

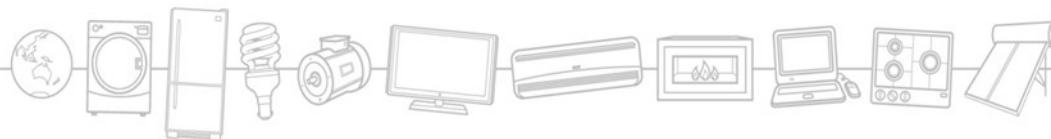
Commercial Lighting consultation

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On behalf of the E3 Committee

Lighting Efficiency - Current Status

Minimum Energy Performance Standards (MEPS) are mandatory requirements for certain lighting products sold in Australia and New Zealand. Regulated via:

- Greenhouse and Energy Minimum Standards (GEMS) Act 2012 (AUS)
- Energy Efficiency (Energy Using Products) Regulations 2002 (NZ)



Commercial lighting products subject to MEPS

- Linear fluorescent lamps since 2004
- Fluorescent lamp ballasts since 2002
- Non-integrated compact fluorescent lamps, circular and U-shaped fluorescent lamps and commercial luminaires are currently not subject to MEPS.

Requirements set out on the Energy Rating Website:

www.energyrating.gov.au/



Commercial lighting in Australia

- In Australia commercial lighting uses about 33.5 PJ
- lighting systems account up to 40% of electricity end-use (commercial sector)
- Sales of linear fluorescent lamps about 17 million in 2013
- Sales of ballasts about 2.2 million in 2013
- Trend of LED downlights replacing CFL cans
- Existing linear fluorescent lamps are more likely to be replaced with more efficient fluorescent lamps than LEDs
- A change to LED linear lamps may occur within 5 years



Purpose of Product Profile

- Report on the state of commercial lighting, capacity for energy efficiency and performance, and current and projected markets.
- To signal to stakeholders the opportunities and options that will likely form the policy options that would be subject to detailed investigation through a Regulation Impact Statement (RIS) before any government decision.
- Product Profiles also released on Incandescent / CFL and LED lighting.



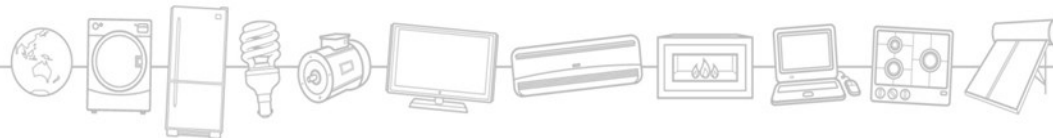
Possible policy options

- No action
- Update test standards for fluorescent lamps and ballasts to recent International Electrotechnical Commission standards
- Increase MEPS levels for linear fluorescent lamps or harmonise with international standards in 2-3 years
- Introduce MEPS for circular fluorescent lamps in 2-3 years

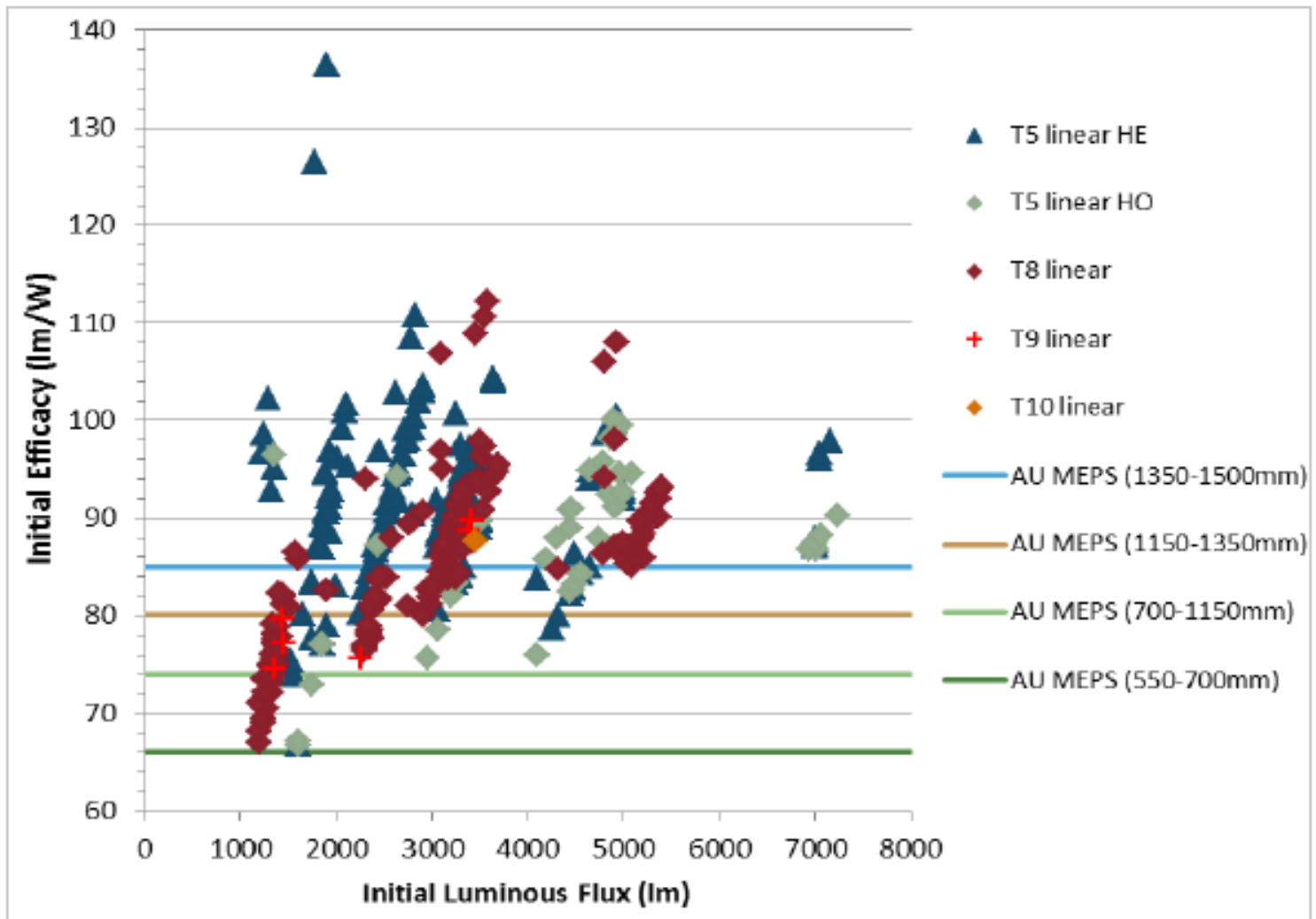


Policy options (continued)

