithm of the measured initial luminous flux (in lumens)
- Until 30 September 2013, mains voltage halogen non-reflector lamps may comply with an alternative initial efficacy requirement, as follows:
  - Initial efficacy: Average test value shall be ≥ 0.95 x (2.8 ln (*L*) − 4.0)

Incandescent Lamps Requirements

- There are also requirements for:
  - Lumen Maintenance (minimum of 80% measured at 75% of rated lamp life); and,
  - Minimum Lamp Life (median lamp life of at least 2000 hours)
- ELV Halogen Reflector lamps max wattage 37 watts
- GLS tungsten filament lamps <150 W are also subject to Import Prohibition
- Package Marking Requirements:
  - Light output (lumens)
  - Wattage (watts)
  - Lamp Lifetime

Halogen Lamps - Challenges

- Incandescent MEPS set at 15 lm/W – intended to allow better performing halogen lamps to remain in the market where there was not currently an alternative.
- At request of industry we have since temporarily adjusted the MEPS level for mains voltage halogen lamps to 95% of the full MEPS level.
- We have also delayed introduction of MEPS for mains voltage halogen reflector lamps - these would not even meet the 95% levels do to losses in the reflectors.
- We are seeking advice at to when effective and efficient alternatives will become available for these lamps.

Compact Fluorescent Lamps (integrated)

- Self-ballasted compact fluorescent lamps (CFLs) of all voltages and wattages irrespective of the type of lamp cap are required to comply with Minimum Energy Performance Standards (MEPS)
- The intention of MEPS for CFLs is to ensure the performance of CFLs to ensure that they remain a viable alternative for inefficient incandescent lamps.

Compact Fluorescent Lamps

- CFL MEPS includes performance specifications for the following attributes:
  - Starting time
  - Run-up time
  - Luminous flux, efficacy and lumen maintenance
  - Power, power factor and harmonics
  - Premature lamp failure rate
  - Low temperature starting
  - Switching withstand
  - Lamp life
  - Colour attributes
  - Mercury content

Compact Fluorescent Lamps

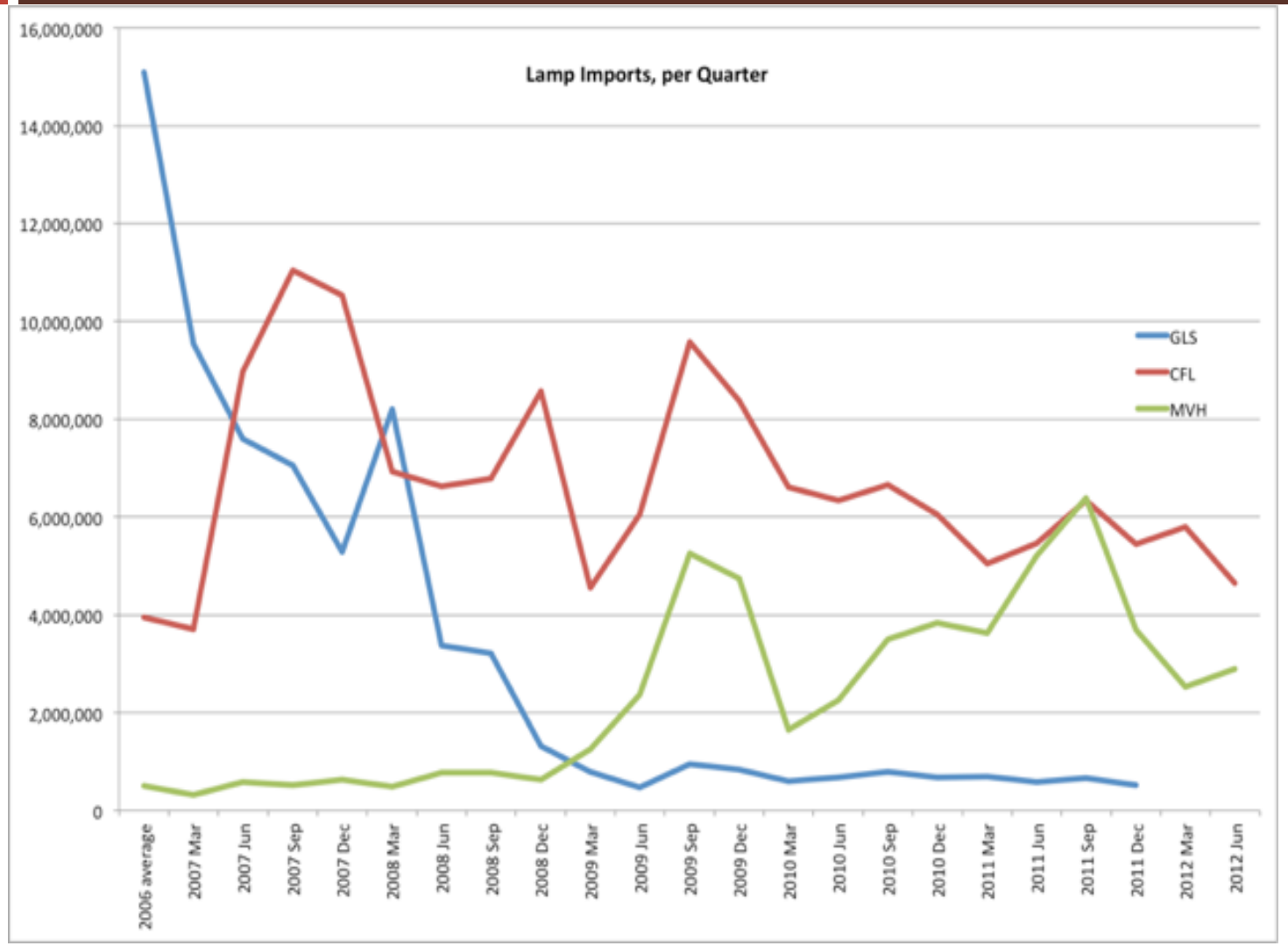
Package Marking Requirements:

