



# Public Consultation Sessions

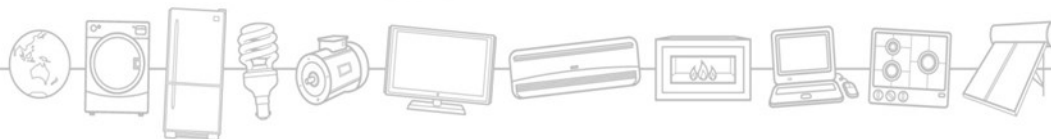
## Lighting Consultation RIS

# Session Objective

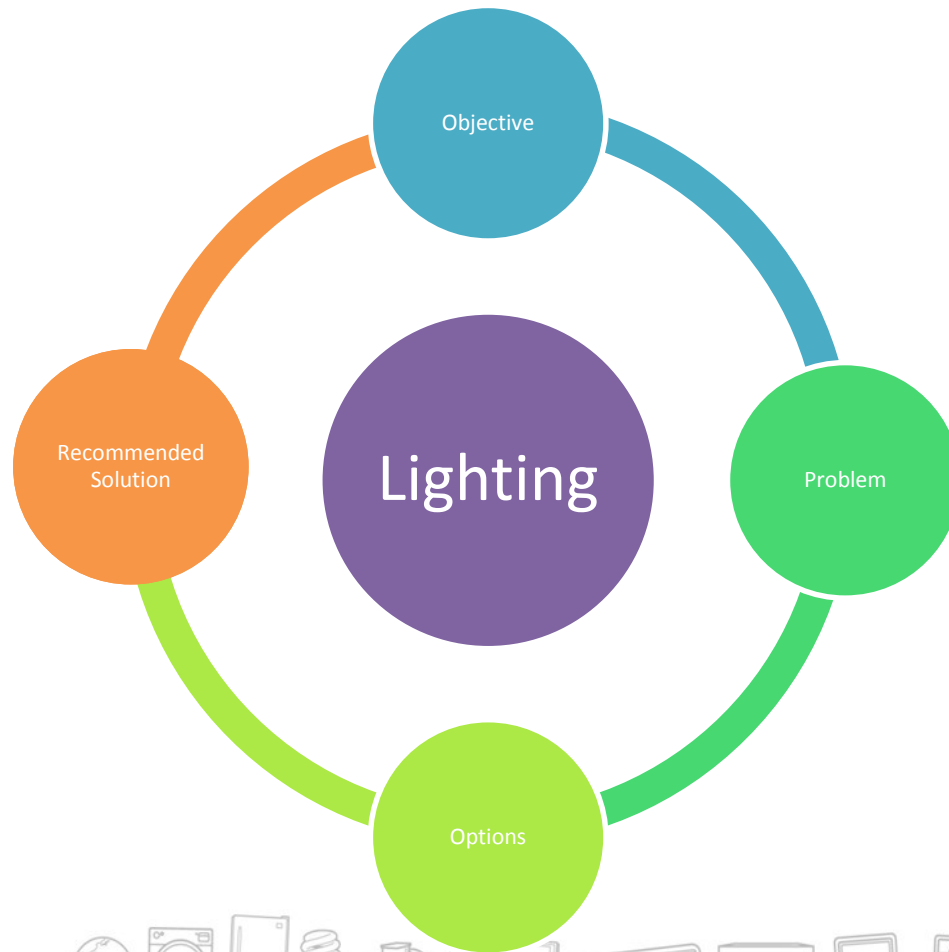


# Equipment Energy Efficiency Programme

- The E3 / Equipment Energy Efficiency programme is jointly funded by Australia and New Zealand.
- E3 works to improve energy efficiency, mainly through developing minimum energy performance standards and labelling measures.



# Overview



# RIS Objective

- Reduce the energy used and greenhouse emissions generated to light our homes and businesses



- by addressing the problems restricting the purchase of efficient effective long life lighting products



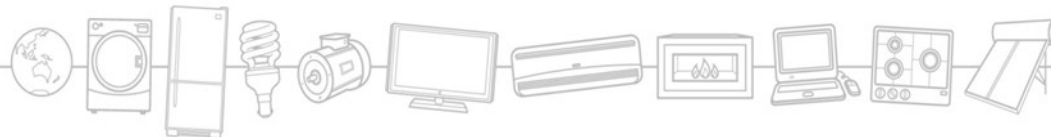
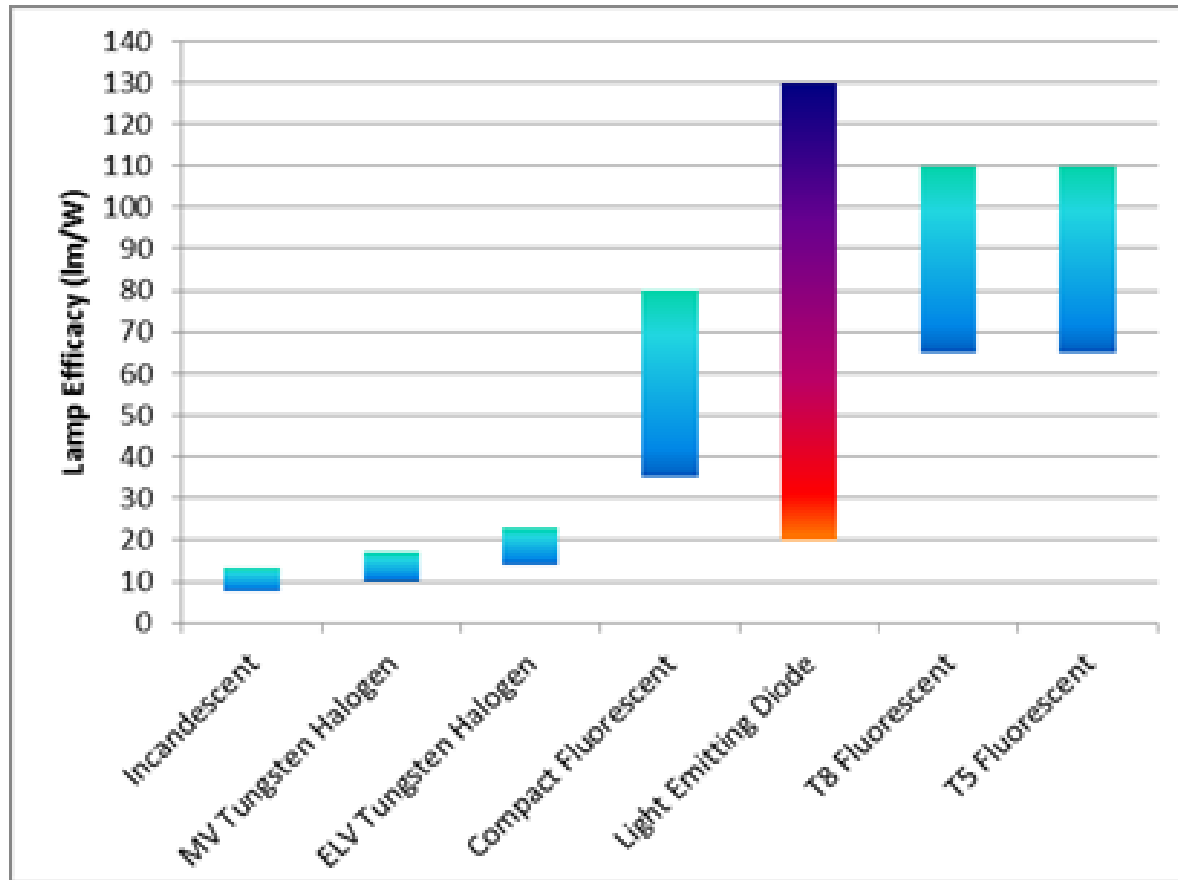
# Rationale

- Opportunity to achieve large energy and cost savings (electricity and replacement)
- Supports wider government policy to reduce energy and emissions
- To reduce waste of our limited energy resources for current and future generations



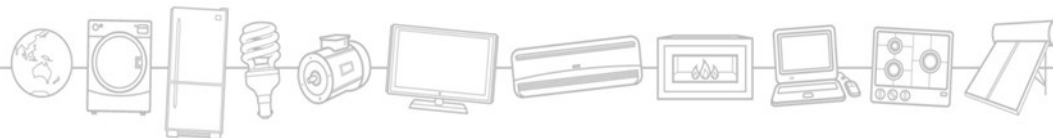
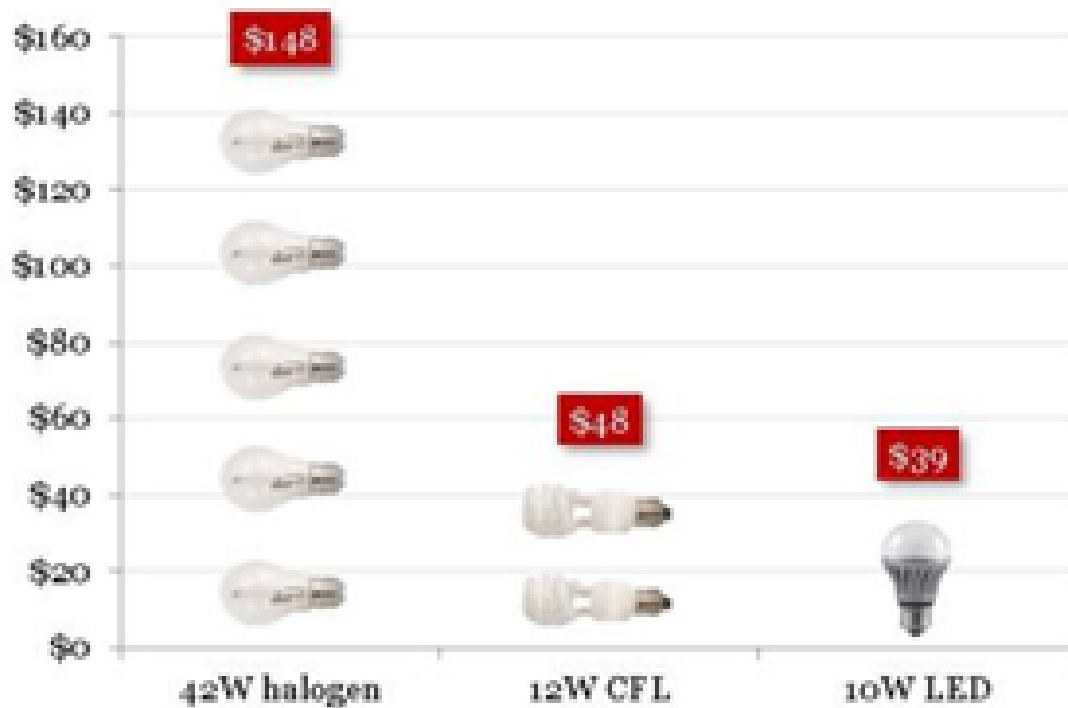
# Opportunity to achieve savings

**Figure 11 : Typical efficacies of lamp technologies**



# Opportunity to achieve savings

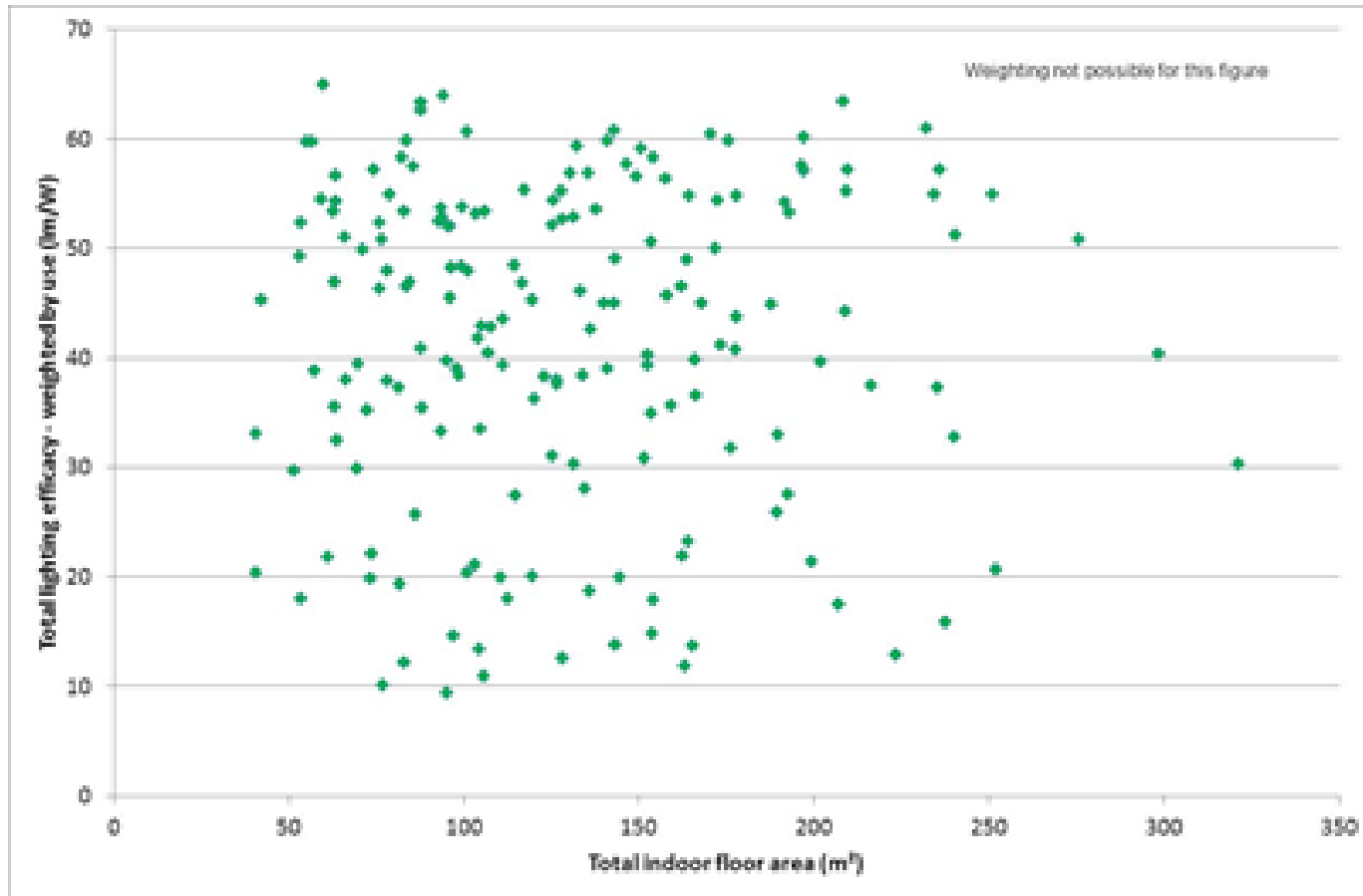
**Figure 14 : Lifetime costs of halogen, CFL and LED lamps over 10 years, with 800 lumen output**