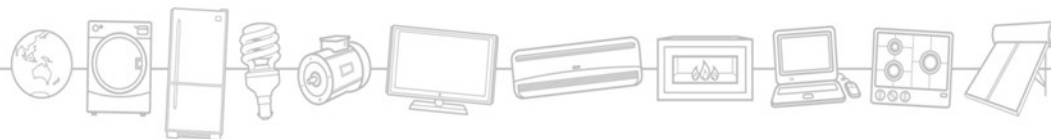
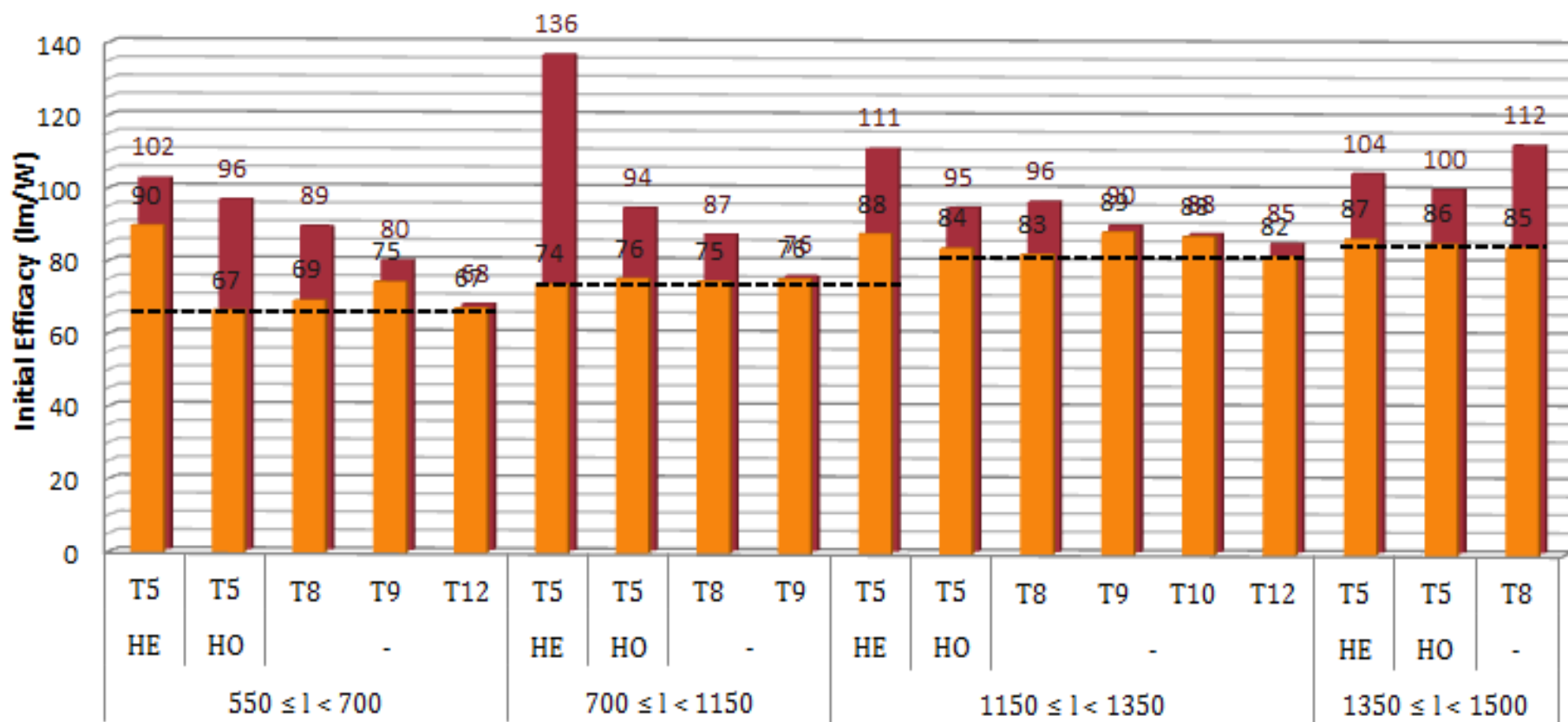
- Reduce mercury content in lamps to meet international requirements
- Harmonise Australia and New Zealand MEPS for ballasts by increasing Australian MEPS requirements
- Align with European stage 3 requirements for ballasts in 2-3 years
- Introduce a voluntary or mandatory MEPS level for commercial luminaires
- Product labelling and education initiatives



Efficacy of linear fluorescent lamps registered in Aus/NZ



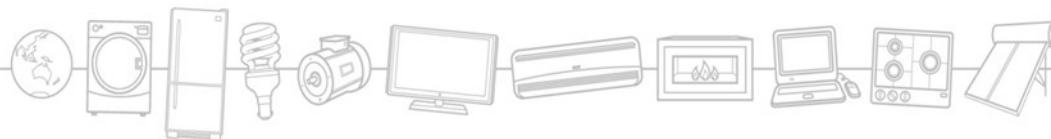
Efficacy of linear fluorescent lamps



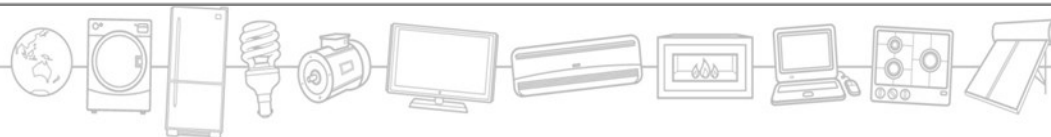
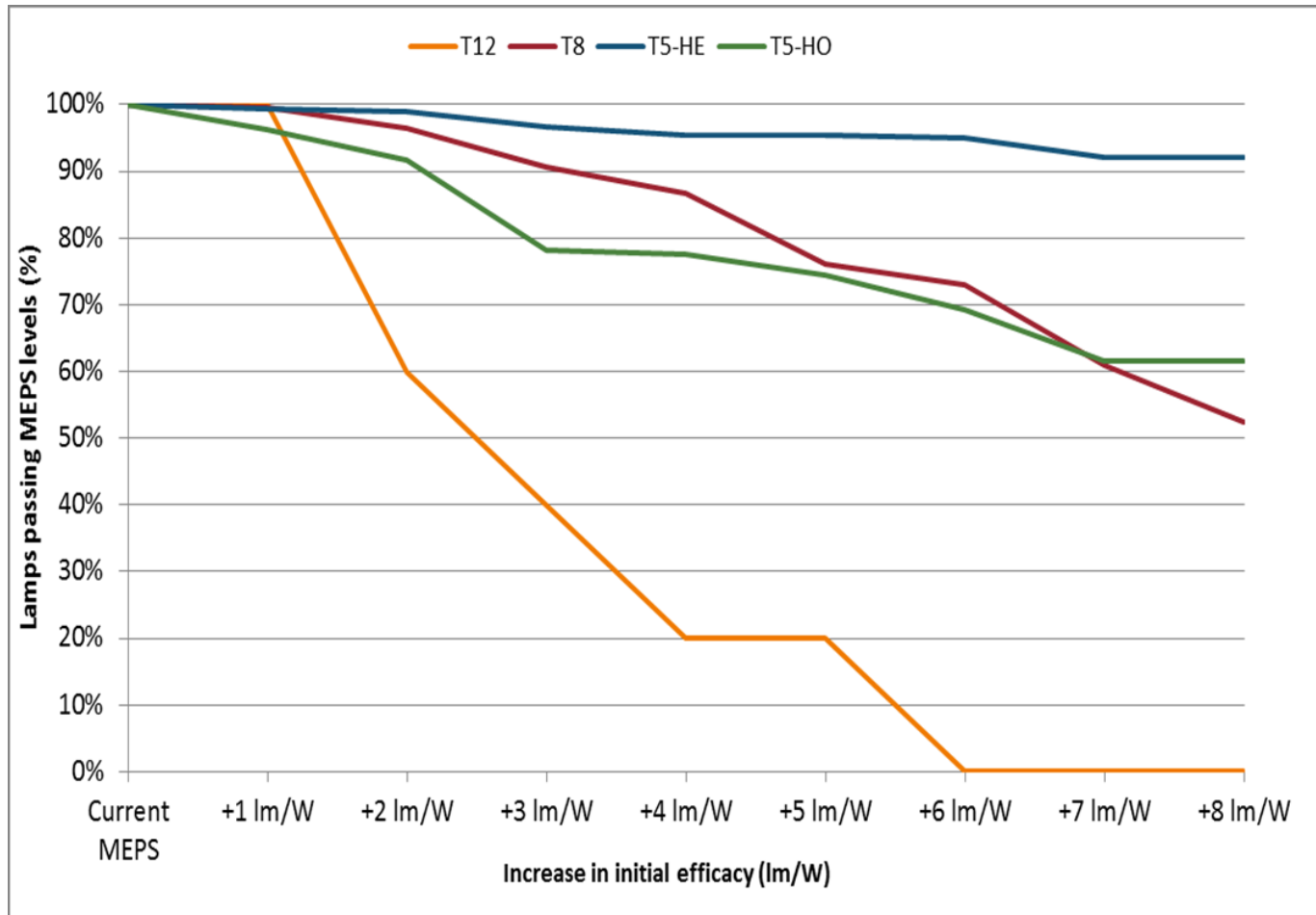
Policy options – linear fluorescent lamps