- Light output (lumens)
- Wattage (watts)
- Lamp Lifetime
- Mercury
- *See 4.4.1 of AS/NZS 4847.2 for full requirements*

Phase-out Results

- Analysis of lamp import data and a household survey.
- Preliminary analysis indicate that, since the announcement of the phase-out until the end of June 2011, the residential stock of CFLs has increased by more than 60 million lamps.
- Greenhouse gas savings from this transition, as well as from the installation of higher efficiency halogen replacement lamps, are estimated to be approximately 2 million tonnes per annum, with total consumer energy savings of around $400 million each year.
- These savings can be attributed to the phase-out regulations and various activities aimed at promoting the use of CFLs, such as state-based lamp replacement schemes.

Lamp Imports



Compliance

- Over 170 CFL products were purchased in 2010 (after introduction of MEPS) and tested.
- Results (including lifetime) have now been received and are being analysed.
  - For example – 131 lamps were tested for mercury.
  - 7 models failed (over 5mg)
  - Three lamps were above 9mg with highest 12mg
- We will soon be commencing an in-store survey of incandescent lamps which will examine
  - Registration of regulated products
  - Compliance with packaging requirements
  - Some samples will be tested for compliance with MEPS

Regulatory Changes - GEMS

- Policy on electrical appliance energy efficiency in Australia is developed cooperatively amongst State, Territory and the Commonwealth Governments (also cooperation with New Zealand) through the Equipment Energy Efficiency Program (E3 Program).
- Greenhouse and Energy Minimum Standards (GEMS) Act 2012 came into effect on 1 October 2012.
- The GEMS legislation will create a national framework for the E3 Program in Australia by replacing seven overlapping pieces of state legislation.

Regulatory Changes - GEMS

- This framework will provide for enhanced monitoring, verification and enforcement and allow the scope of the E3 Program to be expanded.
- The Australian GEMS Regulator will replace state regulators in enforcing regulations.
  - Regulations will specify the requirements for MEPS for lighting, including offences and penalties if a party does not comply with the requirements.
  - Technical requirements for MEPS are set out in Determinations which usually reference the relevant appliance standard.
  - Further information: www.energyrating.gov.au/commencement-of-gems-legislation/

Next Steps?

- Review CLF and Incandescent MEPS Standards to:
  - Identify any technical errors in standards that need to be fixed in the short term
  - Consider options to improve the MEPS, including changes to efficiency requirements – this would require a regulation impact statement.

Next Steps?

