



SEAD

SUPER-EFFICIENT EQUIPMENT AND
APPLIANCE DEPLOYMENT INITIATIVE

Governments Working Together to Save Energy.

Internationally Aligned Test Methods and Performance Requirements for televisions

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Webinar Structure

- Introduction
- Harmonisation of test methods
- Harmonisation of policy requirements
- Conclusions
- Questions

Introduction

Presenter: Cat McAlister



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Webinar Structure

- Introduction
 - Project team
 - Project aim
 - Why harmonise?
 - Country coverage
 - Product scope
 - Technical considerations



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Project Aim

- To analyse the current television test methods to improve:
 - Content, Repeatability, Reproducibilitywith a view to encouraging all APEC economies to use a harmonised test approach.
- To propose a suite of performance levels that:
 - Reflect reasonable technology steps
 - Cover all televisions both currently available and under research and development around the world.

Publications

- Final Report
- Technical Task Reports
 1. Analysis of Test Methods and Performance Requirements
 2. Analysis of Test Video Signals
 3. Analysis of ABC
 4. Analysis of Voluntary and Regulatory Standards

The full report will be available soon on the [SEAD](#) website.
Download a [policymaker summary](#) today.

Why harmonise?

- Growing global television sales:
 - Selling price per TV fell by 43% (2008 to 2011).
 - Screen sizes increasing
- Energy impacts:
 - 3% to 8% global residential energy use.
- Potential for energy savings
 - Wide range of efficiencies in market
- Risk of no action
 - Unregulated markets flooding with less efficient TVs
- Reduced costs
 - To policy makers, manufacturers and testing laboratories
- Supply chains are global, level playing field important



Country Coverage

- Focus on APEC countries that participate in SEAD, and certain other relevant economies, including but not limited to:
 - Australia,
 - China,
 - India,
 - Japan,
 - Korea,
 - the Philippines,
 - the United States,
 - Vietnam
 - the European Union (although not part of APEC)

Product Scope (1)

- Scope is televisions.
- Non-commercial displays not core scope as typically:
 - Viewed from closer range
 - Lower luminance & power levels,
 - Different ABC regime,
 - Smaller screen size.
 - Used with higher ambient lighting levels.
 - More static images (less image processing)
 - Efficiency metrics account for resolution and professional use.
- However, increasing convergence in screen technology, usage, image quality and even metrics.

Product Scope (2)

- Out of scope:
 - Static displays / status displays
 - Commercial displays (signage and advertising)
 - Testing complexities (currently not included).

Technical considerations (1)

- Illuminance
 - The ambient room / background lighting conditions
 - Measured at a surface in the room
 - Units of lux (lx) or lumens per square metre (lm/m²)
- Luminance
 - The measured intensity of light emitted from a TV display surface
 - in a given direction, per unit area
 - Units of candela per square metre (cd/m²)
 - TV setting usually most significant determinant of power demand.
- Brightness
 - Often used erroneously for illuminance and luminance
 - A subjective assessment of visible light energy.
 - Should not be used in the context of measured units of light.

Technical considerations (2)

- ABC: Automatic Brightness Control
 - Adjusts screen luminance in response to changes in background lighting conditions.
 - Reduces television power demand.
 - Tests are with ABC enabled at different lighting levels.
 - On mode power demand calculated based on distribution of levels.
 - Policy measures incentivise ABC technology in different ways.