- *Option - Increase initial and maintained Australian and New Zealand MEPS levels for linear fluorescent lamps*

| | MEPS levels | Length 1 mm | Length 2 mm | Length 3 mm | Length 4 mm |
|----------|-------------|-------------|-------------|-------------|-------------|
| | | 550-700 | 700-1150 | 1150-1350 | 1350-1500 |
| Initial | Current | 66 lm/W | 74 lm/W | 80 lm/W | 85 lm/W |
| Efficacy | Step 4 | 70 lm/W | 78 lm/W | 84 lm/W | 89 lm/W |
| | Step 6 | 72 lm/W | 80 lm/W | 86 lm/W | 91 lm/W |
| | | | | | |



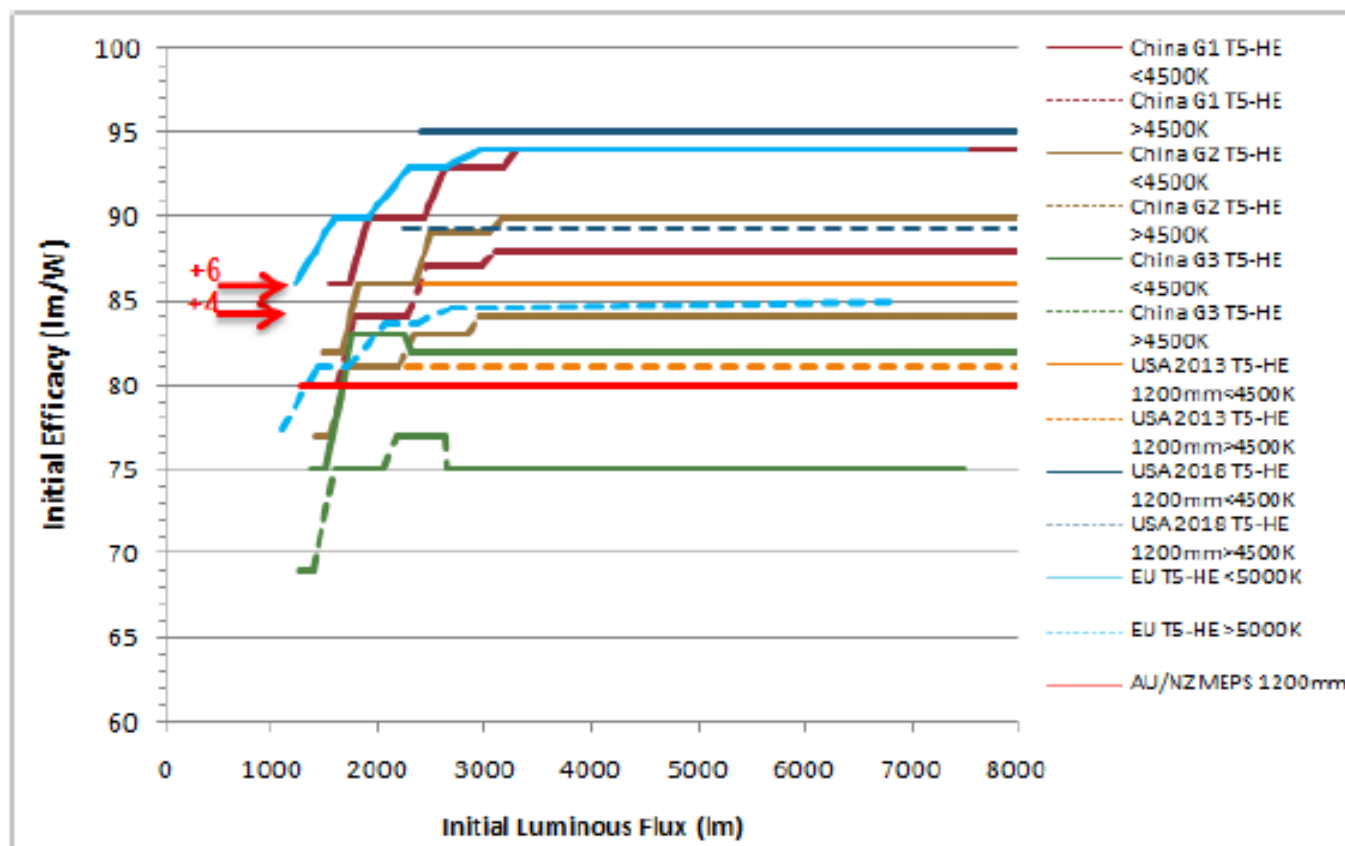
Impact of potential MEPS increase for linear lamps (% lamps remaining in market)