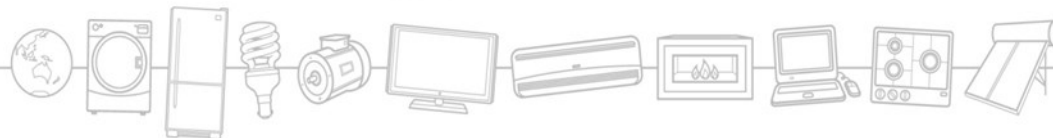
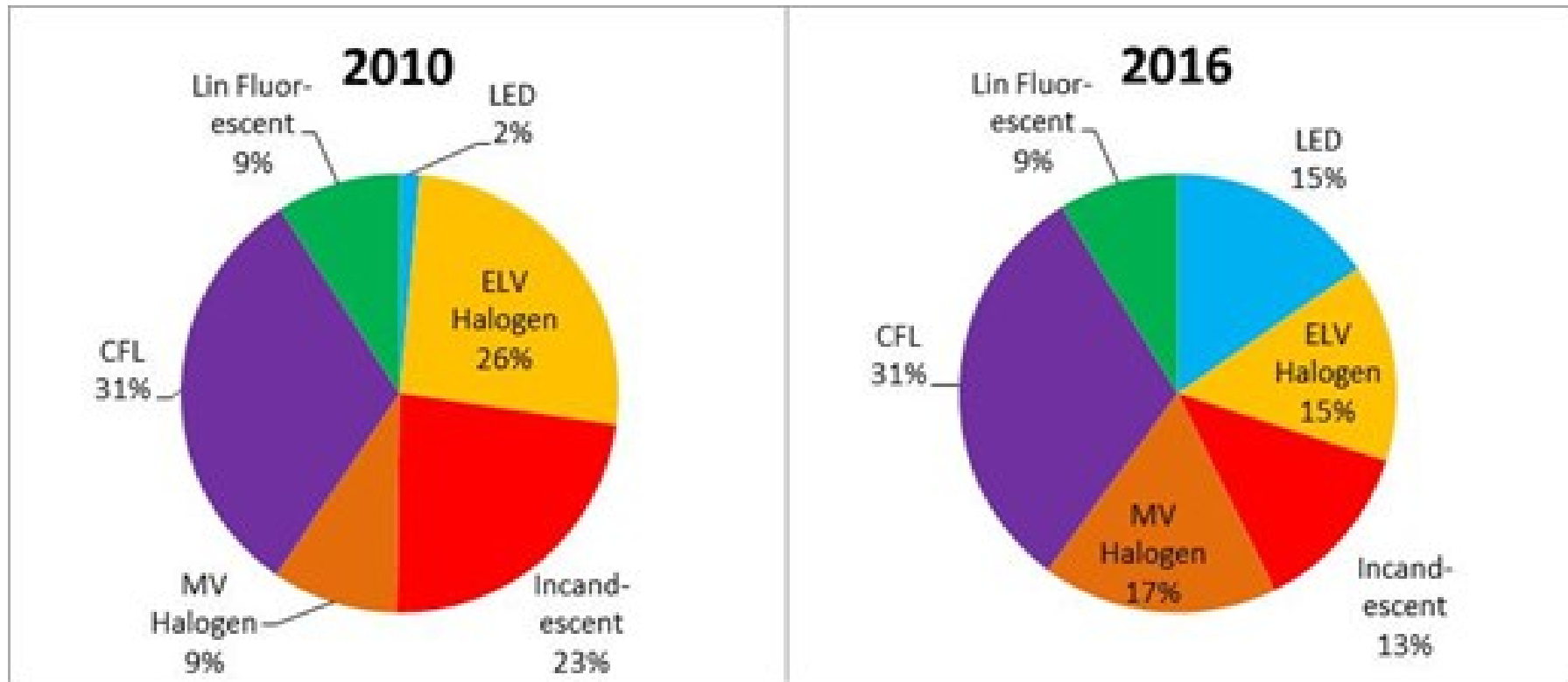
# Opportunity to achieve savings

**Figure 4 : House floor area versus total house lighting use weighted efficacy (Australia)**



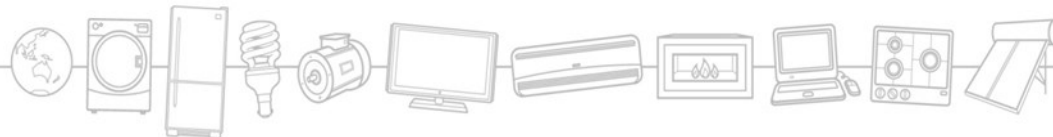
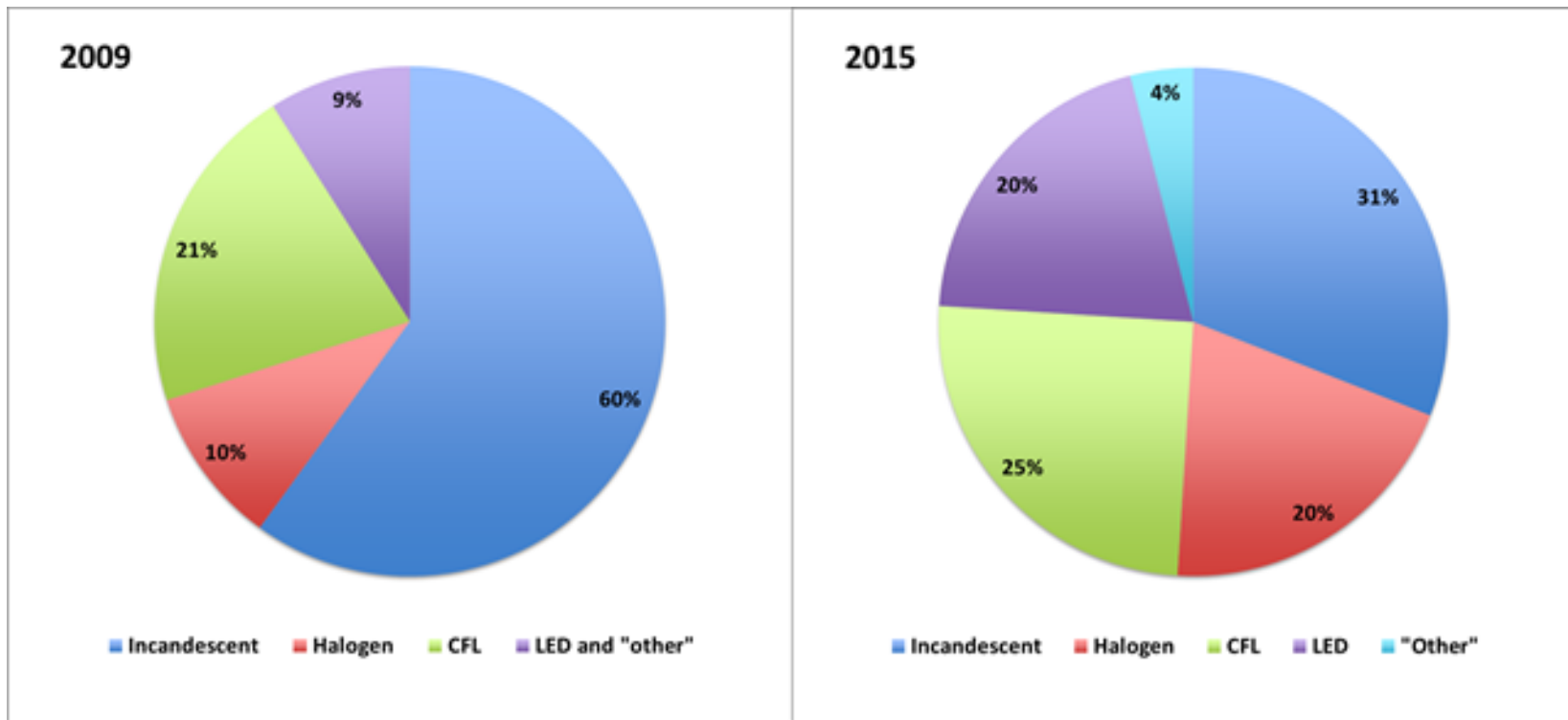
# Opportunity to achieve savings

**Figure : Share of lighting technologies in 2010 and 2016 (Australia)**



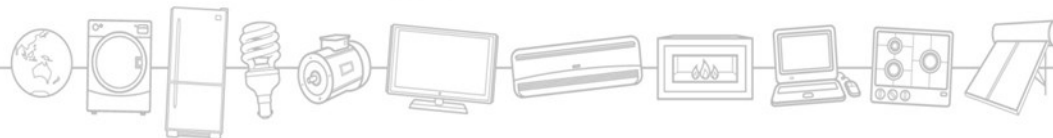
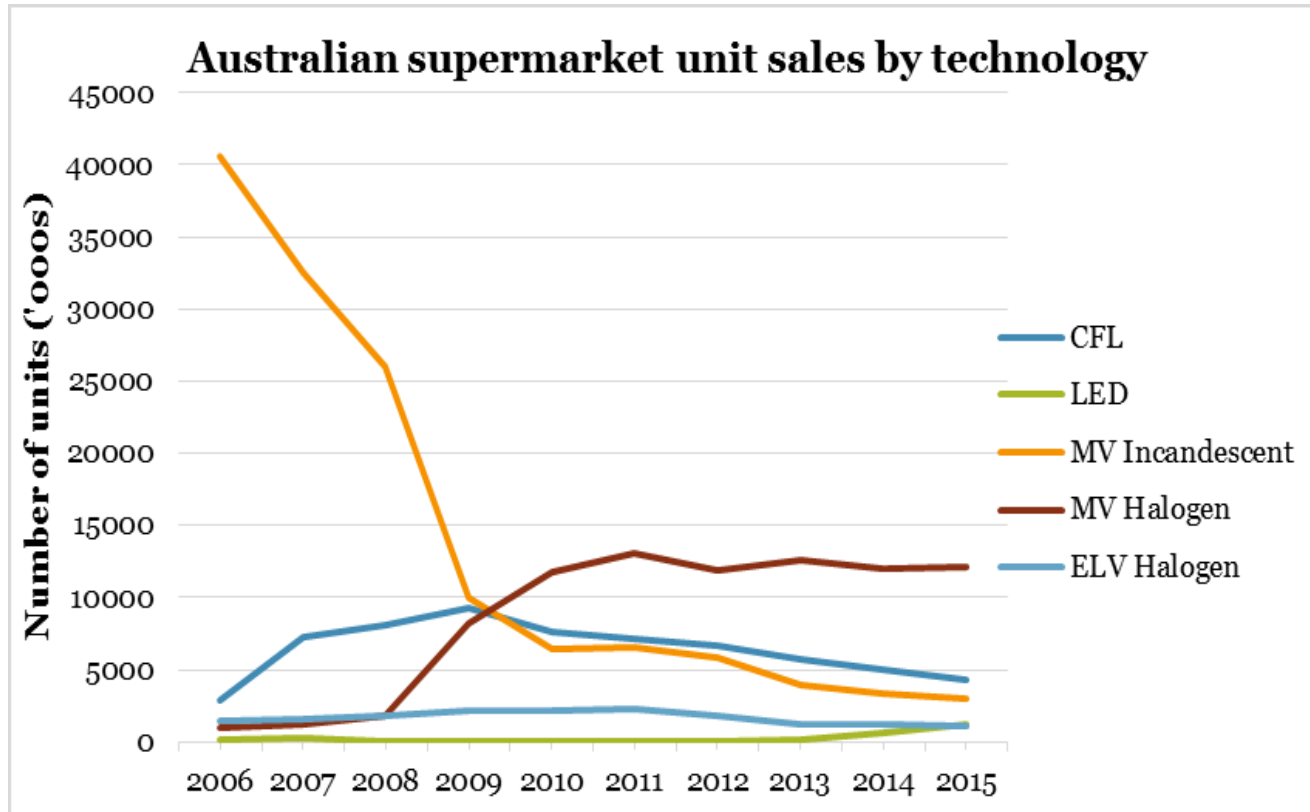
# Opportunity to achieve savings