- Examine options for improving energy efficiency and performance of other lighting products:
  - Commercial lighting and luminaires
  - LED lighting
  - Street Lighting
- We will prepare ‘Product Profiles’ to examine:
  - The range of products in the market,
  - Range of energy efficiency
  - Opportunities to save energy
  - Available international standards
  - Possible tools to improve efficiency of products (information, labels, voluntary standards, MEPS etc)

LED Lighting

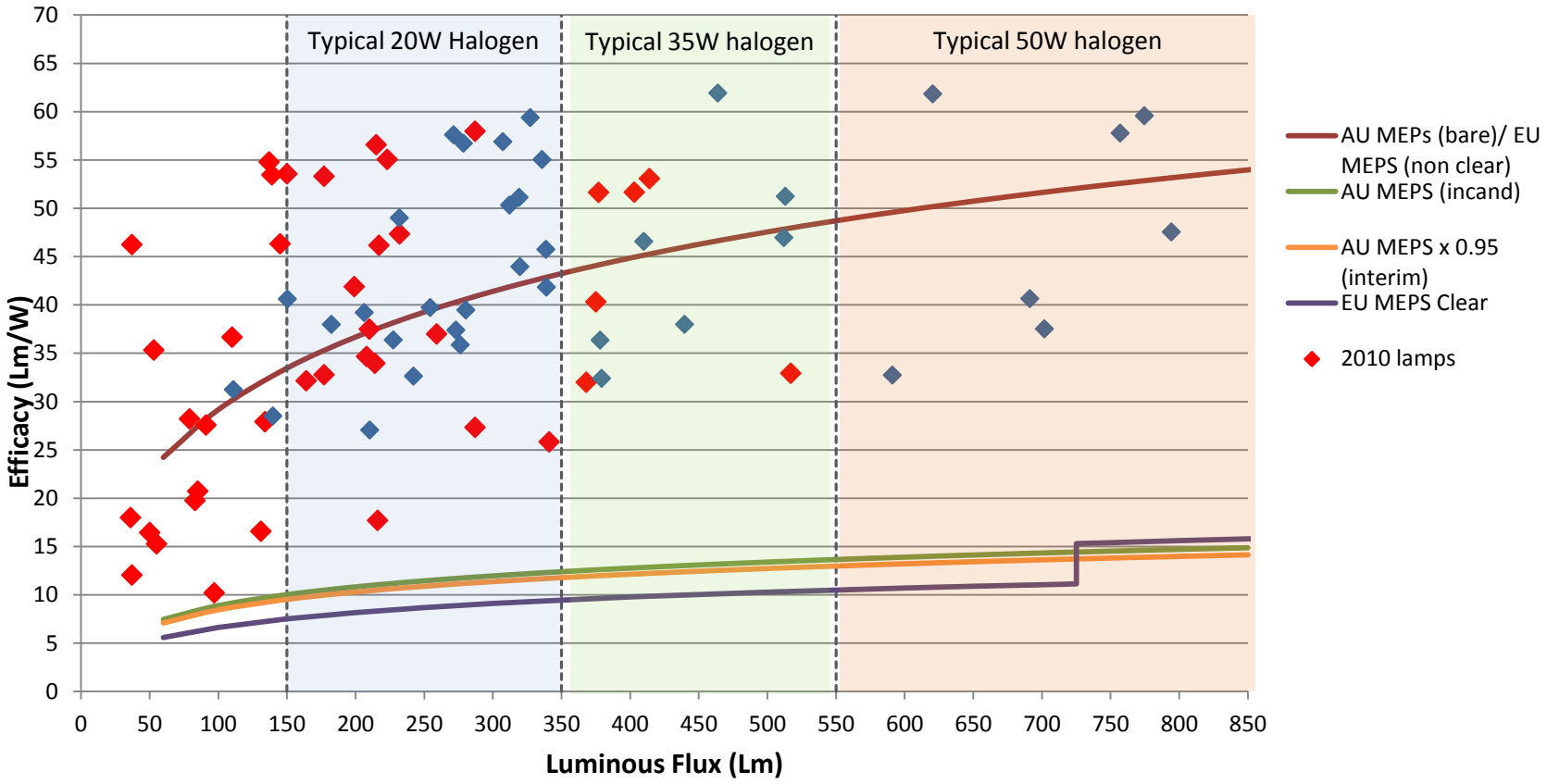
- Monitoring of LED lighting in the market indicates that technology is developing rapidly.
- LED lighting has the potential to broaden the range of energy efficient lighting options available to consumers.
- However evaluation of LED products currently available in the marketplace indicates a wide variation in quality and efficacy.
- We are concerned that consumer experience of expensive, poor quality LEDs will impact upon their willingness to buy the products in the future.