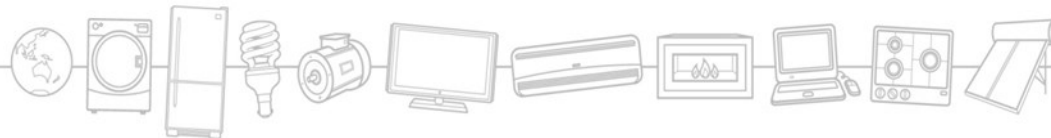
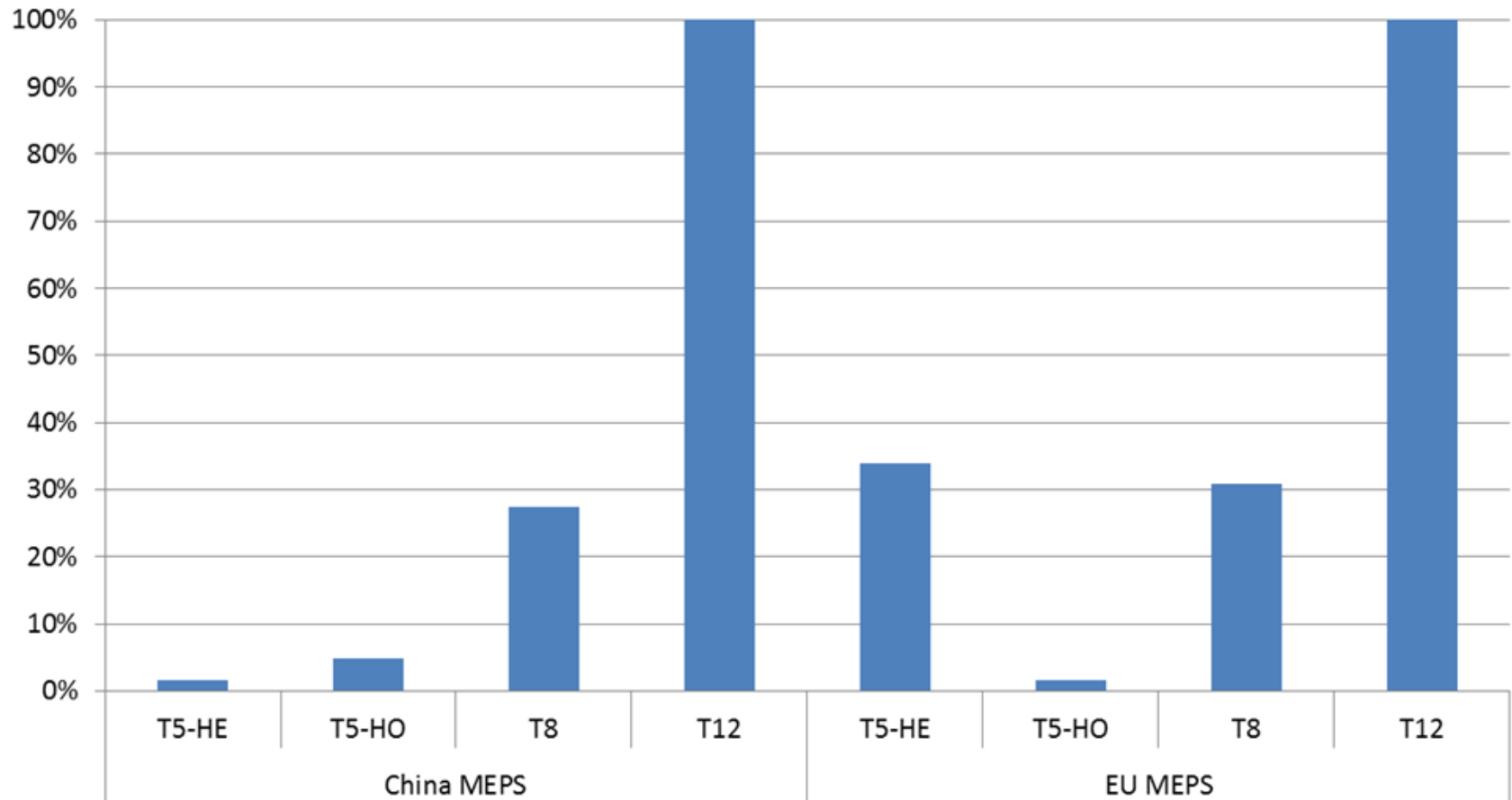
Policy options – linear fluorescent lamps

- *Option - Change linear fluorescent lamp categorisation from length to tube diameter and*
 - *update current MEPS by at least 4 lm/w or*
 - *harmonise with EU or China MEPS levels*

International
MEPS for T8
linear fluorescent
1200mm lamps.



Potential impact of Chinese or European MEPS on linear fluorescent lamps (% lamps removed from the market)



Estimated energy savings for linear fluorescent lamp MEPS

| Policy options, Australia | Energy savings p.a. compared to BAU (GWh p.a.) | Savings GHG emissions (kt CO ₂ -e) |
|---------------------------|--|---|
| LFL (BAU) | - | - |
| LFL (MEPS+4) | 36.7 | 32.2 |
| LFL (MEPS+6) | 47.5 | 41.7 |
| LFL (EU) | 11.1 | 9.7 |
| LFL (China G2) | 3.7 | 3.2 |
| LFL (China G1) | 29.4 | 25.8 |