Harmonisation of test methods

Presenters: Anson Wu



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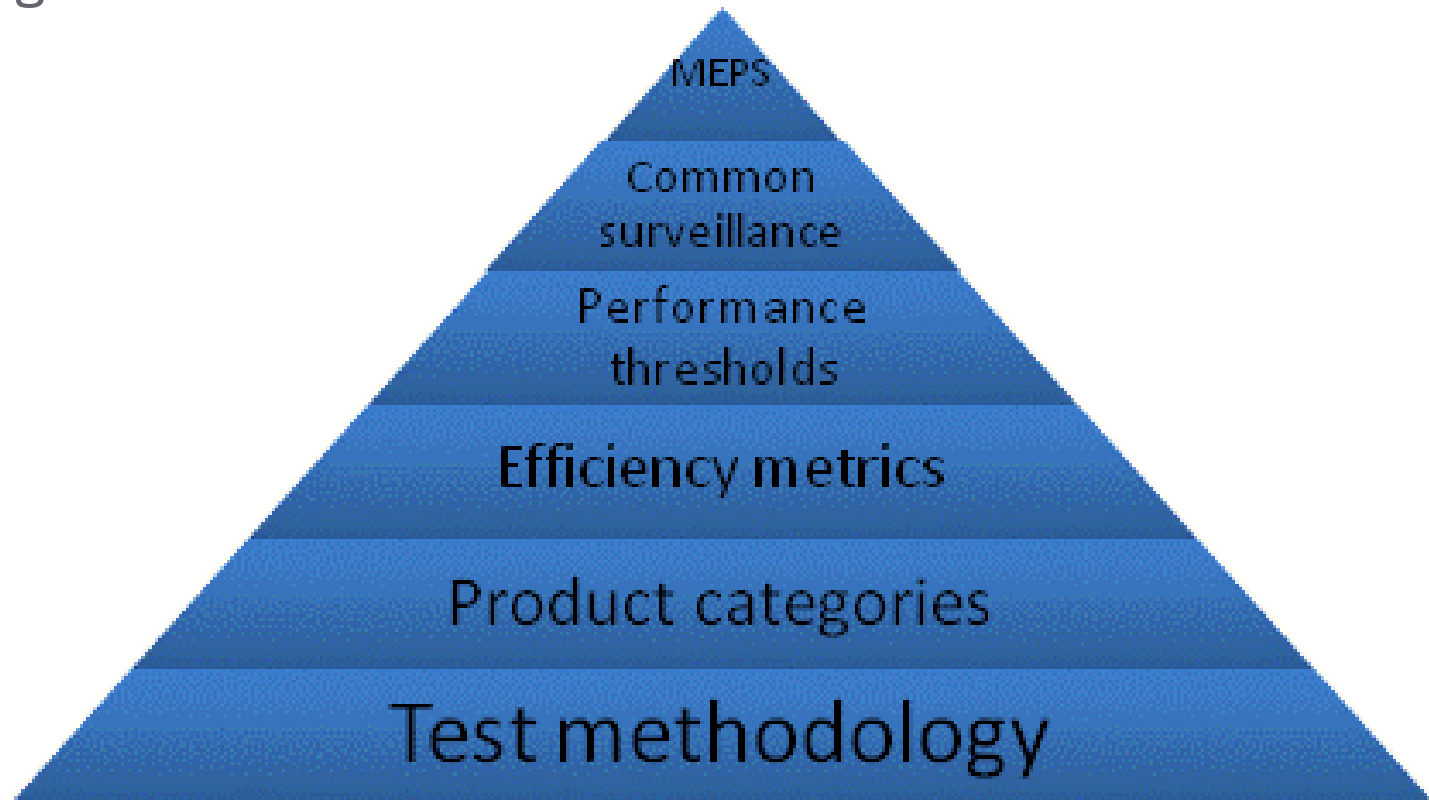
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Webinar Structure

- Introduction
- Harmonisation of test methods
 - Why test methods?
 - Key test methods
 - Reasons for variations
 - Key observations
 - Priorities for harmonisation of test methods
 - Conclusions on testing

Why test methods?