**Figure 5 : Share of lighting technologies in 2009 and 2015 (New Zealand)**



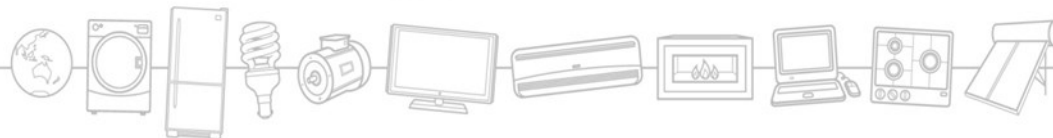
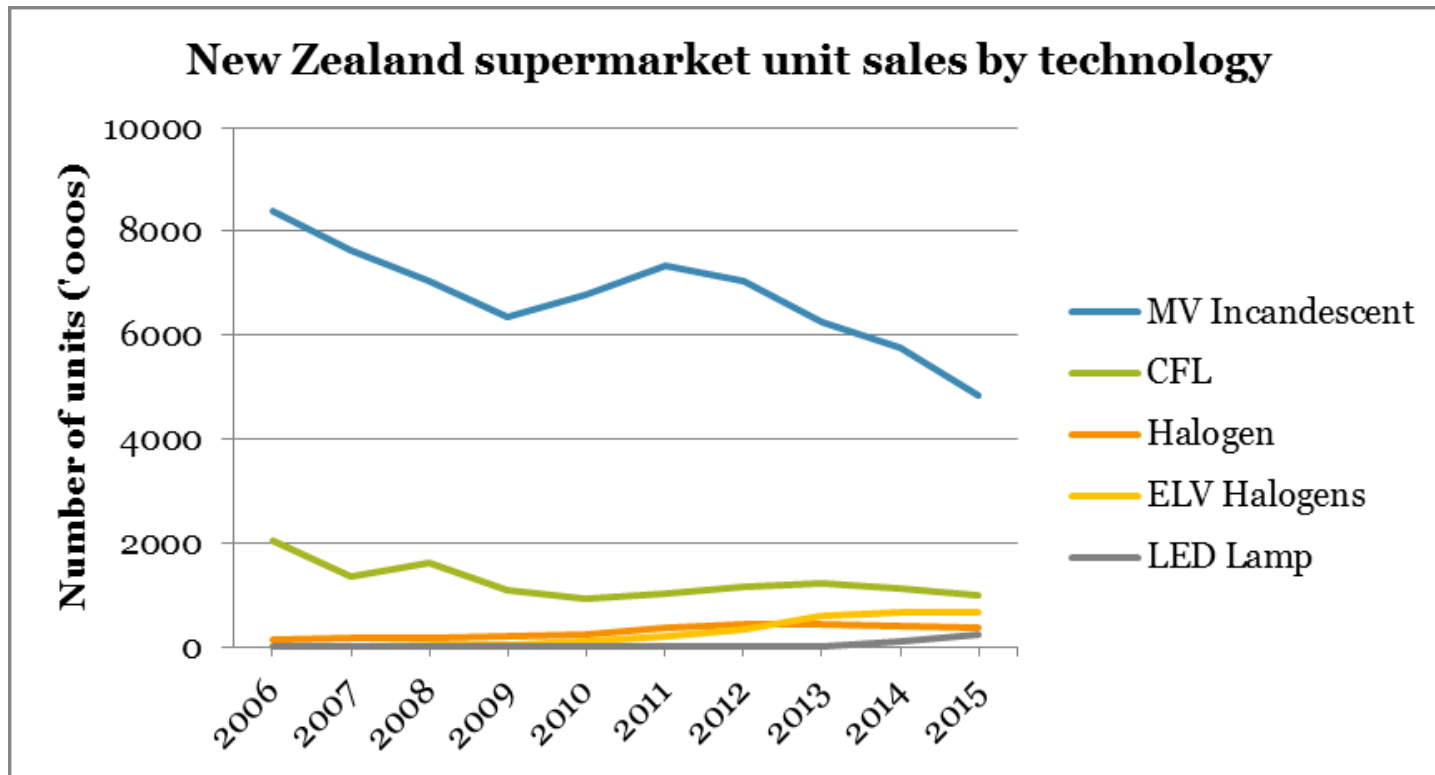
# Opportunity to achieve savings

**Figure 9: Australian supermarket unit sales by technology**

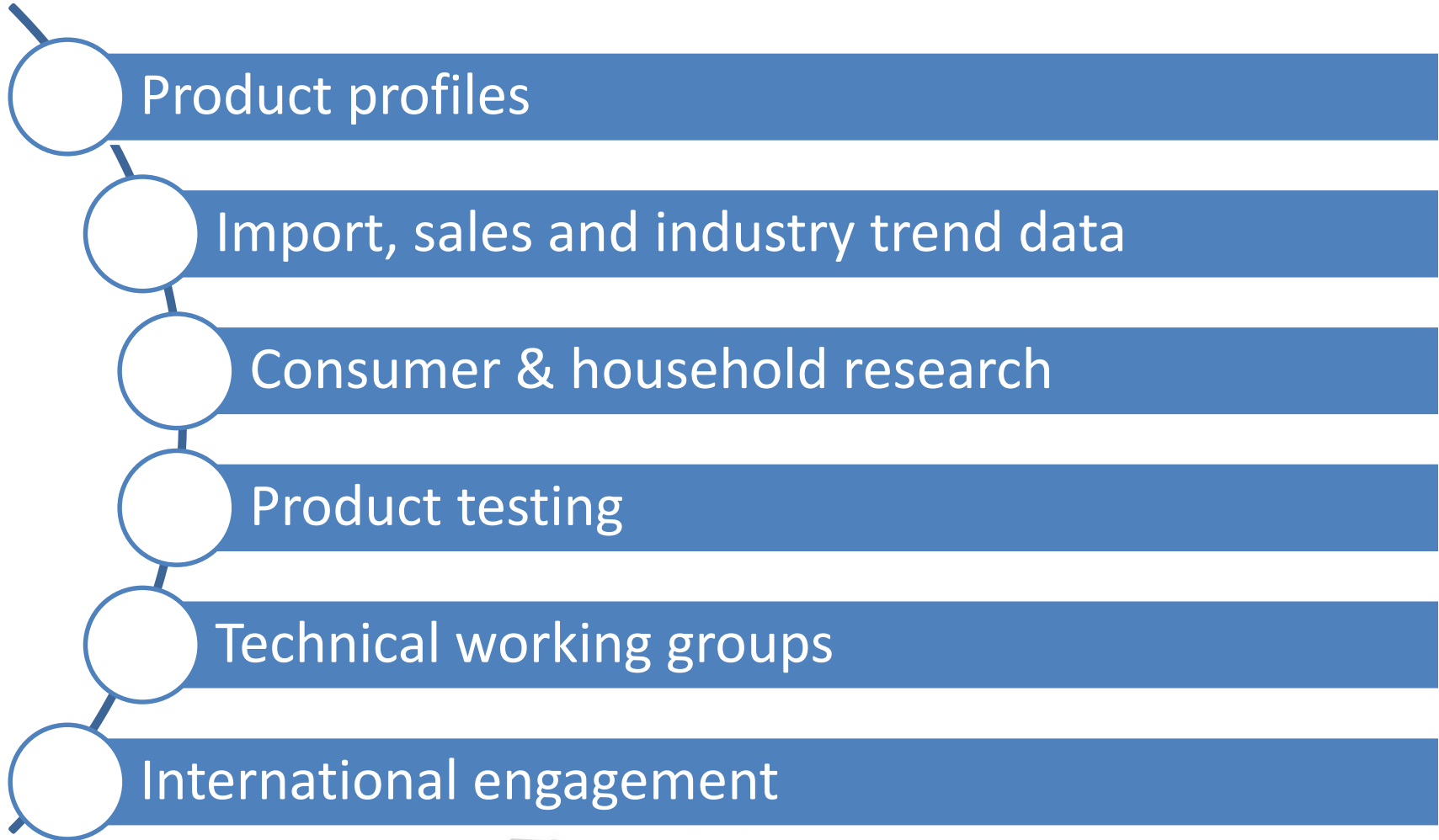


# Opportunity to achieve savings

Figure 10: New Zealand supermarket unit sales by technology



# Inputs to the Consultation RIS



# Problem

Inferior LED  
products

Regulatory  
failure

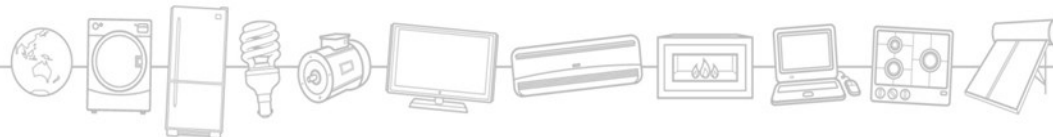
Imperfect  
information

Split  
incentives



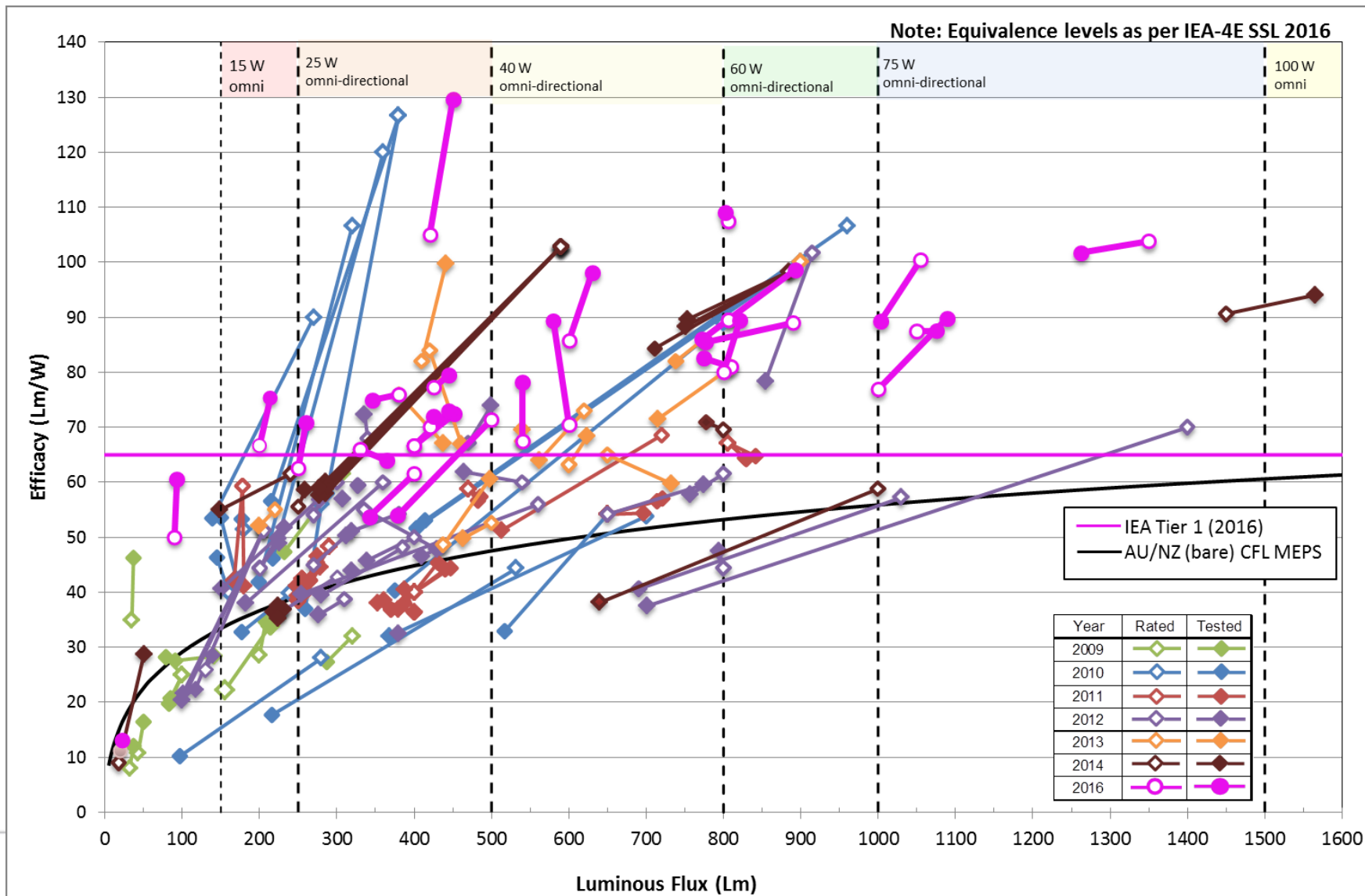
# Inferior LED products

- Consumer research (Aus)
  - 19% CHOICE respondents and 9% IVIEW respondents experienced quality issues (early failure, flickering, compatibility)
  - Both surveys approx. 10% reported they would not buy LED in the future
- Consumer research (NZ)
  - 12% of NZ survey respondents considered LED would have a negative impact on lighting ambience in their home