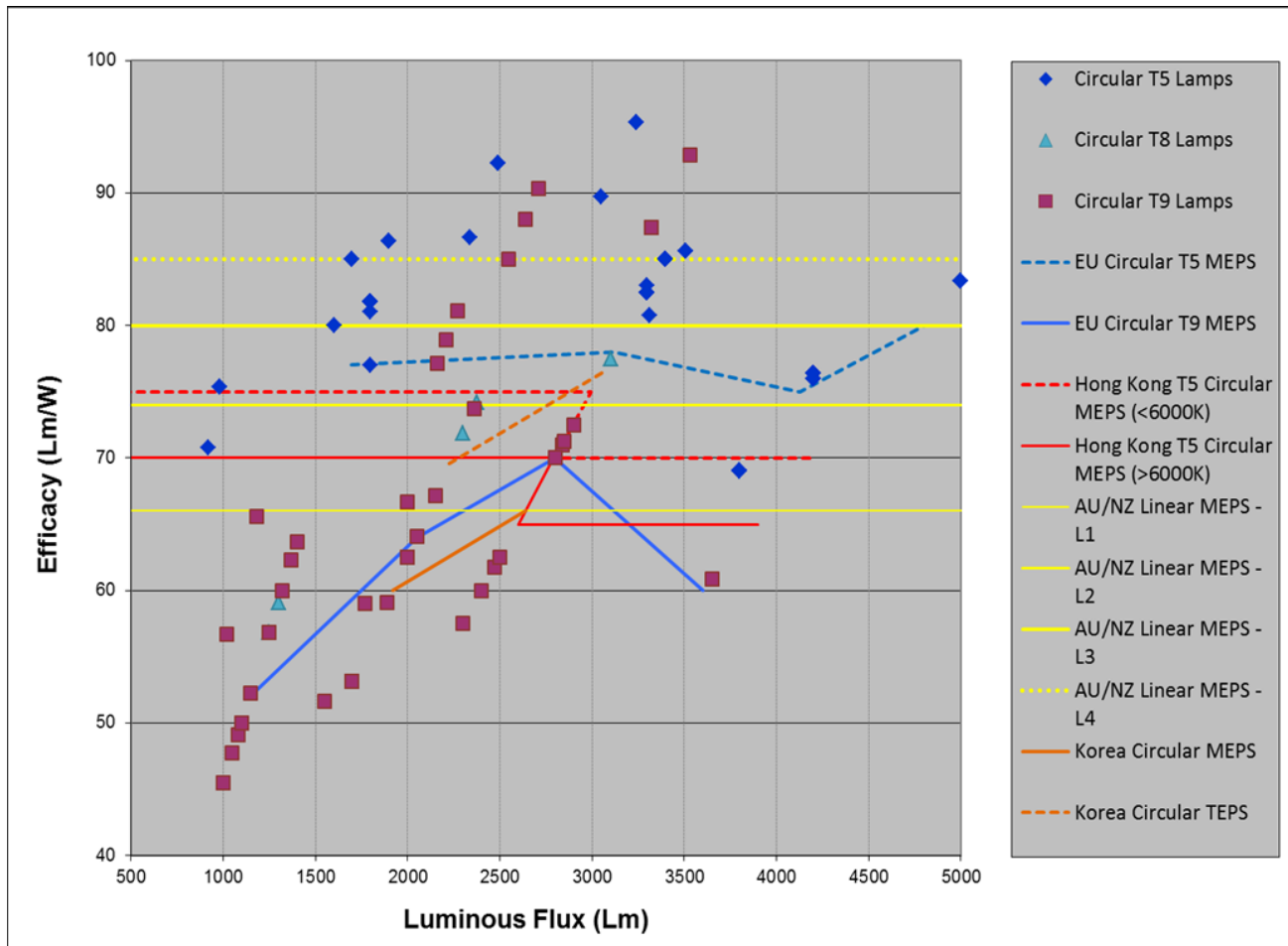


Policy options – circular fluorescent

- *Option - **Introduce MEPS for circular fluorescent lamps in 2-3 years** using test method AS/NZS 60901:2003*
- Opportunity to address lower performances of T9 lamps
- T9 circular fluorescent lamps initial efficacy is broad, although over 50% of models meet the EU requirement.
- Nearly all of the T5 circular fluorescent lamps meet the EU and Hong Kong requirements.

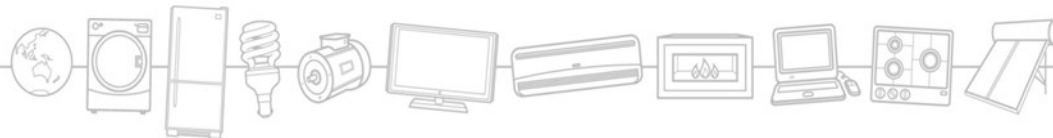


Efficacy of circular fluorescent lamps in New Zealand and Australia



Policy options – Mercury content

- *Option - Reduce mercury content in lamps to meet international requirements*
- The current maximum for linear fluorescent lamps is 15mg but there is room for improvement



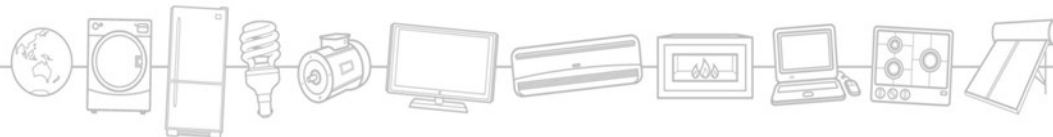
Mercury - International requirements

- The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. This includes the banning of manufacture, import or export of certain lamps containing mercury from 2020 .
- triphosphor less than 60 watts with a mercury content not exceeding 5 mg per lamp; and
- halophosphate phosphor of 40 watts or less with a mercury content not exceeding 10 mg per lamp.
- EU: 3 - 5mg mercury limit for a range of linear fluorescent lamps.



Policy options - ballasts

- *Option - Harmonise Australia and New Zealand MEPS for ballasts by increasing Australian MEPS minimum requirements to B1*
- *Option - Align with European stage 3 requirements for ballasts with an implementation date in the next two to three years*
 - Calculations and minimum categories would change
 - Stage 3 applies from 2017 in Europe



Ballasts - requirements

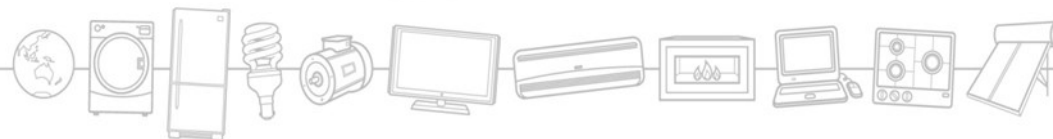
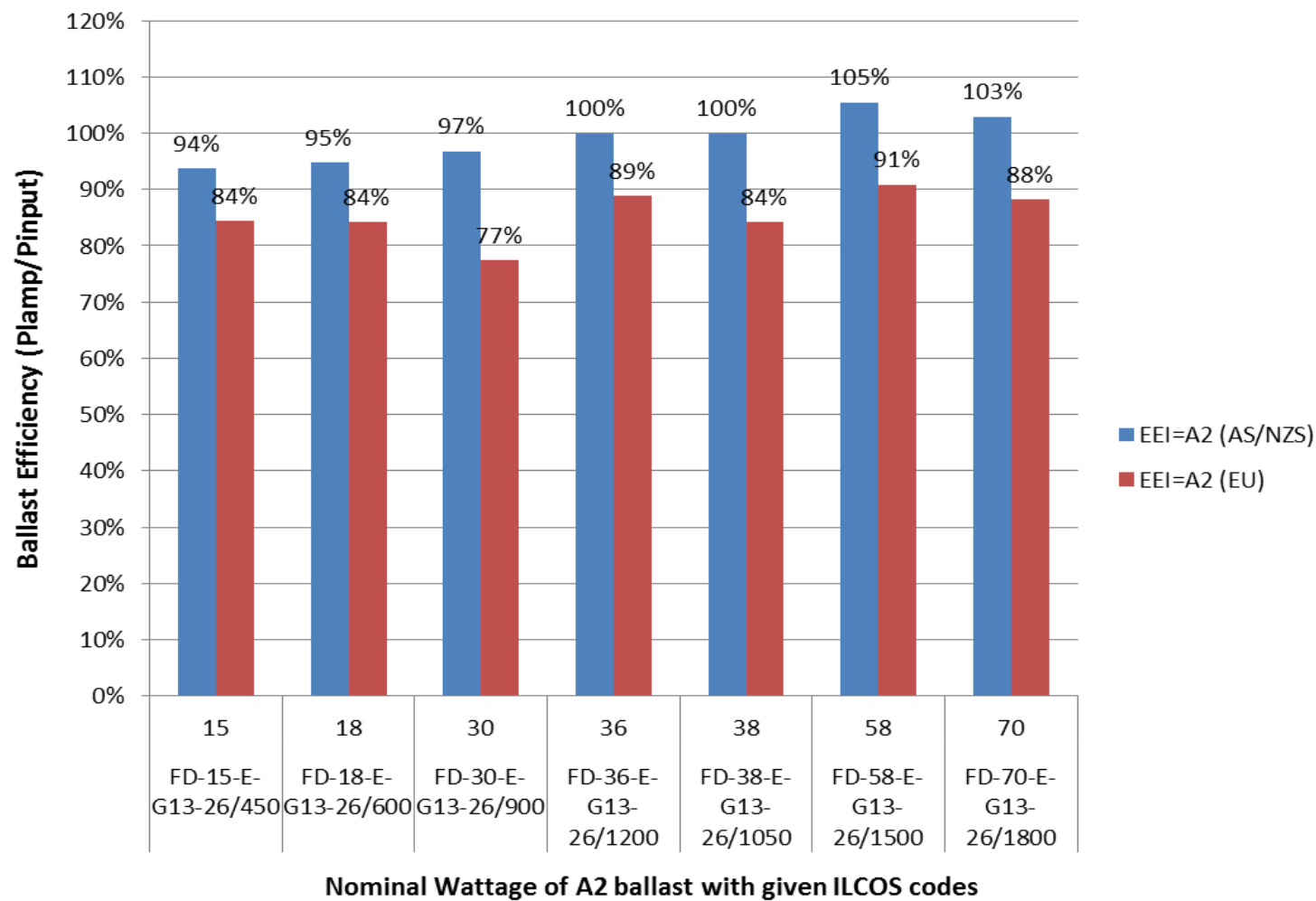
- Harmonise Australia with New Zealand MEPS for ballasts would mean removing B2 ballasts
- Aligning with European requirements for ballasts
 - Calculations would change