- Test standards are the foundation for Energy Efficiency Programmes



Key test methods

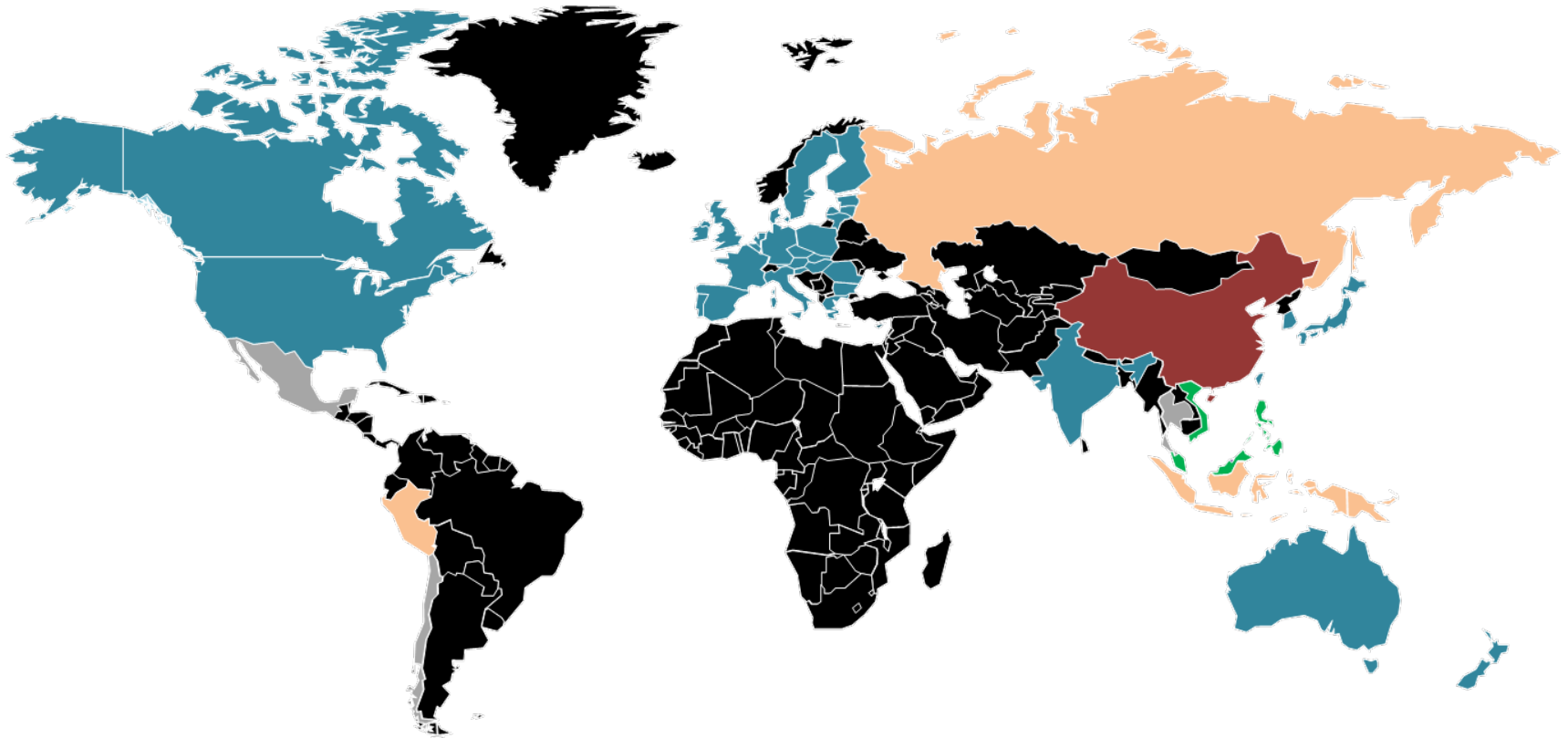
- Six television test methods identified in use
 - All use IEC 62087 dynamic broadcast-content video signal, including Japan and China.
- IEC 62087
 - Referenced (with regional variations) or directly adopted by most existing international test standards.
 - Major revision being completed in 2015
 - Findings of this project are relevant to a subsequent revision.



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IEC 62087 harmonisation



Key – national policy test standard

IEC62087 applied with no modification
IEC62087 applied with compatible
modifications or additional test requirement

No standard
Incompatible use of selective parts of IEC62087
Only standby power covered
Country out of scope

Key test methods

- GB 24850-2013:
 - The testing method used in China,
 - Different to IEC 62087 in terms of sample preparation (pre-test)
 - Prescribes policy requirements on luminance per Watt metric
 - Efficacy (watts per unit of screen size) is used in other regions.