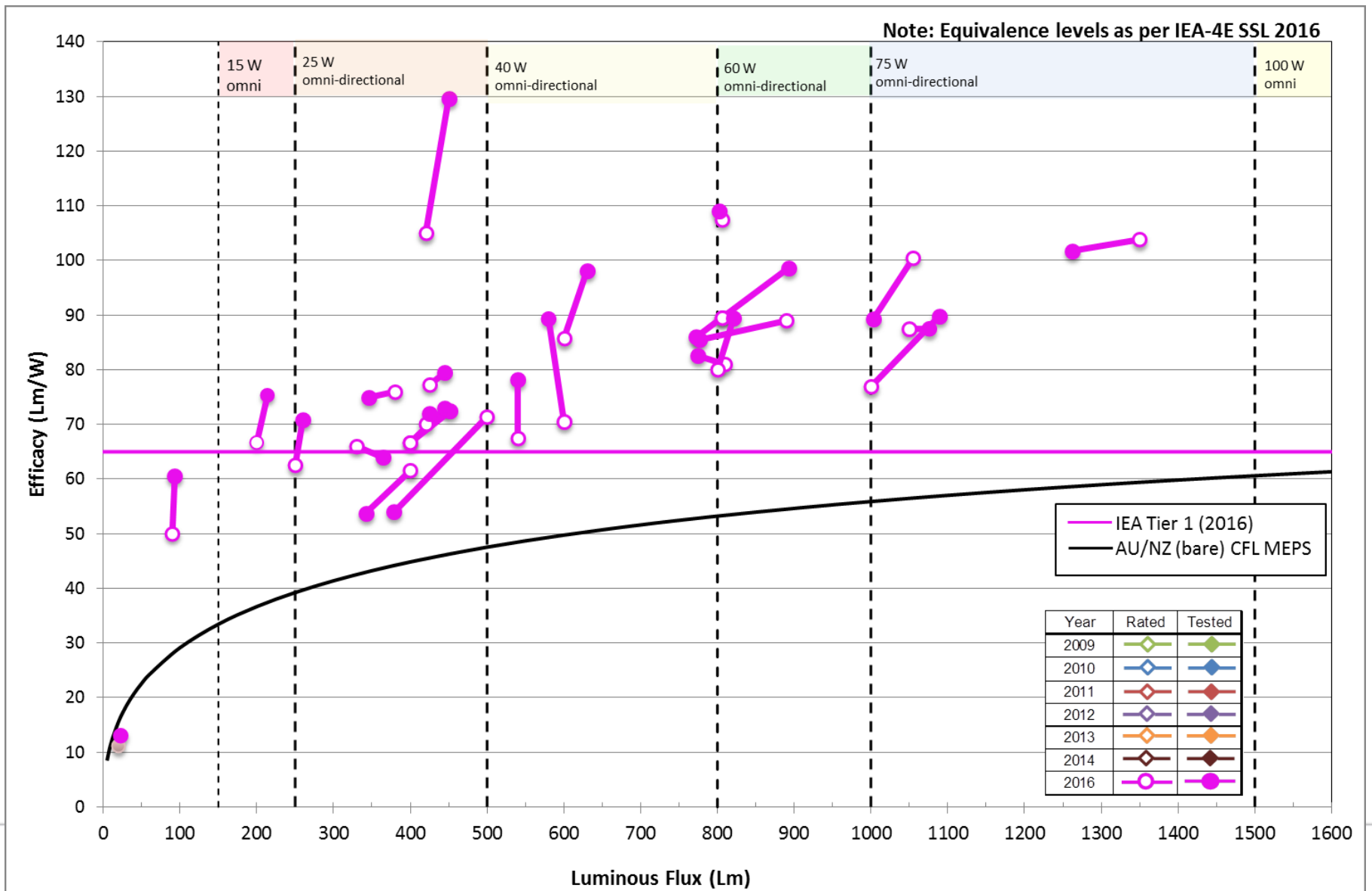




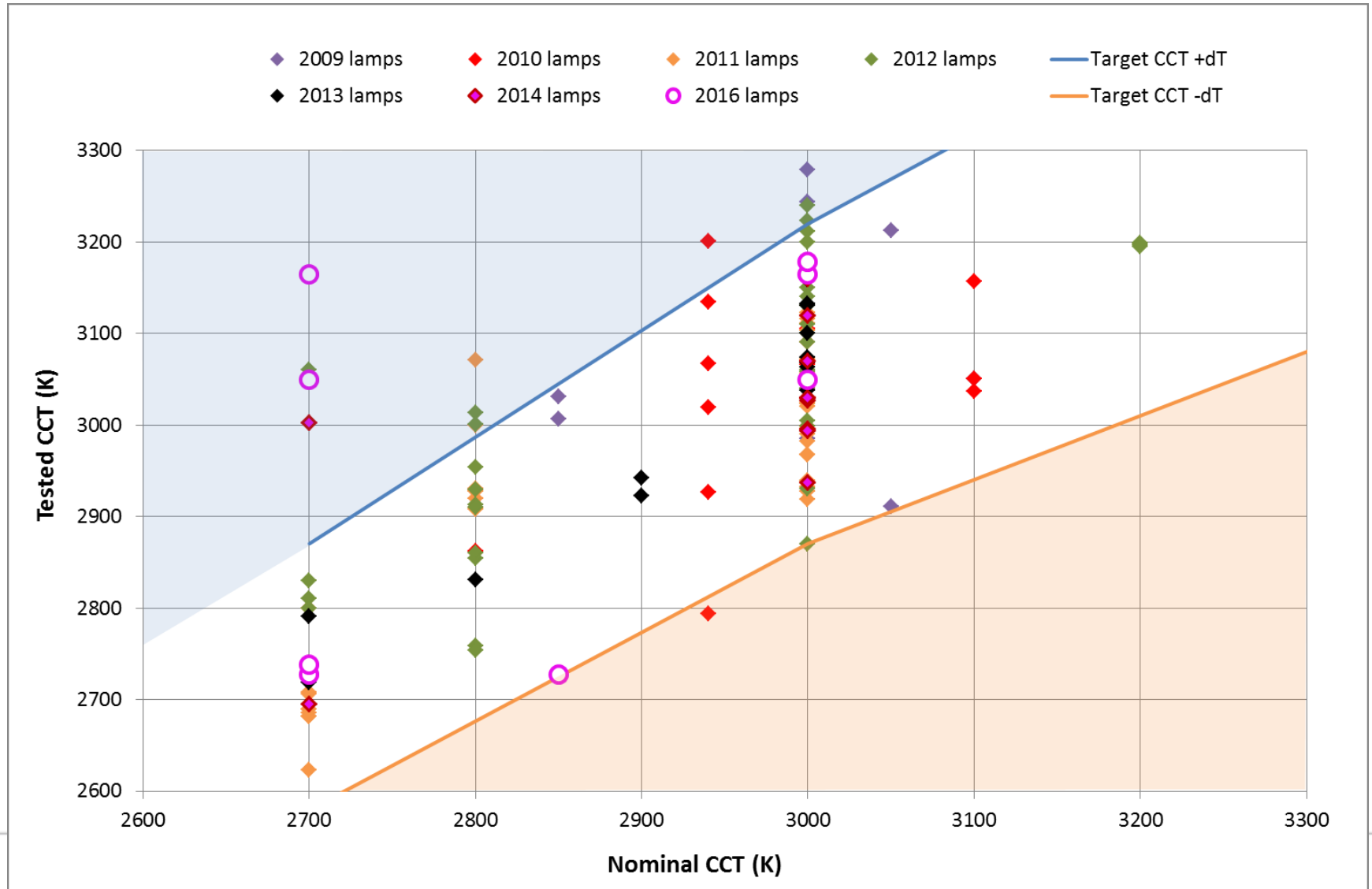
# Rated vs Tested (2009 - 2016)



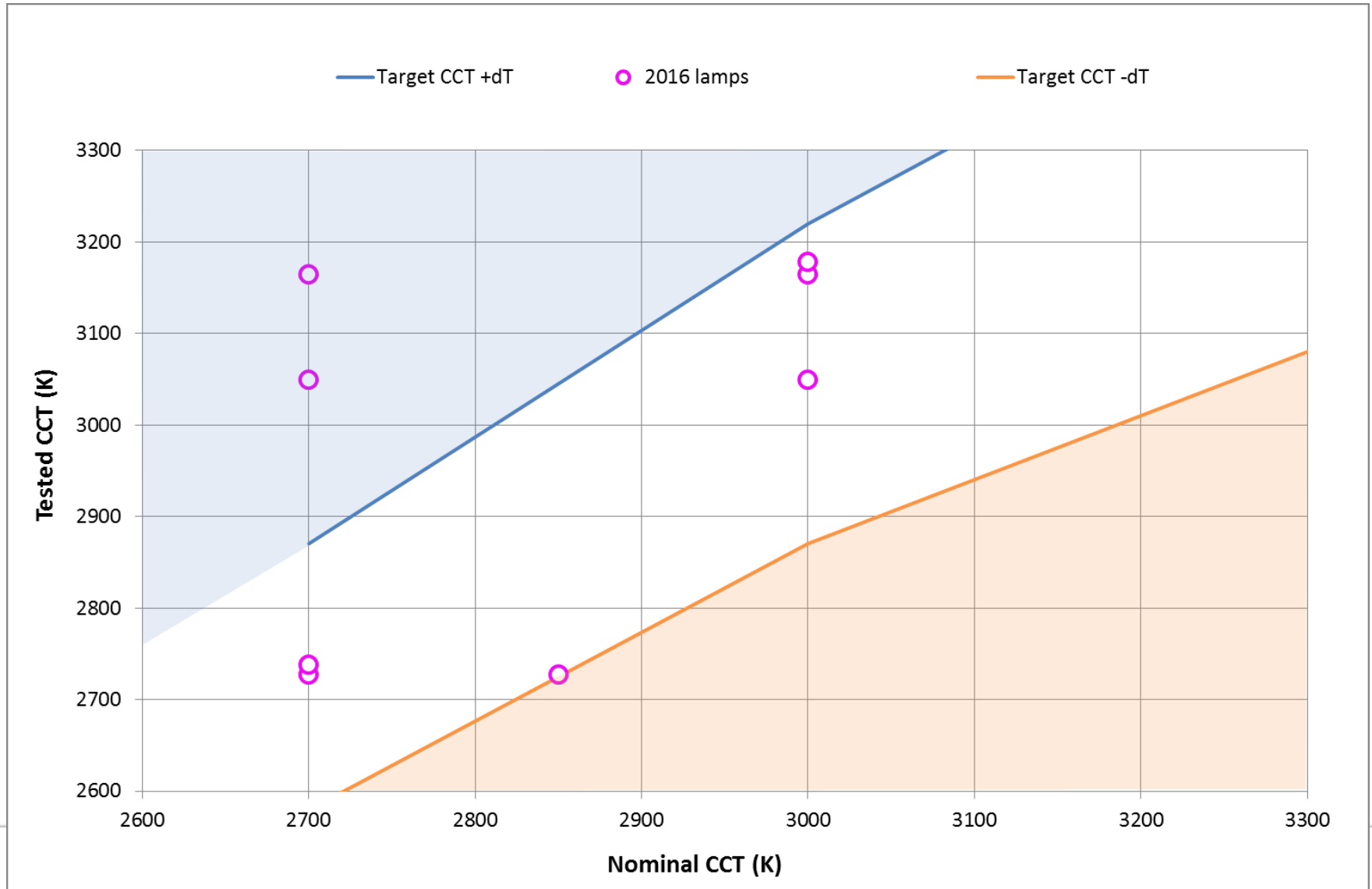
# Rated vs Tested (2016)



# CCT (2009 - 2016)



# CCT (2016)



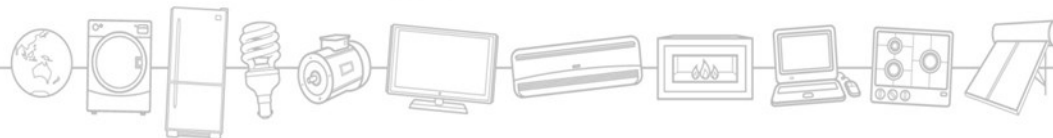
# Regulatory failure

- Lighting MEPS levels have not kept pace with lighting technology or levels set in other major economies
- No MEPS for LED in Australia or New Zealand



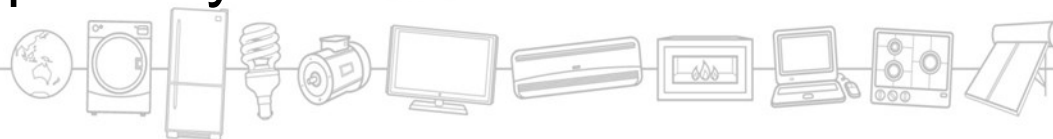
# Imperfect information

- Wide variation in package information - mixed terminology, absence of efficacy, inconsistency with equivalency claims, no lumen groupings
- Lack of knowledge about equivalency and lifetime costs of different lighting technologies
- Motivation also an issue