| | Ballast Efficiency (AU/NZ) | Ballast Efficiency (EU) |
|-----------|---------------------------------------|--|
| High Freq | $\frac{P_{Lamp, nominal}}{P_{input}}$ | $\frac{P_{Lamp, HF}}{P_{input}}$ |
| Low freq | $\frac{P_{Lamp, nominal}}{P_{input}}$ | $\frac{P_{Lamp, LF} \times 0.95}{P_{input}}$ |

- EU categories: minimum is EEI:
 - A2 or A2 BAT for non dimmable ballasts
 - A1 BAT for dimmable ballasts
 - High efficiency is A2 BAT and A3 BAT
 - Note: BAT = Best Available Technology

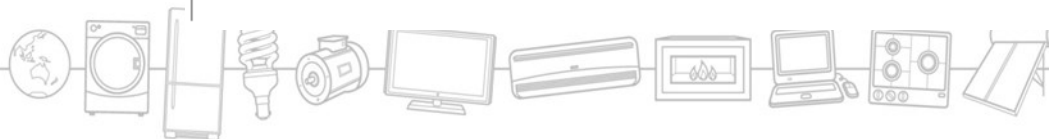
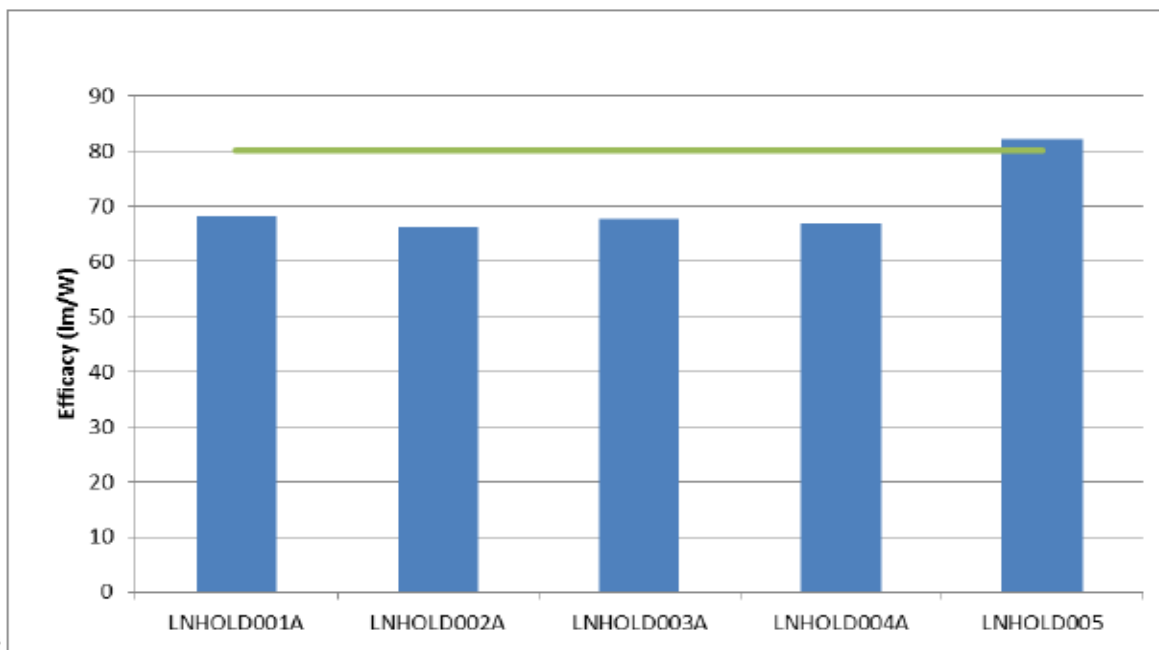


Comparison of ballast efficiency requirements in Australia/New Zealand (blue) and Europe (red) for ballasts with EEI classification A2.



Policy Options - T8-T5 Adapters

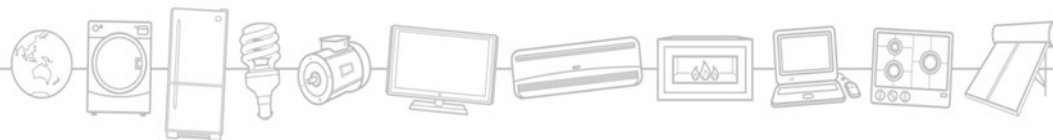
- *Option - None proposed*
- Although, four out of five adapters tested with lamps provided failed to meet MEPS for replaced T8 lamp (reduced power consumption but also light output)
- Interested in feedback