Reasons for variations

- Evidence locally available to policy-makers,
- Timing of digital switch-over
- Consumer attitudes toward default product settings.
- NOT laboratory set up between countries
 - This is relatively consistent
 - Any variation between labs is instead due to training and misinterpretation of standards.

Key observations (1)

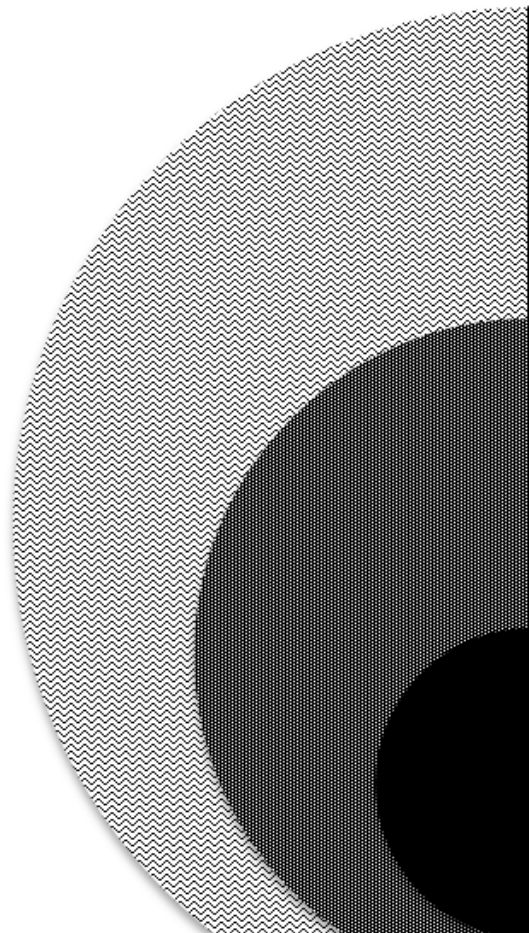
- Evolution is a necessity for TV test methods:
 - TV technology development rapid
 - Tests should reflect actual in-home energy consumption.
 - Increasingly sophisticated picture optimisation algorithms
 - Automatic brightness control (ABC)
 - New broadcast formats such as ultra high definition (UHD) and 3D.
- Some harmonisation progress has already been made:
 - Measuring equipment requirements;
 - The broadcast content test video signal;
 - Confidence level requirements for measurement of uncertainty.
- Some regional variations are a necessity
 - e.g. different ambient temperature ranges or input voltages.

Key observations (2)

- Sample preparation: greatest impact on result comparability.
 - GB 24850-2013
 - Requires luminance & contrast configuration to grey-scale test pattern.
 - Influenced by the perception of the individual
 - Adds an unquantifiable variability to testing results.
 - IEC 62087 regions
 - Usually test televisions as supplied 'out of the box',
 - More consistent testing results between laboratories.
 - Good indication of the energy impact in "real life" use.
- Policy requirements add to testing divergence
 - discussed later



Priorities for testing harmonisation

A decorative graphic on the left side of the table, consisting of three overlapping semi-circles. The outermost semi-circle is light gray with a fine hatched pattern. The middle semi-circle is dark gray with a medium hatched pattern. The innermost semi-circle is solid black.

Low	<ul style="list-style-type: none">•Luminance test method•Identifying ABC sensor location•TV stand impact in ABC testing•RF vs HDMI inputs in sample prep•Defintions / calcs on uncertainty
Medium	<ul style="list-style-type: none">•Light source (colour, directionality)•Test video signals for new formats
High	<ul style="list-style-type: none">•Illuminance in ABC test•TV sample preparation (luminance)•Test video signal revision

Conclusions on testing

- Refine approaches to testing light sources
 - Further examine specifications in international use to define a harmonized method that:
 - Is simple, repeatable, and reproducible.
 - allows a wide repeatable range of illuminance to characterise the full ABC control curve.
- Greater harmonisation of test approaches between Chinese and IEC approaches
 - Screen luminance in sample preparation.
 - No robust method to translate / compare results between the two test approaches.