LED Lighting

- Negative consumer perception could reduce consumer uptake and reduce the energy savings that could be gained from adoption of this new technology as a replacement for inefficient lighting.
- We have commenced testing of over 80 LED products purchased in Australia and overseas:
  - to further understand the quality and efficacy of products currently available to consumers;
  - to examine available test methods for LEDs.
- Tests to date have shown significant variation in quality and efficacy and between claimed and measured performance.

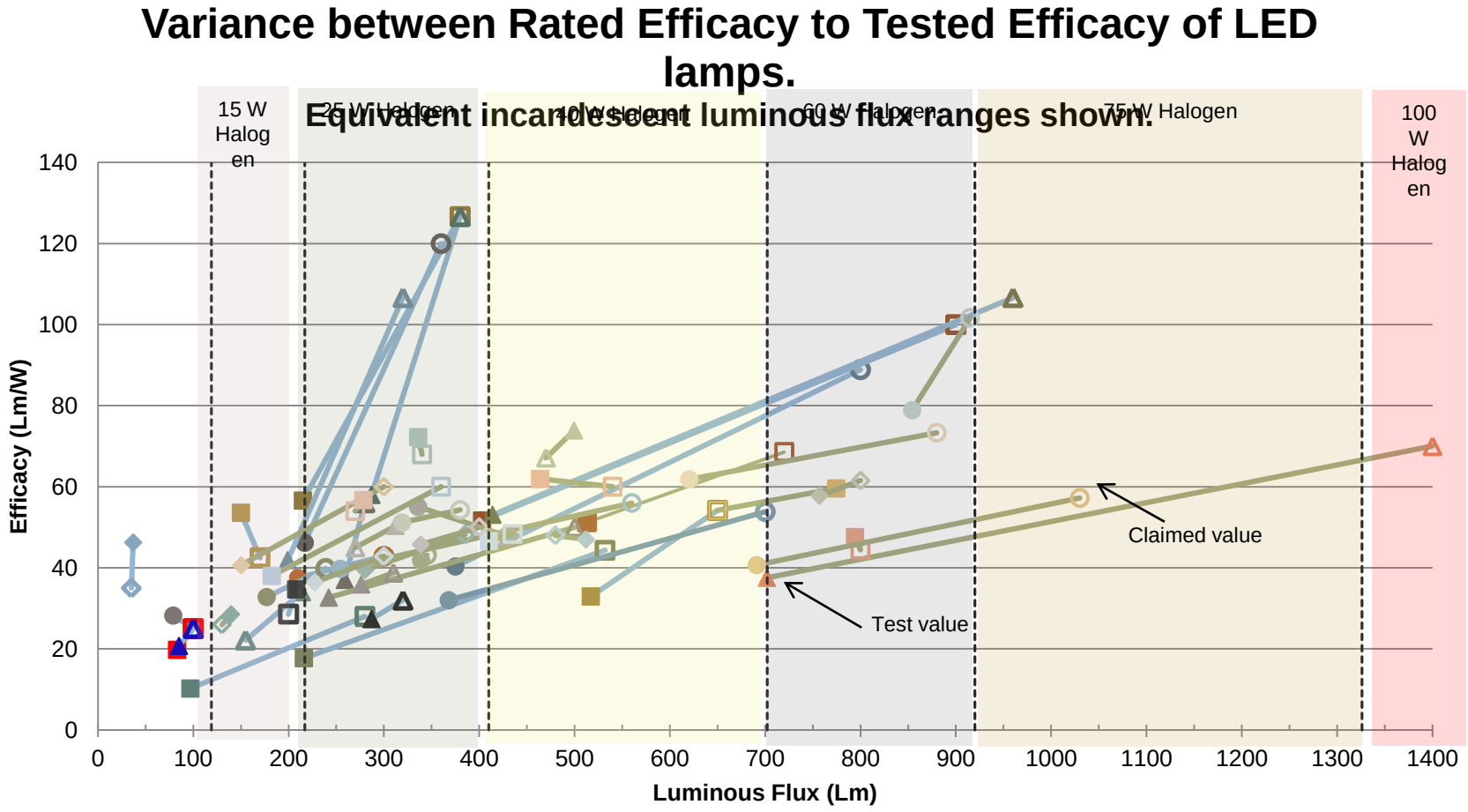
LED Performance

Performance of LED lamp technologies purchased in 2010 and 2012