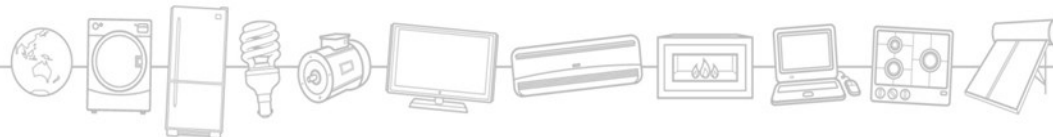
# LED lamp packaging

- The packaging attributes of 47 LED lamps from 20 manufacturers were examined
- Luminous flux on 96% but inconsistency in display
- 34% Watts larger font. 73% had equivalency
- Efficacy only on 17% (back of package)
- Lifetime 62%
- CCT 98%, CRI 47%
- 50% marked as dimmable, but only 21% of these had information on pack and 38% a web address
- 29% of MR16 LED packs had compatibility information for ELVC converters, with some products claiming non-specific compatibility



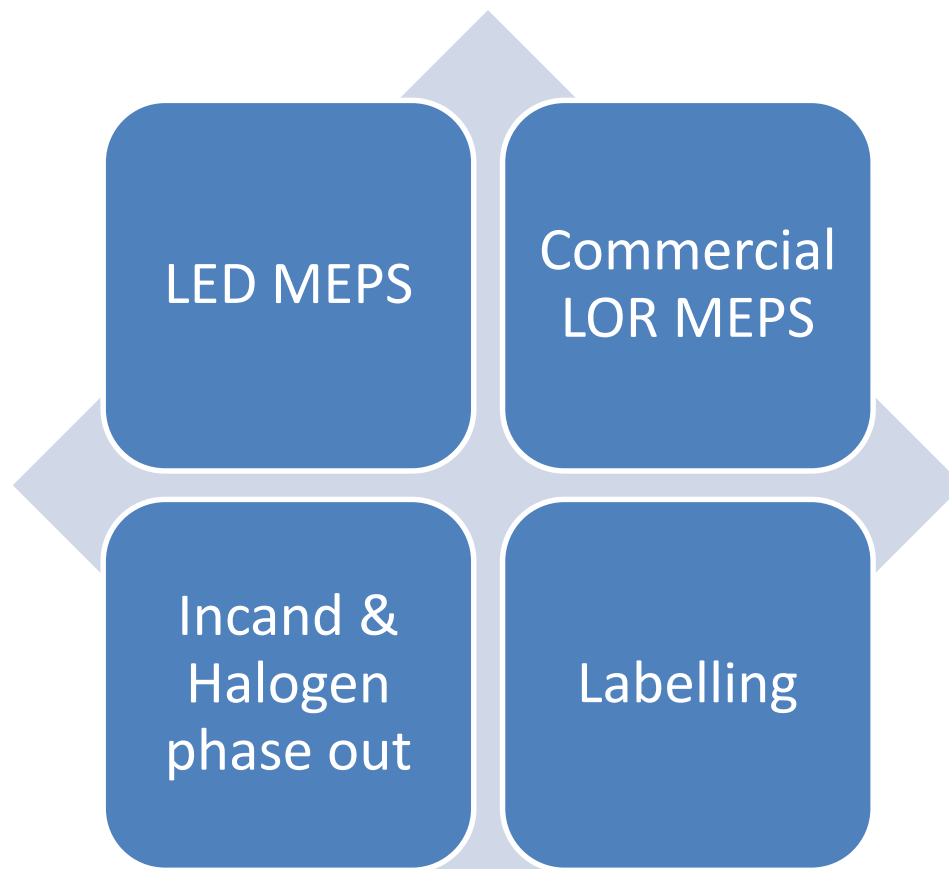
# Split incentives

- Principle-agent problem - cheap inefficient or low quality lamps purchased for rental properties and new properties for sale as no incentive for owner to reduce electricity or replacement costs
- Significant variation in efficacy of commercial luminaires in the market – evidence that demand for cheap and inefficient products.



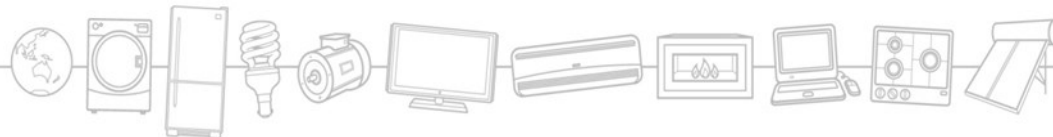


# Options



# LED MEPS

- Sale and commercial use
- Where possible references international standards
- Scope
  - Non-directional and directional LED lamps
  - Linear LED lamps
  - Integrated LED Luminaires
    - Planar LED Luminaires
    - Small  $\geq 100$  lm and  $< 2,500$  lm
    - Large  $\geq 2,500$  lm &  $< 50,000$  lm
- Specific exclusions (theatrical, portable, battery operated, rope & chains, medical)
- Simplified registration for decorative, low volume luminaires



# LED MEPS

**Table 7: Timeline for LED MEPS and Efficacy Levels (lm/W)**

Product Scope	2018	2019	2020	2021	2022	2023
Lamp Non Directional	65		85			100
Lamp Directional	65		85			100
Lamp Linear	100		110			120
Luminaire Small Directional	65		85			100
Luminaire Small Non Directional		65		85		100
Luminaire Planar etc		90		110		120
Luminaire Large			110			120



# LED MEPS

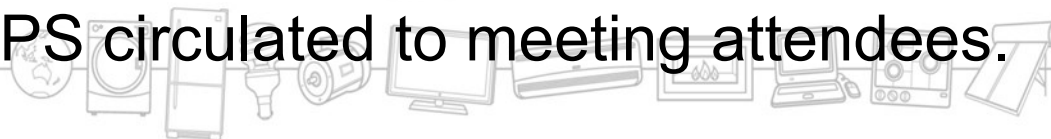
## Performance requirements

- Intended to ensure that LEDs are efficient and effective alternatives to inefficient lighting
- Third party tests not required (except modules, drivers)
- Levels initially based on analysis of shared database of LED test data compiled by IEA 4E SSL Annex and Australia / New Zealand Market analysis
- MEPS further developed with Technical Working Group including Aust & NZ suppliers, test labs, experts
- Stakeholder comments on initial draft received
- Revised draft included in the RIS.
- Further revisions following TWG 1 December

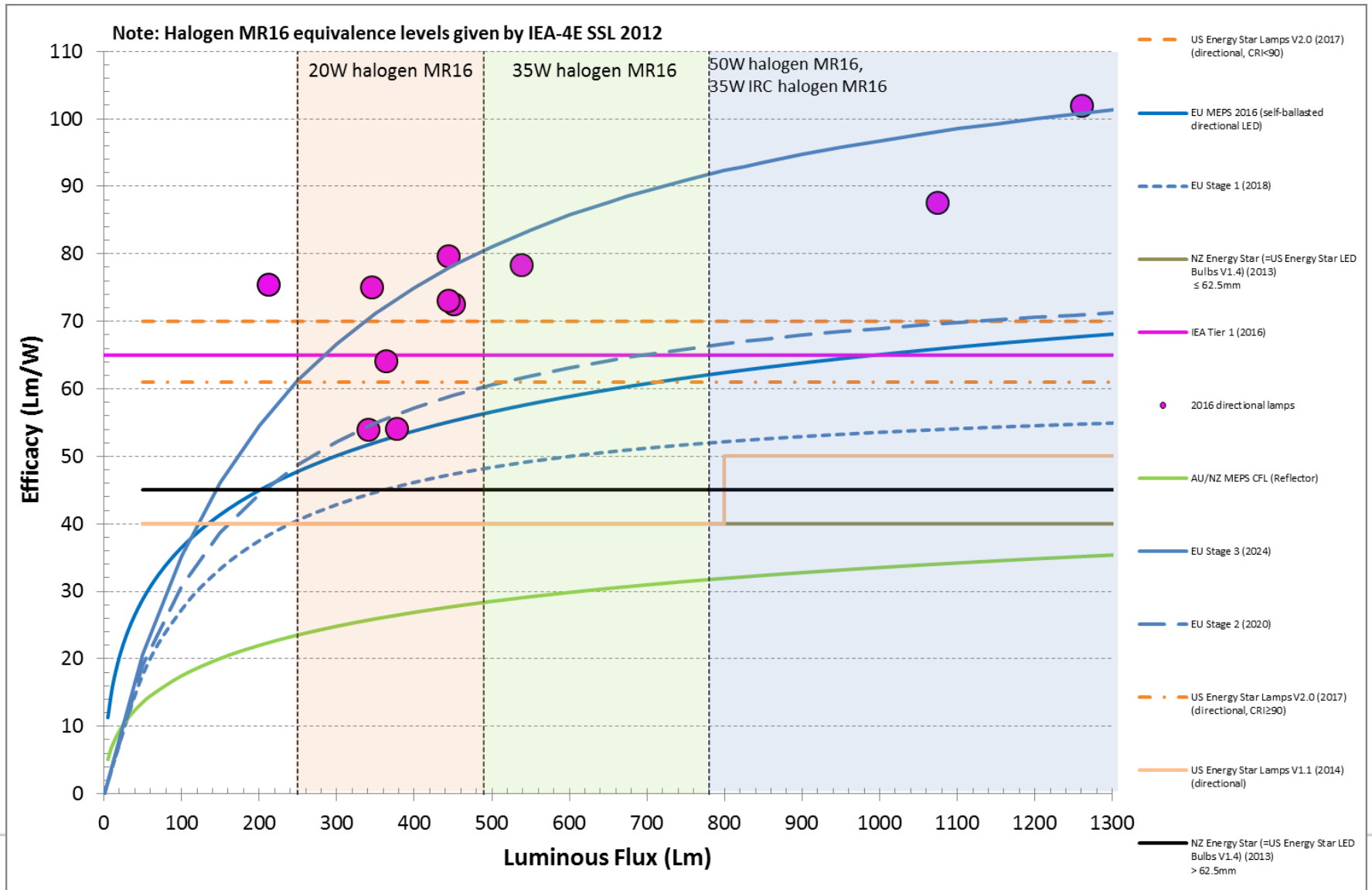


# LED MEPS - Revisions

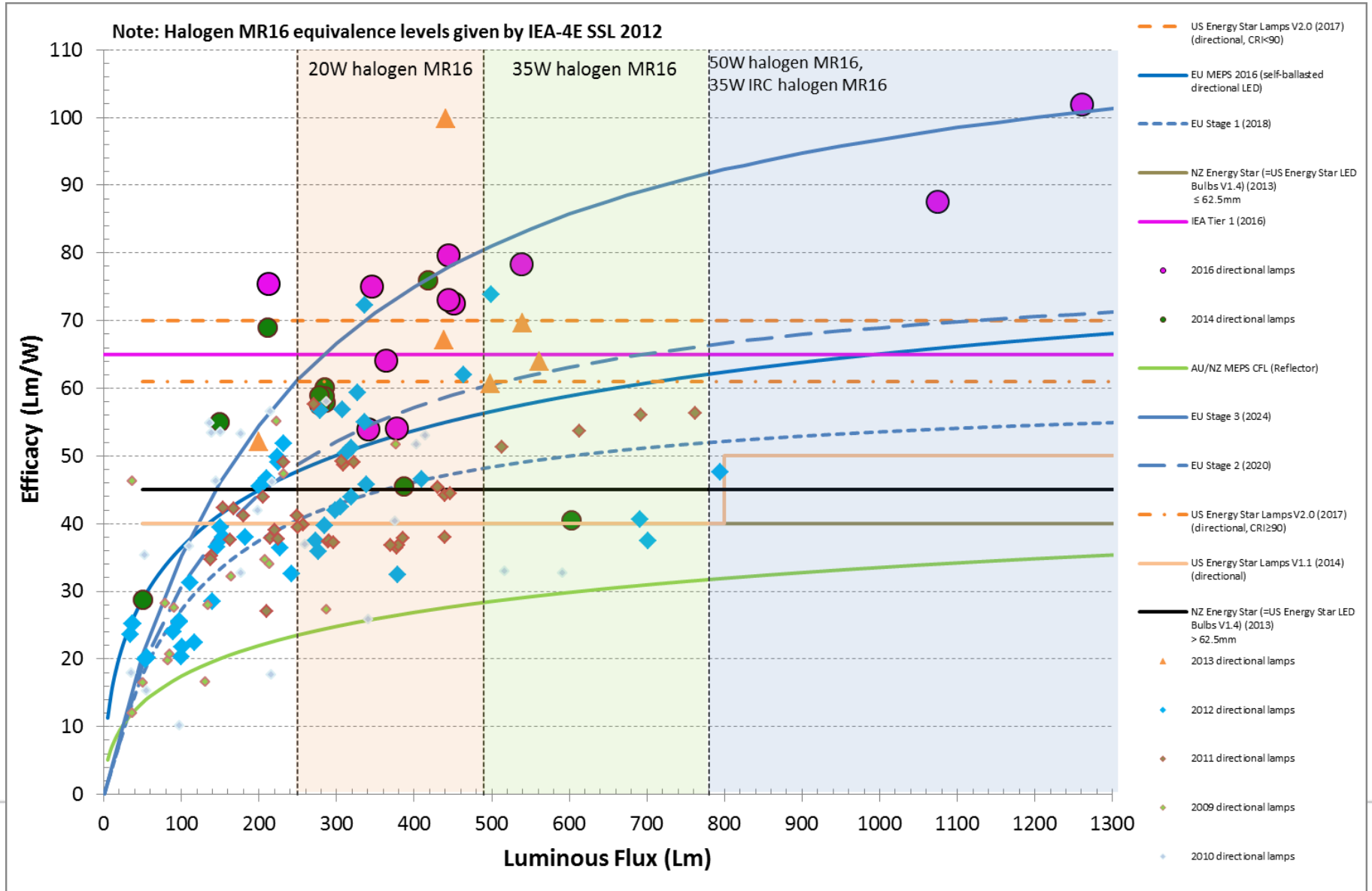
- Further proposed scope exclusions
  - Compliant with cyanosis observation index AS/NZS 1680.2.5:1997
  - Outdoor luminaires IP65 and above
  - Road and public space lighting AS/NZS 1158
  - Specified wall and floor/step luminaires
- Allow use of module and driver test reports for some parameters (including colour & lumen maintenance, harmonics, power factor)
- Allow use of LM 79 until 2021
- Longest product test now 1,000 hrs (endurance)
- Premature failure rate and warranty duration removed
- Revised MEPS circulated to meeting attendees.