Harmonisation of policy requirements

Presenters: Jeremy Tait, Anson Wu, Bob Harrison



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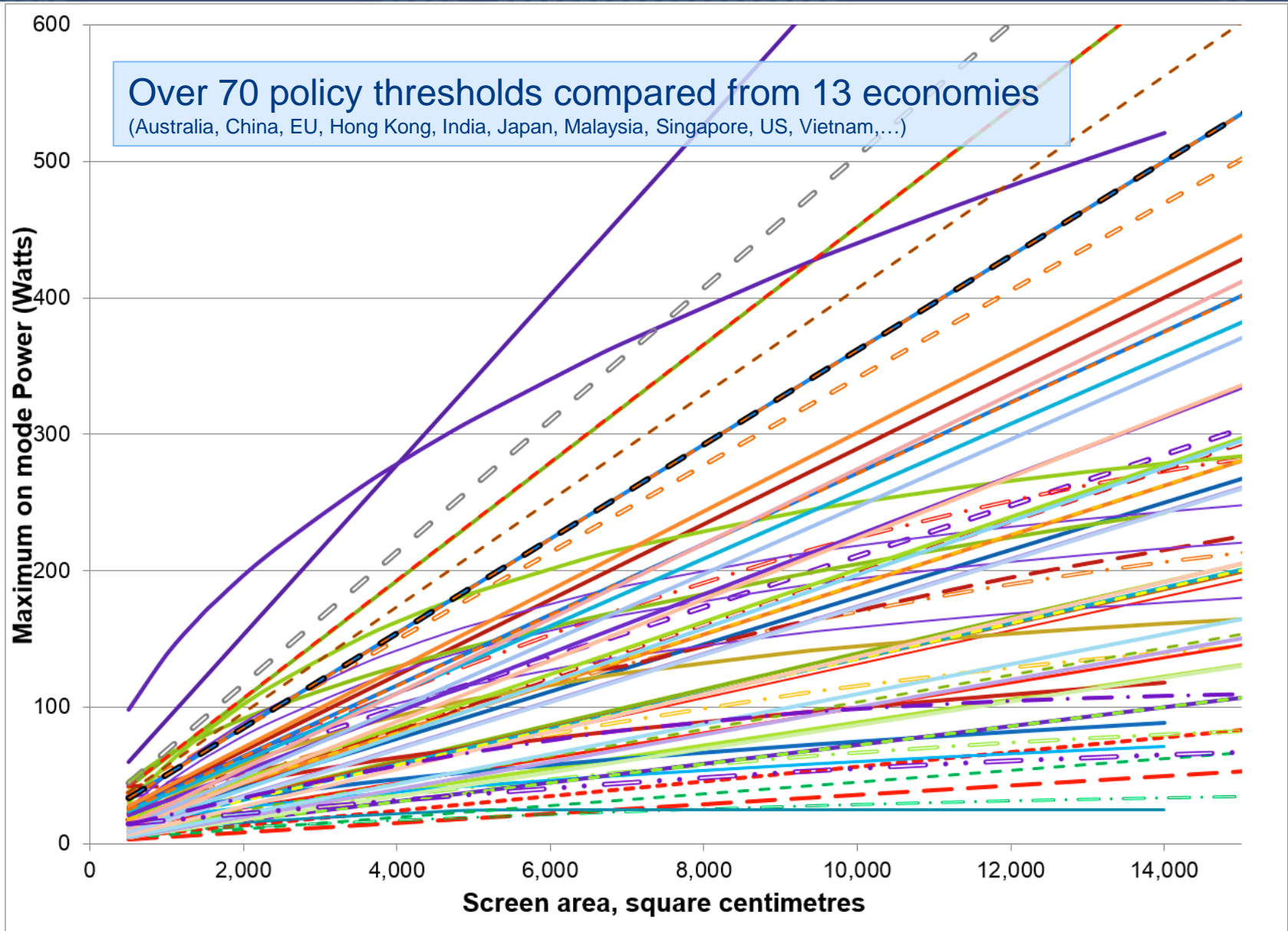
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 - Comparing performance levels
 - Relative stringency of requirements
 - Towards greater policy harmonisation