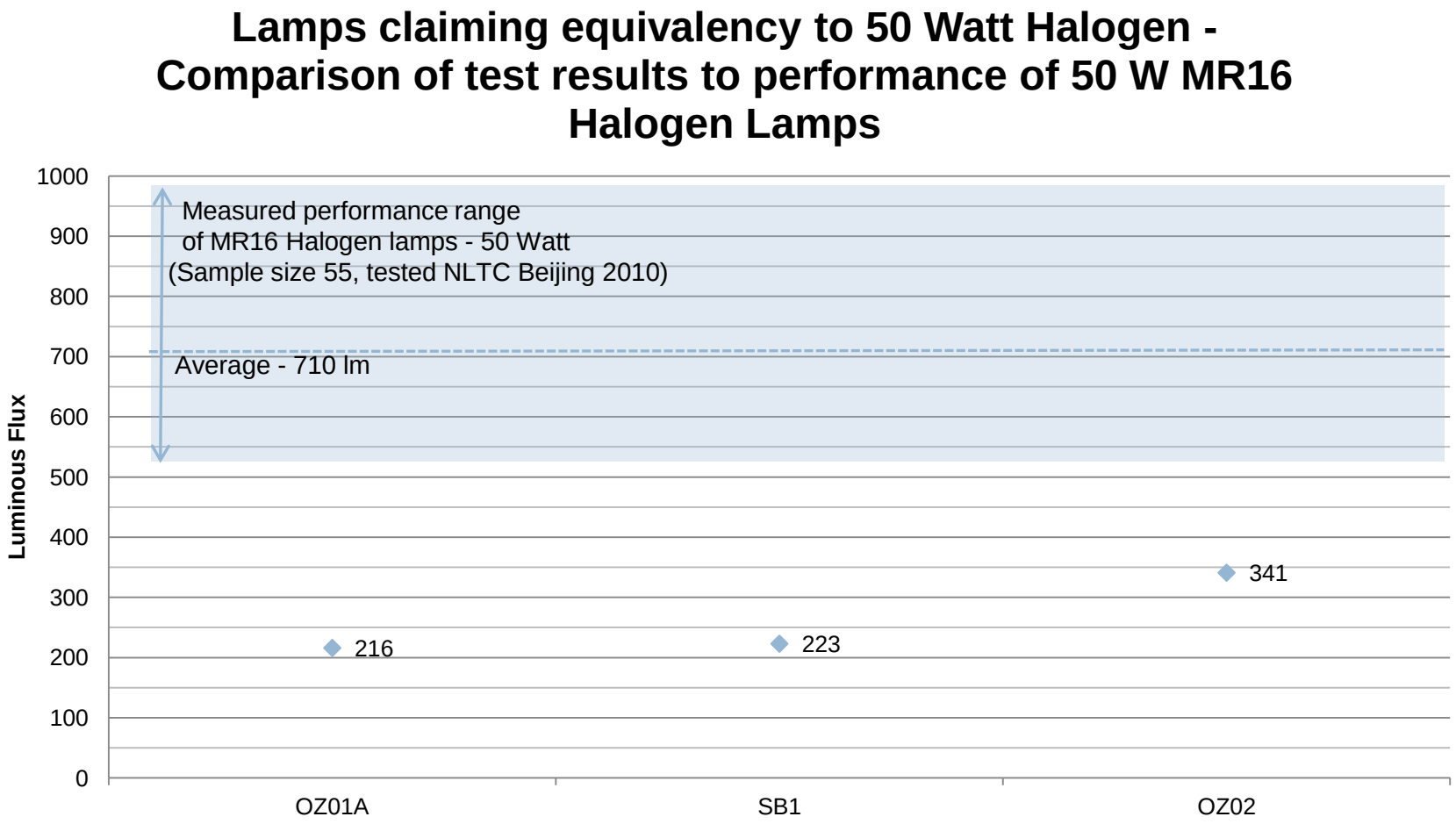
lites.asia

LED Performance – Claim Vs Test



lites.asia

Equivalence Claims



LED Challenges

We need to:

- Ensure accurate information on product performance and equivalence is available so that consumers understand what they are buying.
- Provide guidance on acceptable minimum performance levels.
- Discourage the least efficient LEDs that may potentially be less efficient alternatives to more efficient LEDs and already proven efficient lighting (such as CFLs) for uninformed consumers
- Recognise that LED lighting performance and quality is complex and truth in claim will not in itself ensure consumers have access to quality products.