# Directional (2016)

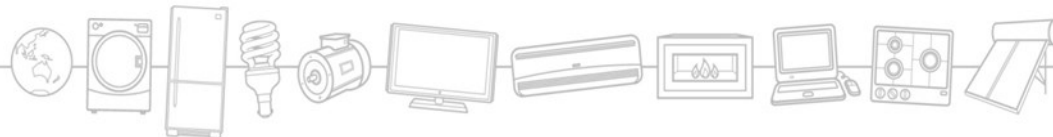
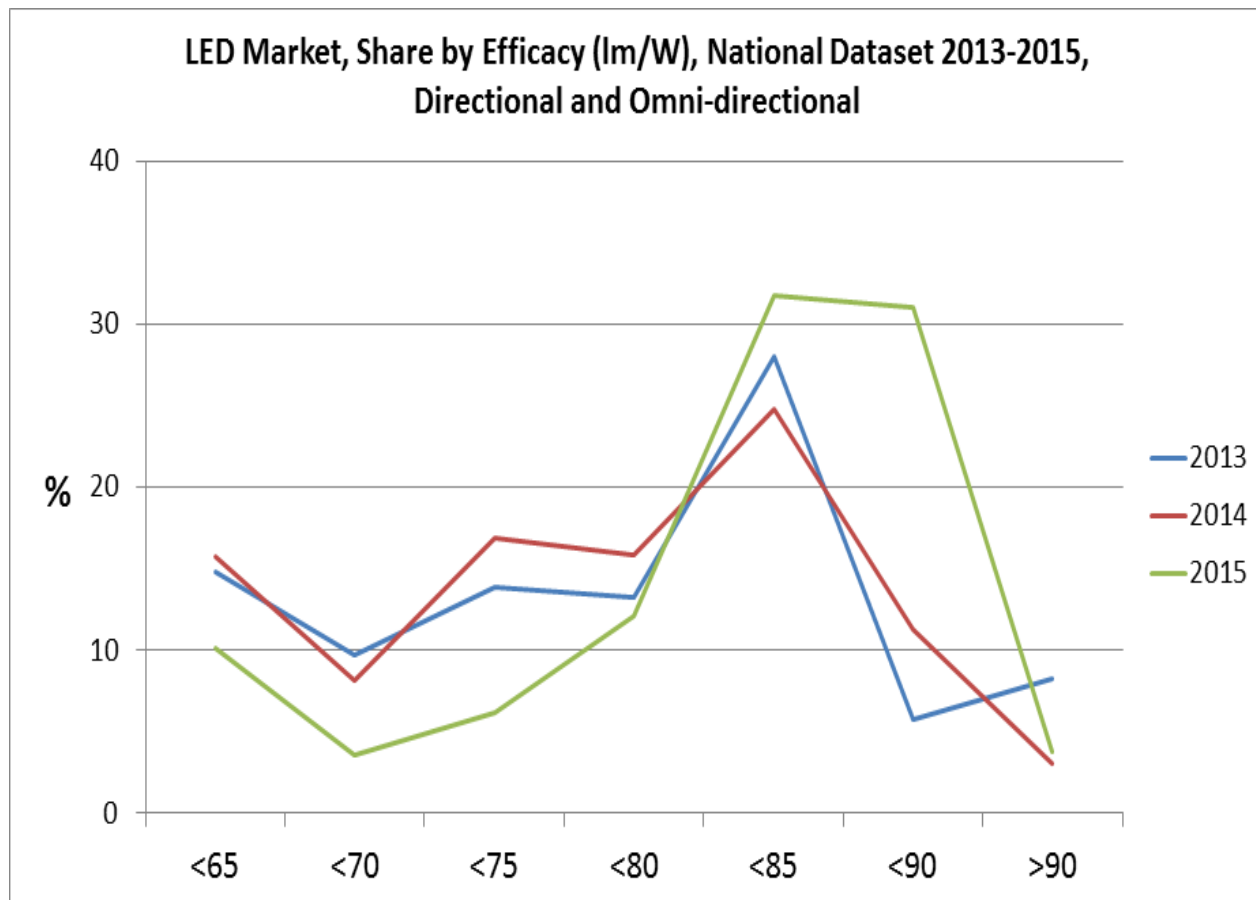


# Directional (2009 - 2016)



# LED MEPS

**Figure 17: Market share of LED by efficacy**





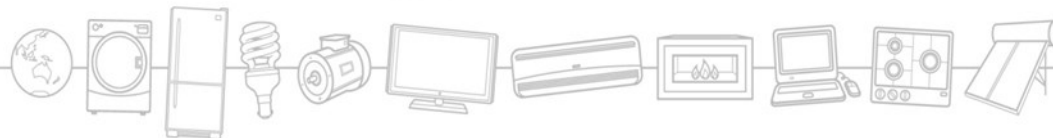
# Registration – what's involved?



# Current Lamp Registration

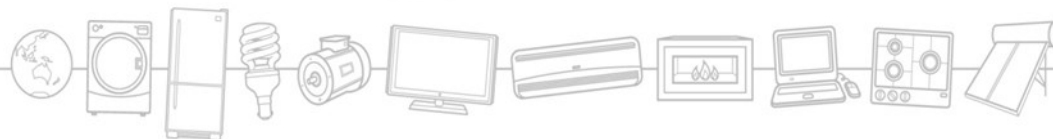
Lamp Registration Steps	Notes
Type	E.g. CFL, Single or Family
Applicant	Supplier and contact details (pre-filled)
Models	Enter one (or more for family)
Test reports	Upload and key identification data
Product details	Marked details on product e.g. lumens
Test results	Test parameter MEPS details e.g. mean measured lumens
Declaration	
Payment	

- Bulk upload function available
- Uploaded test report can be used in more than one product registration
- Drop down menus to allow easy population of fields with details previously provided by a registered supplier (e.g. supplier and brand details, test lab details etc.)



# Other Regulatory Approaches Explored

- A range of options were looked at, such as approaches take by energy safety, and the Australian system for registration of Ozone depleting substances.
- Simplified registration
- Non registration



# Proposal LED lamps

Lamp registration – Variations allowed in families:

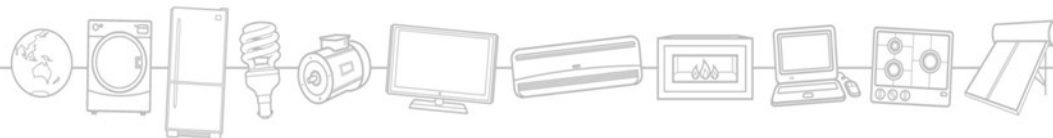
- Extension of family definition to allow variation in CCT, CRI and beam angle
- Minor physical characteristics (caps, shape of outer glass or plastic cover)
- These variations allowed if the rated luminous flux of all models is within 20% above and 10% below submitted test results.

Test report and values submitted for least efficient model

Model numbers and rated values for all MEPS parameters to be entered for all models

Supplier declaration

Max 25 models per family



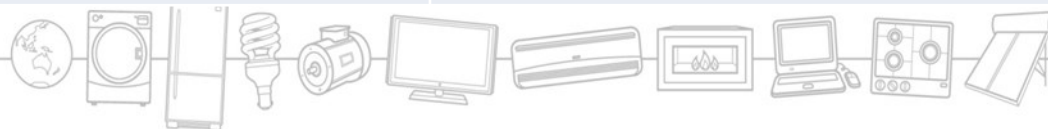
# Proposal LED luminaires

- Simplified registration
- Family definition proposed to allow variations:
  - CCT, CRI, beam angle and diffuser
  - Minor physical characteristics e.g. mounting brackets, casing or luminaire surround variations that do not change the size, shape and reflectivity of the light emitting components of the product.
  - Colour or other surface variations to casing areas other than changes to the reflectivity or diffusers of the light emitting components of the product
  - Proposal for Wattage variations to be permitted within the following ranges:
    - Small luminaires: 50% variation from nominated least efficient model
    - Large Luminaires, planar, battens and troffers: 80% variation from nominated least efficient model
  - higher maximum of number of models in a LED Luminaire family



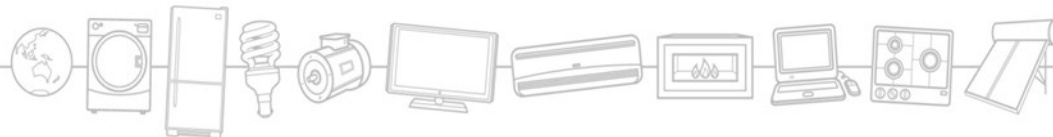
# Proposal LED luminaires - registration

Luminaire Registration Steps	Notes
Type	E.g. small/large/planar . Single / family
Applicant	Supplier and contact details (pre-filled)
Models	Enter one or more model numbers (all model numbers in family to be entered)
Test reports	Report for least efficient model in family / or voluntary with obligation for supplier to hold and provide test report if required
Product details	Marked details on product for least efficient only (remaining voluntary) / or lumens & Watts for all?
Test results	Test details entered for least efficient only
Declaration	Meets the requirements of the GEMS Act
Payment	



# Registration - Families

- Additional models may be later added to families.
- For registrations in Australia that would mean reduced cost.
- The administration of the GEMS Act (Australia) is based on a partial cost recovery model. Given that these proposed family provisions are different to what has been allowed to date under the GEMS Act, the Department would reserve the right to review and modify the approach if the family definitions proved to result in too few families being registered.

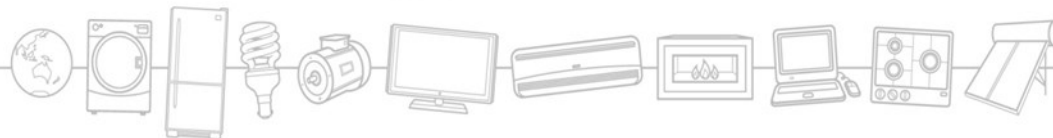


# LED MEPS

- Also proposed to collect bar code/s for registered products (voluntary / mandatory) – feedback requested
  - This would make compliance store surveys much more efficient

## Simplified Registration for :

- Decorative luminaires (max number?)
- Limited production runs ( $\leq 20$ )
- Would not require demonstration of full compliance with MEPS.
- Import/production volumes to be provided annually for duration of registration.





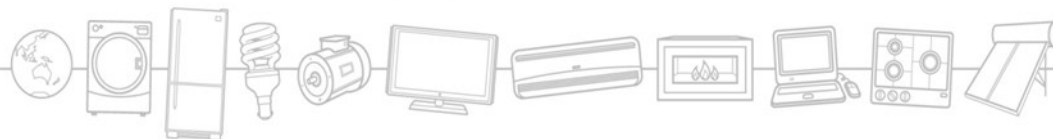
# ENERGY STAR

- EECA will be reviewing existing ENERGY STAR specifications for LED products in line with the outcomes of this consultation process.
- Contact Chris Forsman – [chris.forsman@eeca.govt.nz](mailto:chris.forsman@eeca.govt.nz) for further information



# The 2017 Interlaboratory Comparison

- IEA 4E Solid State Lighting Annex 2017 Interlaboratory Comparison of Goniophotometer Measurements (IC 2017). [ssl.iea-4e.org/news/pre-announcement-ic-2017](http://ssl.iea-4e.org/news/pre-announcement-ic-2017)
- Designed to be in compliance with ISO/IEC 17043 to serve as a proficiency test for SSL testing.
- Will use CIE S 025/E:2015 as the test method for measurement, and participant results reports may be submitted to accreditation bodies as a proficiency test for CIE S 025 and some regional test methods.
- Products: narrow-beam LED directional lamp, LED panel luminaire, linear LED luminaire, and an LED street lighting luminaire)



# Labelling

- Option goes beyond mandatory marking requirements to specify presentation
- Would be applied to all technologies (residential products), making it easy for consumers to compare products
- Number of countries have comparative, endorsement or information only labels including EU, US, NZ, China and Japan.