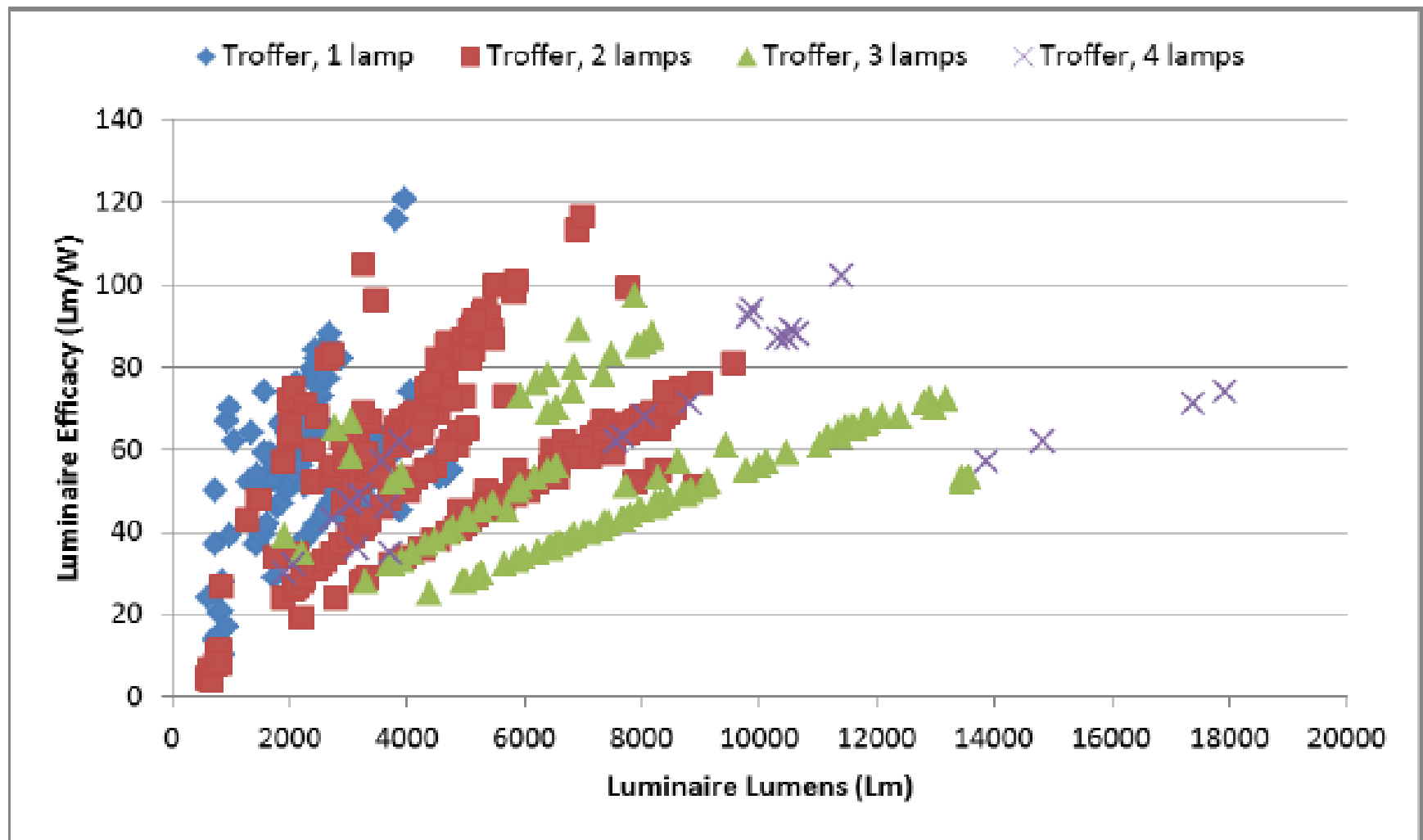
Policy Options - Commercial luminaires

Option - Introduce a voluntary or mandatory MEPS level

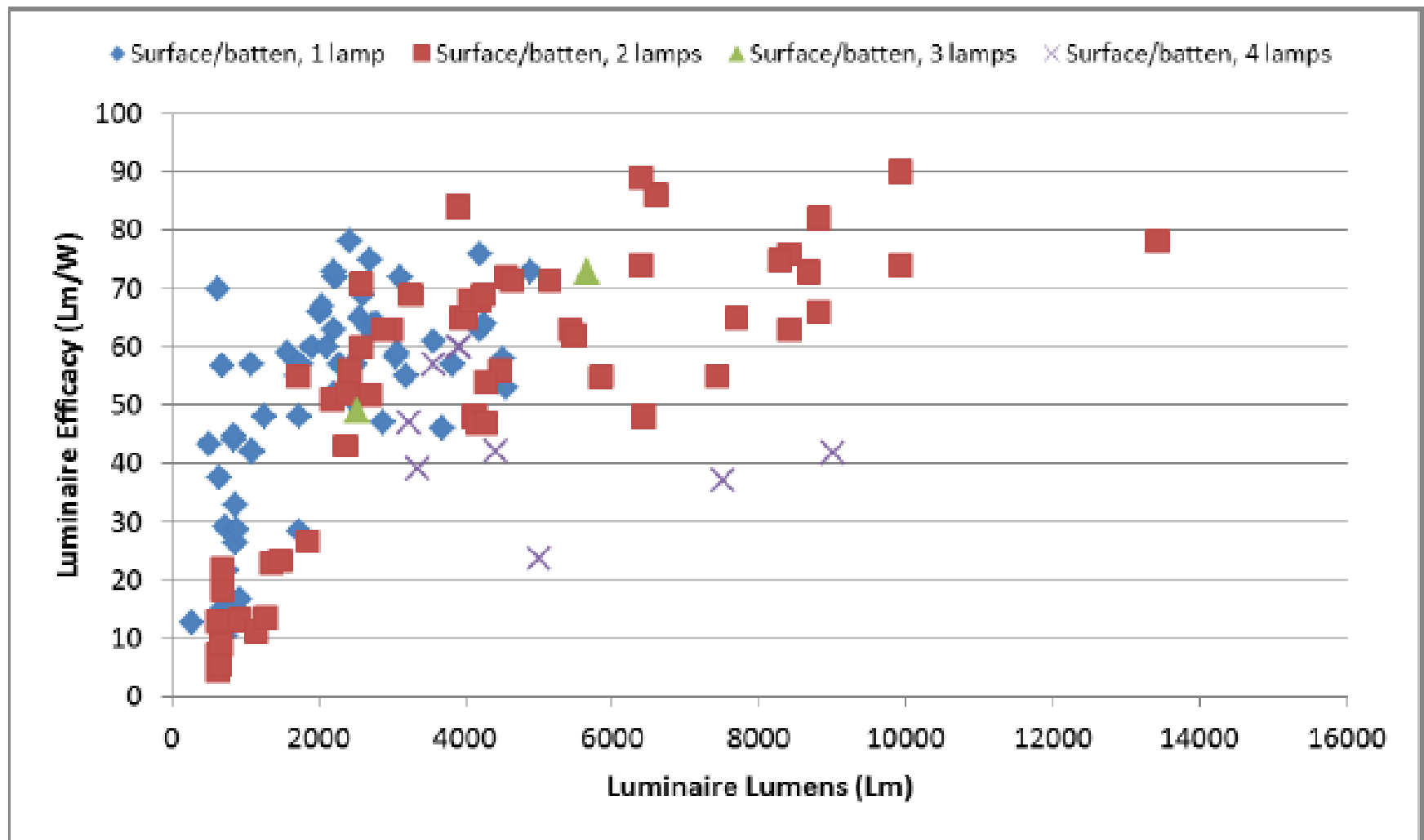
- Only the EU and Japan have mandatory requirements for fluorescent lamp luminaires energy efficiency / power consumption.
- Constraint for development of MEPS for luminaires has been the absence of an agreed international standard which includes photometric and electrical characteristics.
- A holistic measure of luminaire efficiency should incorporate the (maintained) efficacy of the light source, the electrical losses of the control gear and the (maintained) photometric efficiency of the light fitting.