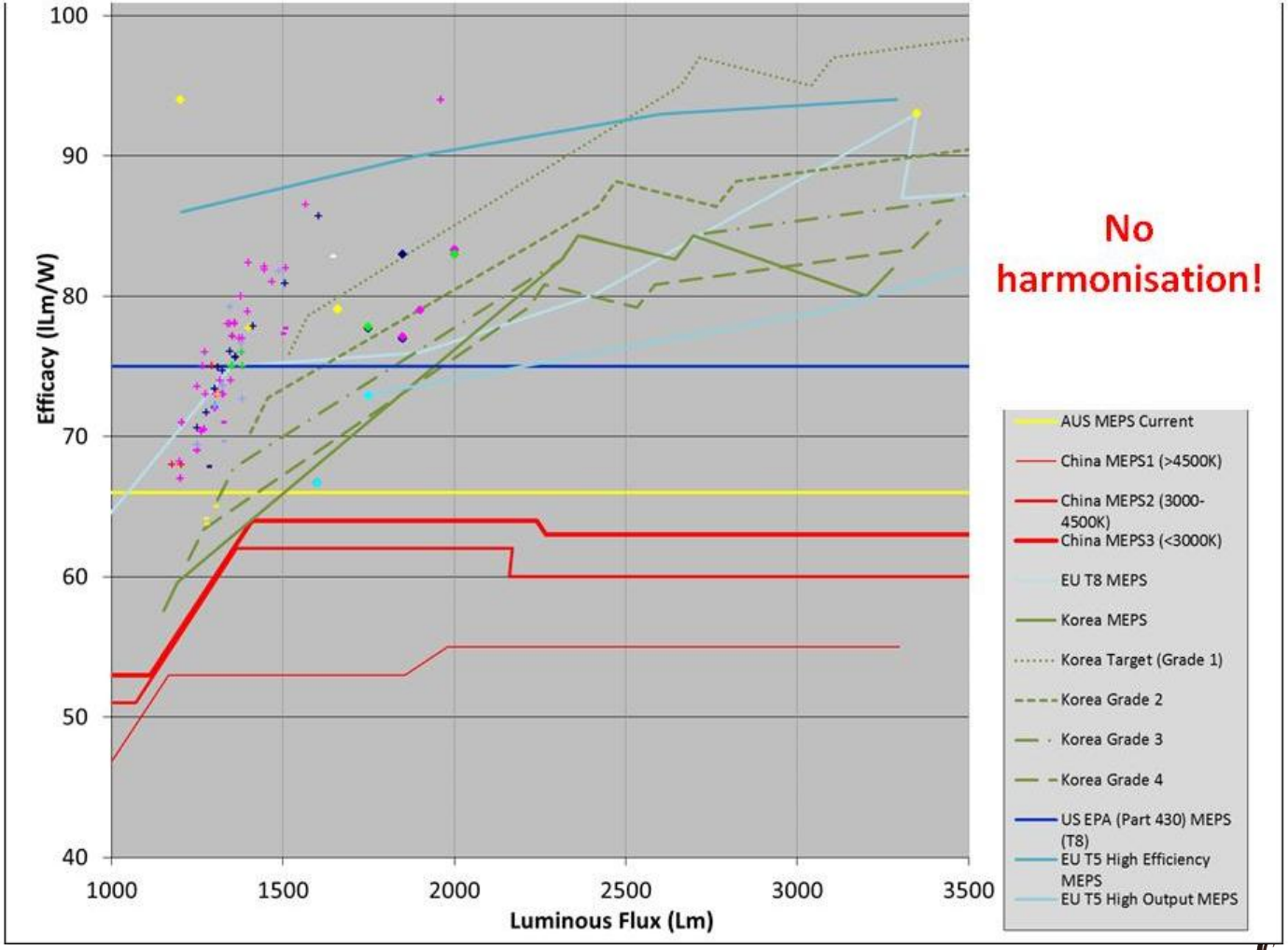
LED Action

- Make available lites.asia LED consumer guide.
- Continue to participate in relevant international work:
  - IEA 4ESSL work on LED performance parameters and testing
  - IEC LED standards
  - These international initiatives will help guide our domestic action
- Continue monitoring LED performance.
- Prepare LED lighting Product Profile.
- Use the product profile to consult with stakeholder on how best to ensure efficiency and quality of LED lighting.
- If regulatory action is considered an option, a Regulation Impact Statement (RIS) will be prepared.

Commercial Lighting

- A product profile is being prepared to consider options for the improvement of commercial lighting energy efficiency
- MEPS regulations for linear fluorescent lamps and ballasts have been in place since 2004 and will be reviewed:
  - Market information is being examined to evaluate range of claimed efficiency in order to determine potential improvements in efficiency through a more stringent MEPS.
  - International standards also being examined for best practice

Survey of Linear Fluorescent Performance Levels



lites.asia

Commercial Lighting

- We are also examining options for improvements to the energy efficiency of basic commercial luminaires – 'troughers' for linear fluorescents and 'can' recessed lighting for compact fluorescent lamps.
  - Will examine market data on performance
  - Consider parameters that influence product efficiency
  - Consider international best practice
- The Commercial Lighting Product Profile will also consider circular fluorescent and non self-ballasted CFLs
- A Regulation Impact Statement will be developed following stakeholder consultation on the Product Profile

Street Lighting

A National Energy Efficient Street Lighting Strategy has been developed to examine options to improve the efficiency of street lighting in Australia including:

- Identify barriers to the uptake of more efficient street lighting and develop strategies to address any identified problems, including considering introduction of mandatory standards for lighting energy efficiency while considering related cost implications for local government.
- Collect and make available to street lighting service providers and local governments nation-wide information on energy efficient street lighting technologies and operational practices.
- Consider whether an incentive mechanism for distributors to install efficient equipment is needed to give effect to this measure.

Street Lighting