# Labelling

- Would assist with transition, but additional measures would be required to achieve greater savings.
- Proposed labelling approach is to base on a shortened version of the US Federal Trade Commission (FTC) Label.
- If approved, scheduled to commence Jan 2018



# Labelling – consumer research study

To determine if a label would assist consumers in lamp purchasing OR if product marking requirements would be just as effective.

Stage 1 (Nov) – online questionnaire, 850 people

Stage 2 (Jan/Feb) – focus groups and shop interviews (in progress)



# Key findings – online survey Nov 2016

- Decision making is short
- 40% conduct no research prior to purchase
- LED and linear identified as best VFM, but NZs still see incandescent GLS to be cost efficient
- Watts, light output and lifespan all important on packaging (Aus 88%, 86%, 85%) (NZ 87%, 86%, 89%)



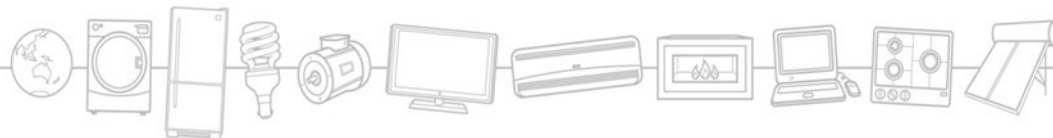
# Key findings – online survey Nov 2016

- Energy efficiency and claimed incandescent equivalence also seen as important on packaging (Aus 81% and 80%) (NZ 80% and 71%)
- 76% Aus and 75% NZ would like to see estimated annual electricity cost on packaging
- Understanding terms – 58% (Aus)/49% (NZ) don't understand lumens, 60% (Aus)/53% (NZ) don't understand l/w



# Key findings – online survey Nov 2016

- High proportion felt a label would influence their behaviour (75%)
- Energy and cost saving information is communicated most clearly by the US Lighting Facts Label (58% NZ, 52% Aus selected out of 5 options presented).





# Recommendations

- Purchasers are open to energy efficiency
- Challenge old habits
- Make the connection between frequency of purchase and value for money
- Must have for future labels



# Stage 2 - Qualitative discussions

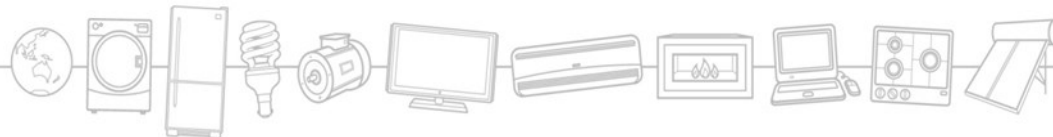
- focus groups
- paired in-depth shopper experience interviews



# Non-integrated comm luminaire MEPS

## Scope

- All linear troffers, batons, suspended luminaires and other fixtures which accept linear fluorescent lamps or equivalent linear retrofit LED lamps
- All downlight luminaires which accept non-integral-ballast compact fluorescent lamps or equivalent LED retrofit lamps.



# Non-integrated comm luminaire MEPS

## Rationale

- To achieve energy savings in the cheap end of the commercial market
- Address a potential regulatory imbalance if MEPS is applied to LED luminaires

## Timing

- Align with LED MEPS for planar luminaires, integrated batons and troffers (flagged 2019)



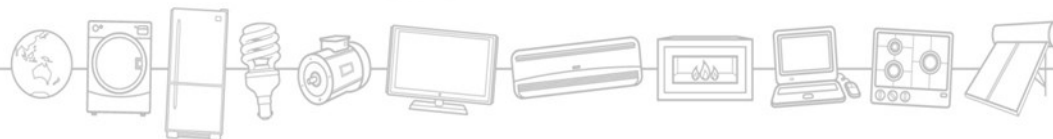
# Non-integrated comm luminaire MEPS

## Proposed levels

- MEPS levels of 80 per cent LOR for linear luminaires
- MEPS level of 70 per cent LOR for downlight luminaires

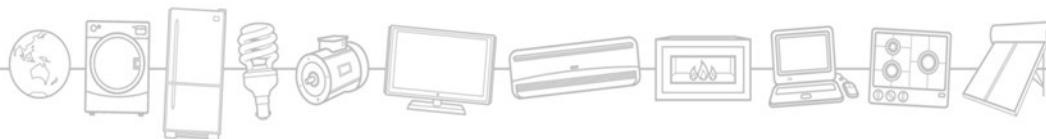
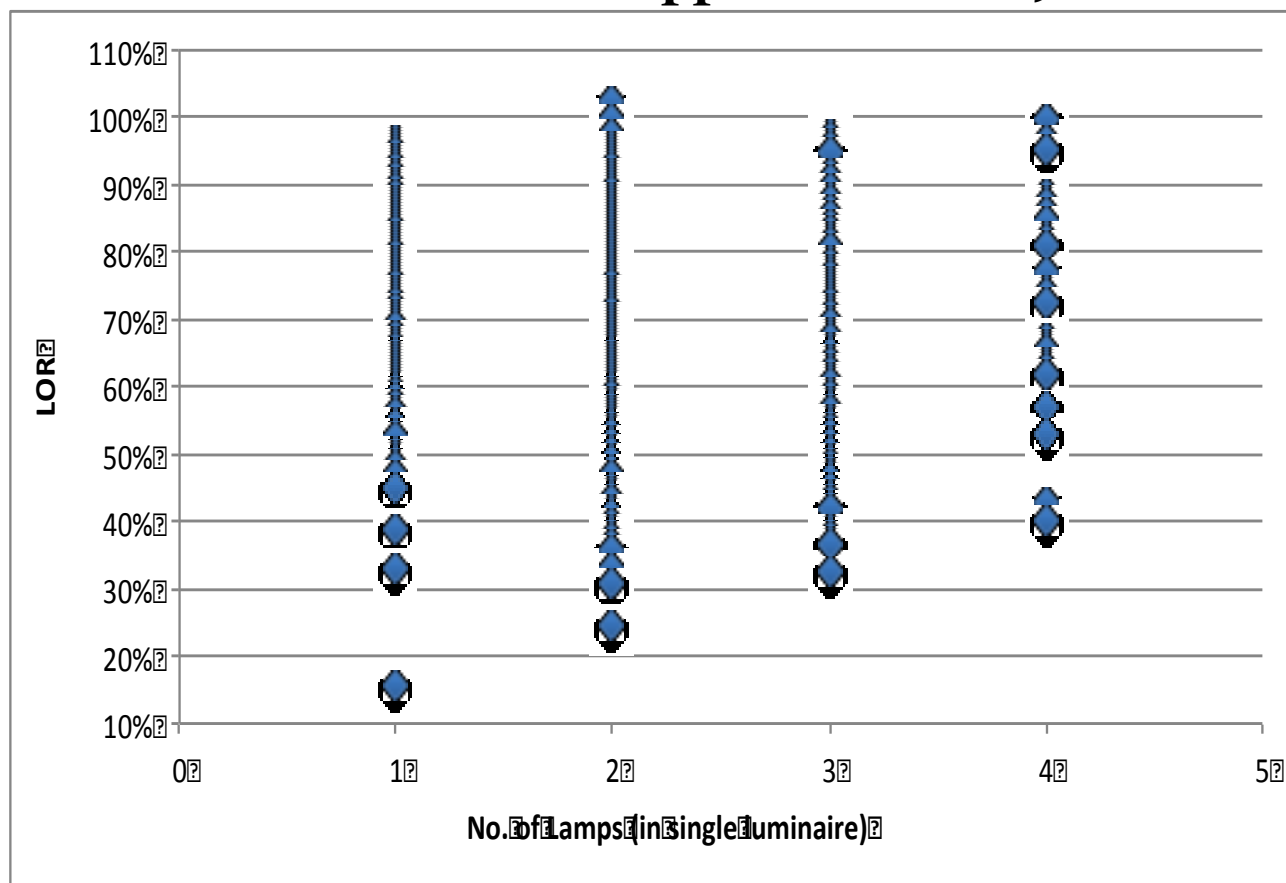
## Method

- Simple test based on photometry information already available to manufacturers
- Total LOR which includes light emitted in all directions from the luminaire (upwards and downwards)



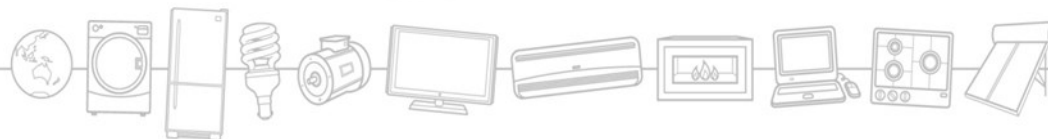
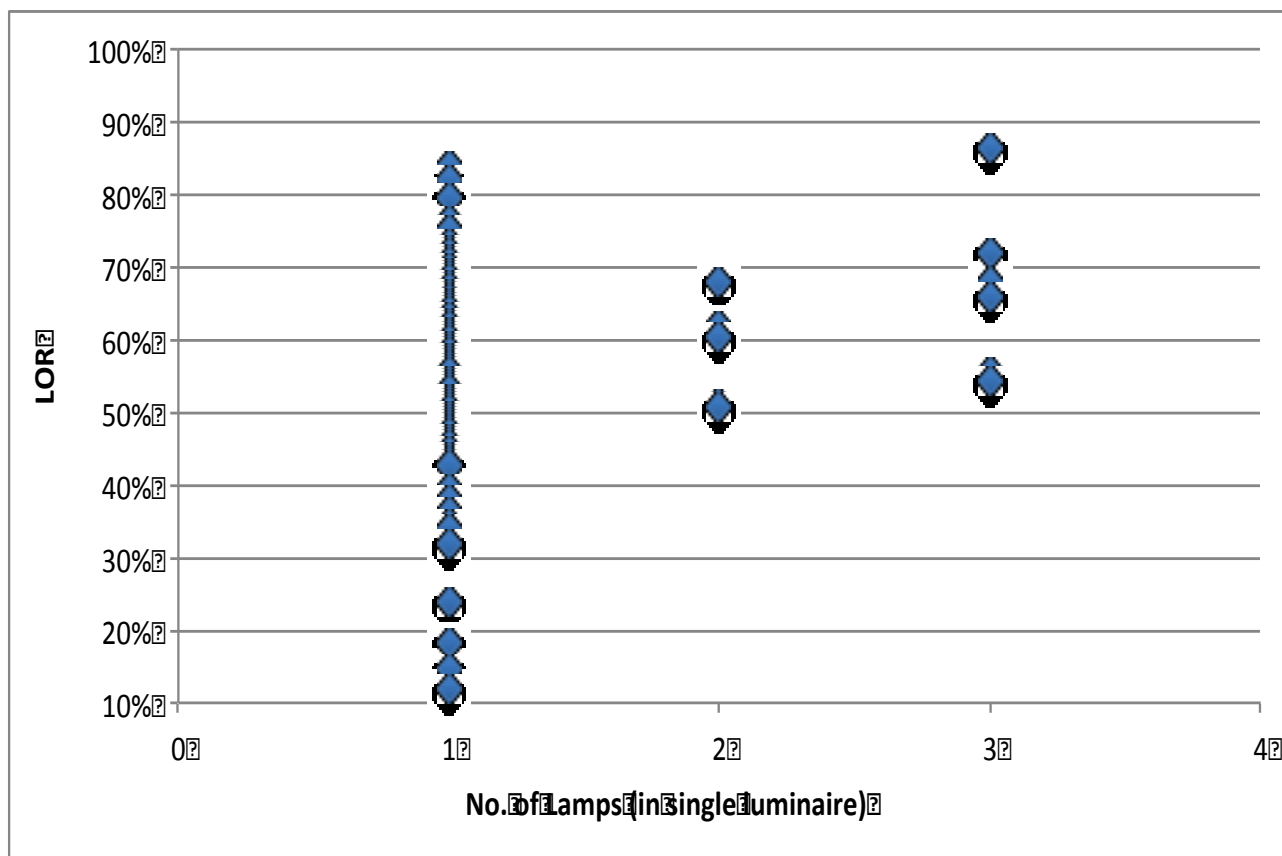
# Non-integrated comm luminaire MEPS