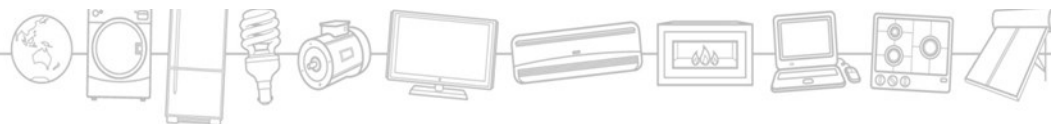
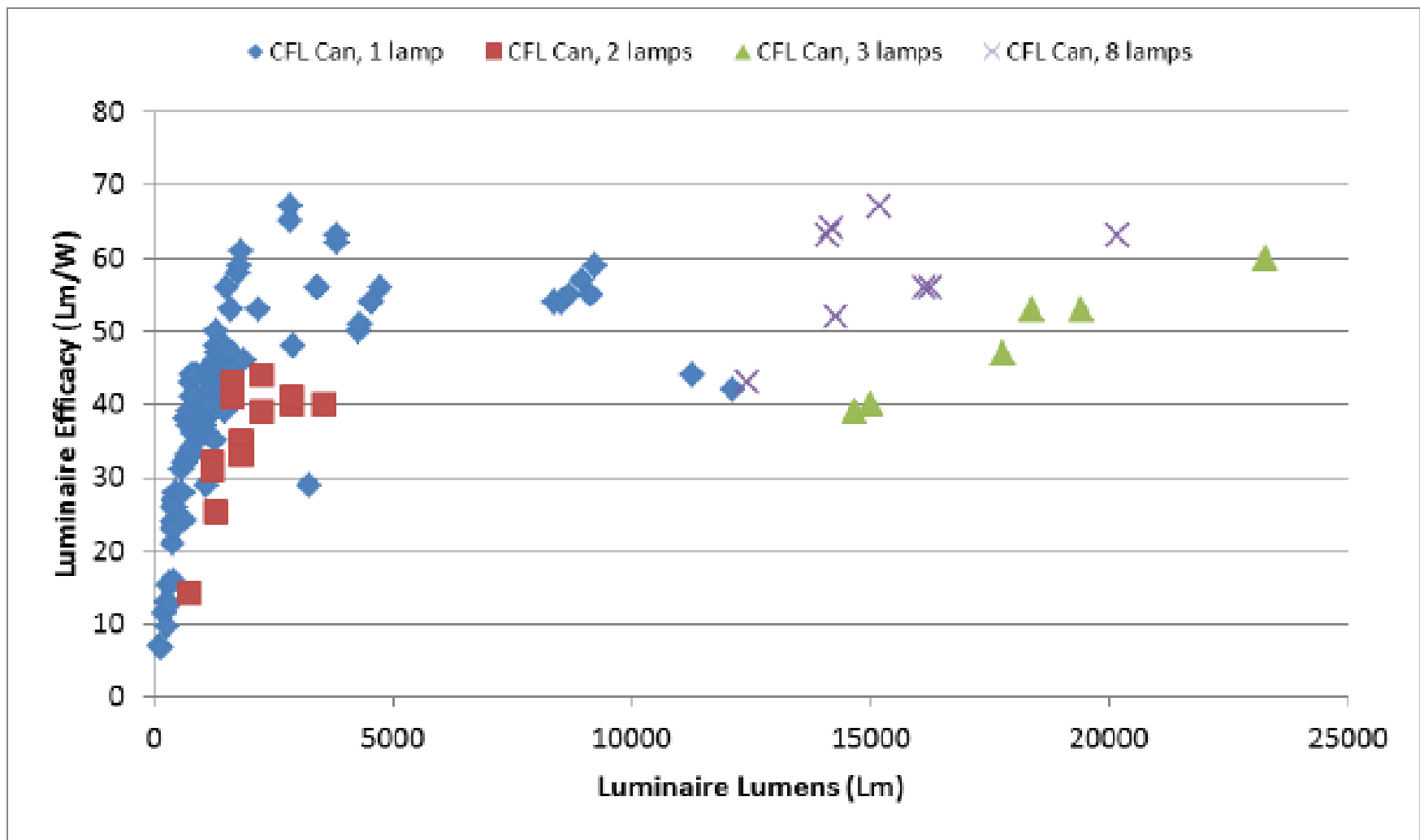
Linear fluorescent troffers: LER vs Luminaire lumens



Linear fluorescent battens: LER vs Luminaire lumens

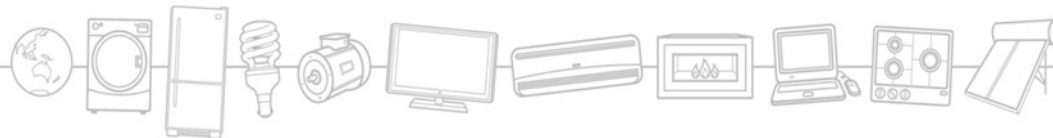


CFL cans: LER vs Luminaire lumens



Product labelling and education initiatives

- Linear fluorescent lamps have voluntary energy efficiency labelling
- Fluorescent lamps ballasts subject to MEPS must be labelled with the EEI classification
- Ballasts outside the scope of MEPS but within the scope of AS/NZS 4783.2 can be voluntarily labelled with the EEI classification.
- An alternative or addition to mandatory energy labelling would be voluntary energy labelling and/or the use of endorsement labelling such as ENERGY STAR.



Key questions to consider

- Sales and stock volumes of the commercial lighting product categories?
- relative split between categories and estimated market share?
- major channel to market ?
- wholesaler groups and specifiers for new builds and renovations



Key questions to consider

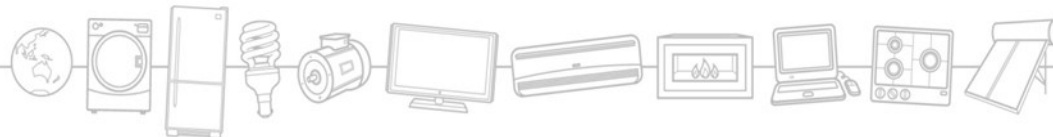
- What additional costs would these policy options place on industry?
- Which policy options would you support to improve energy efficiency?
- Would you support energy labelling for commercial lighting?
- Can you comment on the projected trends for commercial lighting, including the use of LEDs?



- What is the replacement rate for converting to LEDs?

Consultation

- Consultation closes 25 September 2015
 - www.energyrating.gov.au/products-themes/lighting/
- Written submissions to:
 - EER-Lighting@industry.gov.au



Questions?