The draft Strategy identified a range of options to improve the efficiency of street lighting in Australia including:

- Establish a National Street Lighting Assessment Process to provide for coordinated technical trials and approvals of proposed new lamps and luminaires that offer energy savings.
- Ask the Australian Energy Market Commission (AEMC) to change the national electricity market rules to provide a more streamlined and equitable process for pricing of street lighting services.
- Further assess and consult with industry stakeholders on options for the accelerated phase-out of inefficient lighting technology such as mercury vapour including the consideration of regulatory approaches, through the formal regulatory impact assessment process.

Street Lighting

- Support the reactivation of the Standards Australia Street Lighting Committee and the revision of the Road Lighting Standard (AS/NZS 1158) to ensure they do not unintentionally obstruct the introduction of new efficient street lighting technologies.
- Implement a communication and stakeholder information sharing program to overcome information barriers among street lighting stakeholders.
- Implement small scale demonstration bulk replacement roll-outs in each region over three years.
- Assist local councils to act cooperatively in regions to prepare business cases to access third party funding for accelerated roll-out of efficient street lighting.

Street Lighting

- Implementation of the Strategy would provide estimated annual energy savings of between $35 million and $52 million, and greenhouse savings of 400,000 to 635,000 tonnes CO_2-e per annum over the life of the products (generally 20 years).
- The Draft Strategy is currently being considered by governments – no decision has been made.
- Standards Australia Street Lighting Committee has been reconvened and the revision of the Road Lighting Standard (AS/NZS 1158) is underway.
  - A key aim of the revision is the inclusion of LED street lighting and the IEA 4ESSL performance parameters are being taken into consideration.

Education

- Phase-out Program included an extensive point of sale consumer education campaign in consultation with industry and retailers.
- Consumer and stakeholder survey conducted post Phase-out indicated a good level of understanding and little need for further broad based consumer education at this time.
- We are now preparing training for specialist lighting retailer stores:
  - Guidance for store staff on appropriate lamp selection
  - Guidance of basic elements of lighting design
  - Information sheets that can also be provided to customers

Thank You