**Figure 18: LOR for linear fluorescent luminaires (derived from manufacturer-supplied IES files)**



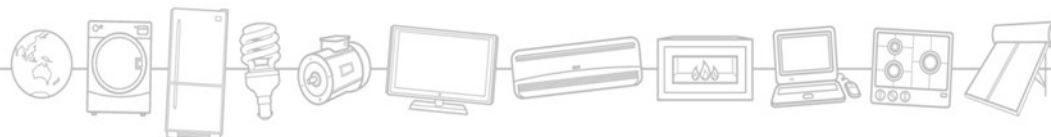
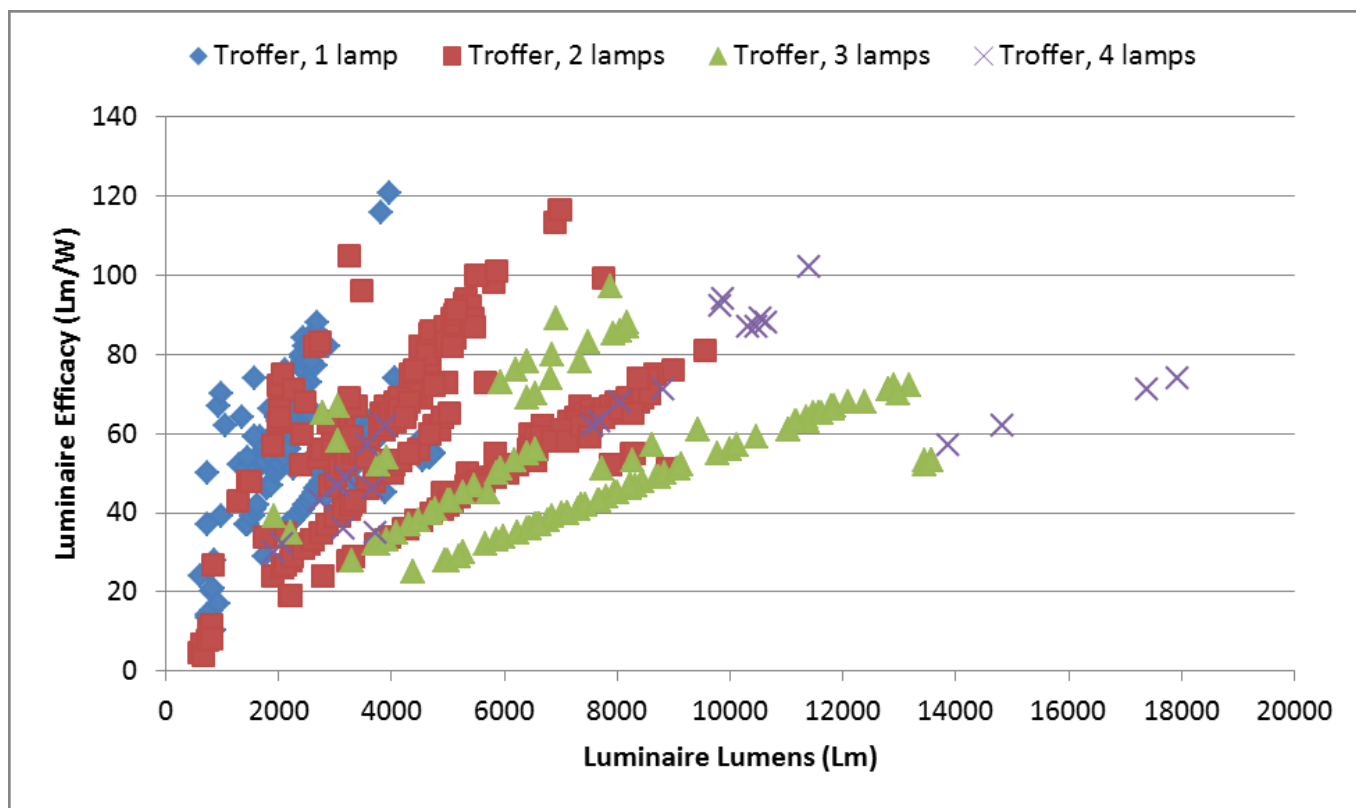
# Non-integrated comm luminaire MEPS

**Figure 19: LOR for CFLn luminaires (derived from manufacturer-supplied IES files)**



# Non-integrated comm luminaire MEPS

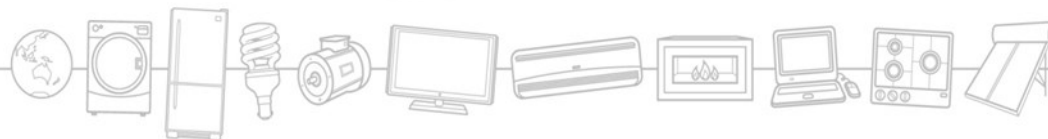
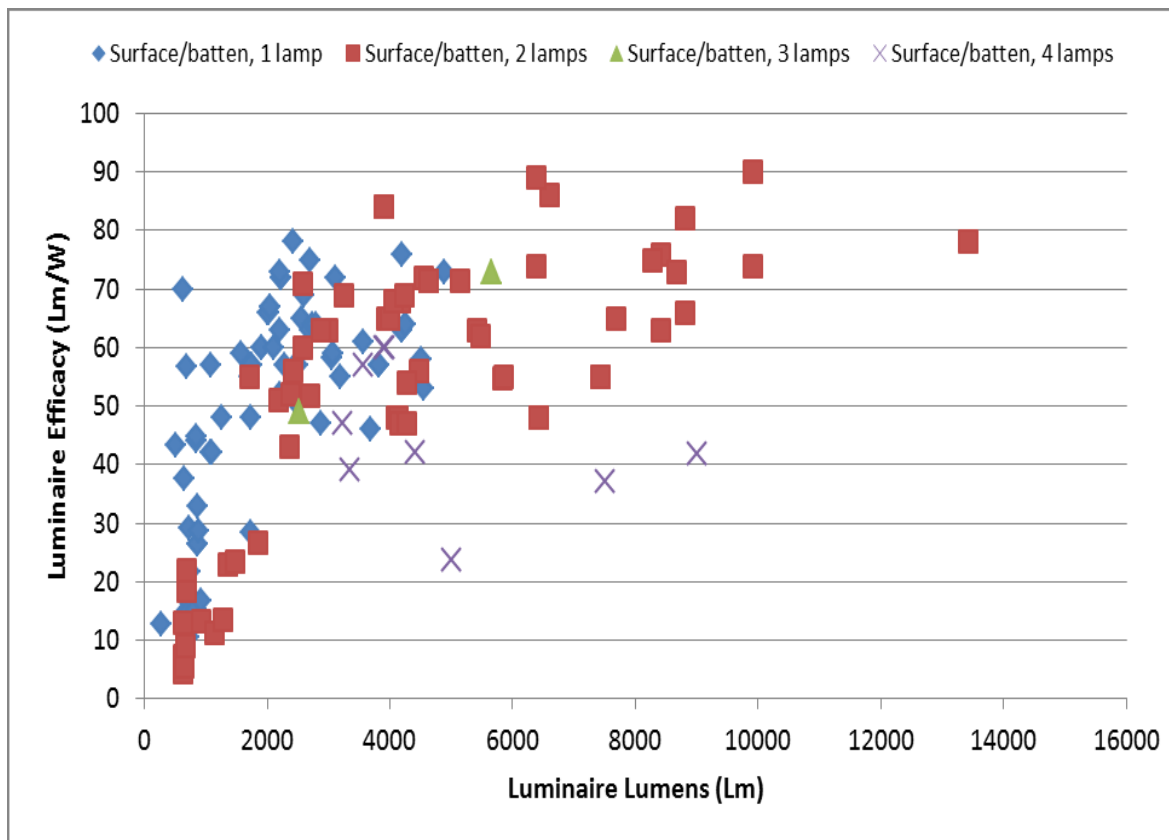
**Figure 20: Linear fluorescent troffers LER versus luminaire lumens**





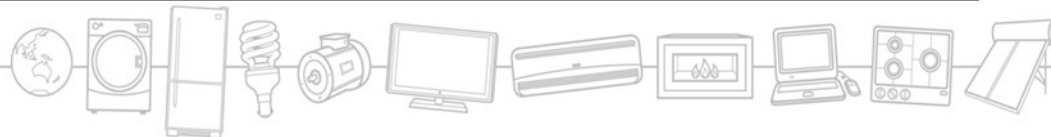
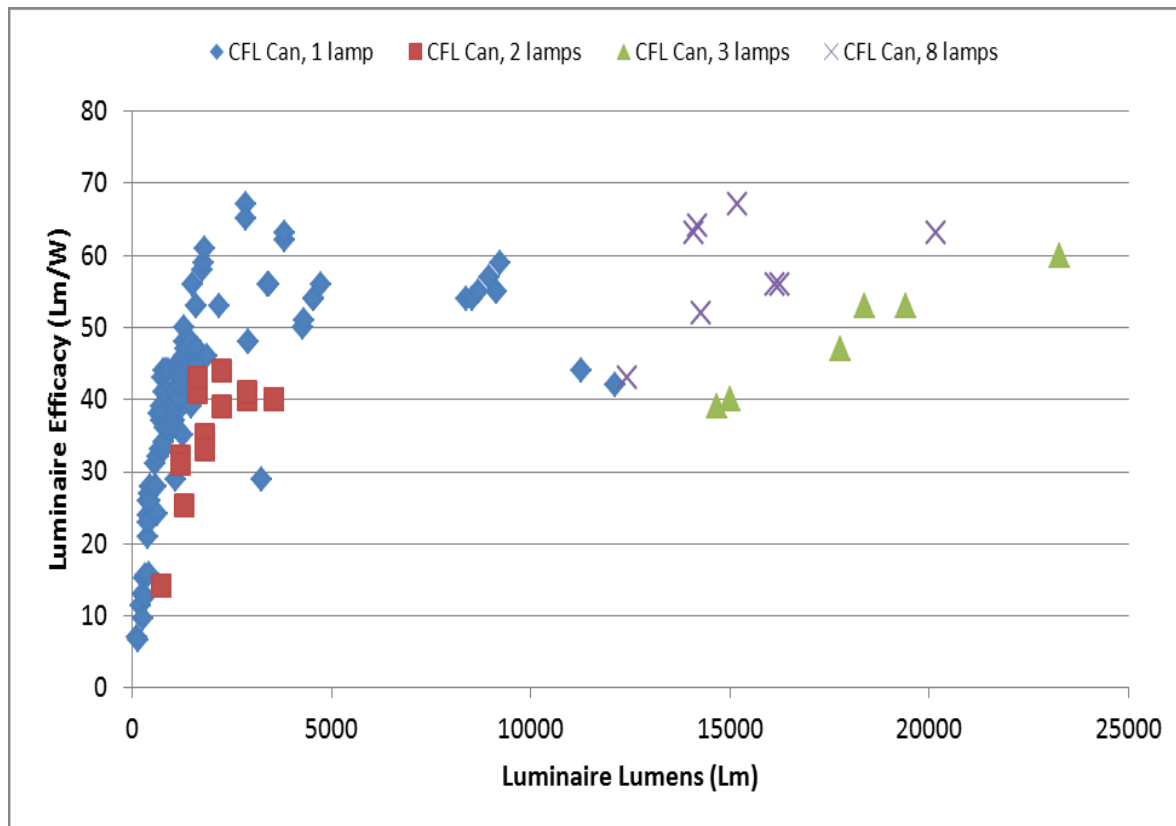
# Non-integrated comm luminaire MEPS

**Figure 21: Linear fluorescent battens LER versus luminaire lumens (approximate efficacy of integrated LED luminaires)**



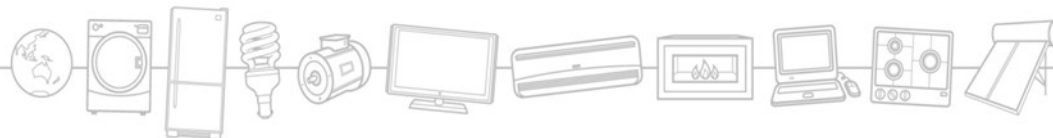
# Non-integrated comm luminaire MEPS

Figure 22: CFL can LER versus luminaire lumens



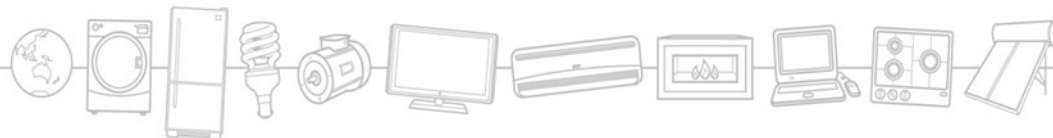
# Ripple Control

- Ripple injection load control is a communication method used by electricity distributors to turn on and off loads such as off-peak hot water systems.
  - Superimposes a coded control signal on to the normal 50 Hz voltage waveform.
- Signal can cause impacts in consumer electrical products.
- In the case of lighting, ripple current signals can cause flashing or repeated changes in light levels.
- Initially emerged 15-20 years ago with increase in dimmers, now re-emerged with LEDs.
- Potentially significant inconvenience and cost for consumers who do whole house conversion to LEDs.



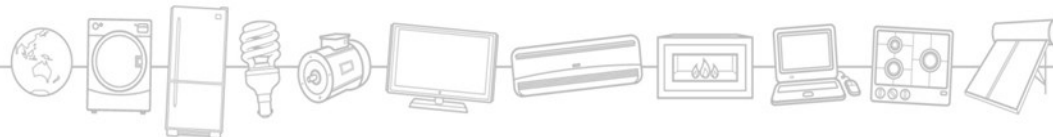
# Ripple Control

- Working group formed involving Distribution Network Service Providers (DNSPs), lighting suppliers and experts
- We are considering commissioning testing of a range of nominated LED lamps and dimmers suitable for areas with high signal levels.
- Other options include consumer and trades guidance on dealing with issue, household filters, testing devices for electricians, regulation, lighting supplier return and replacement policy.
- This problem exists with or without MEPS – we want to work together with lighting industry, DNSPs to resolve – all will need to actively contribute



# Post Consultation sessions

- Please finalise and submit written submissions (24 Feb)
  - Include or reference product and market data to support your comments.
  - Respond to questions in consultation RIS
- We will consider feedback
- Further consultation and analysis
- Decision RIS
- Draft Determinations



# Next steps

Provide formal submission by 24 Feb

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