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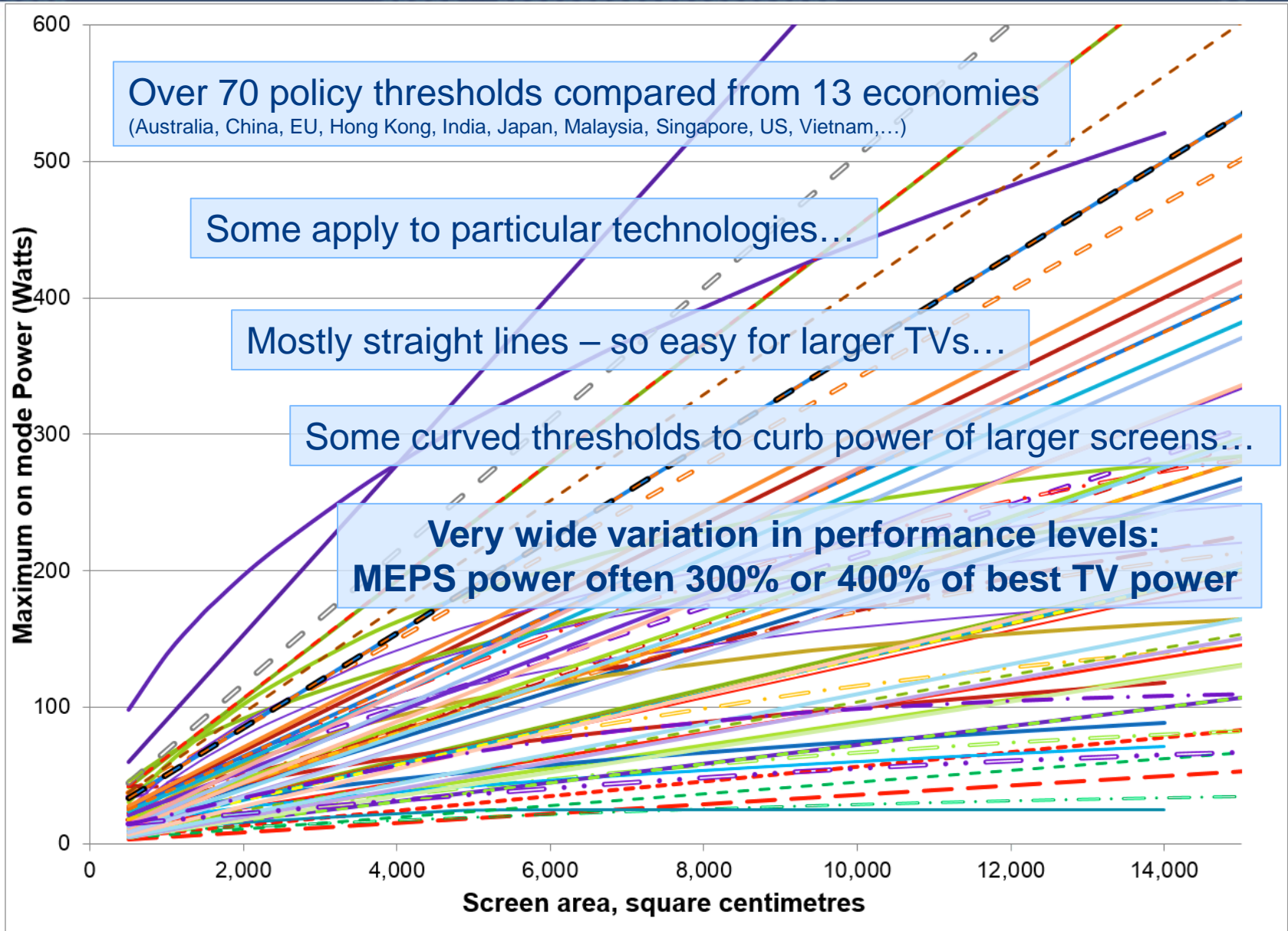
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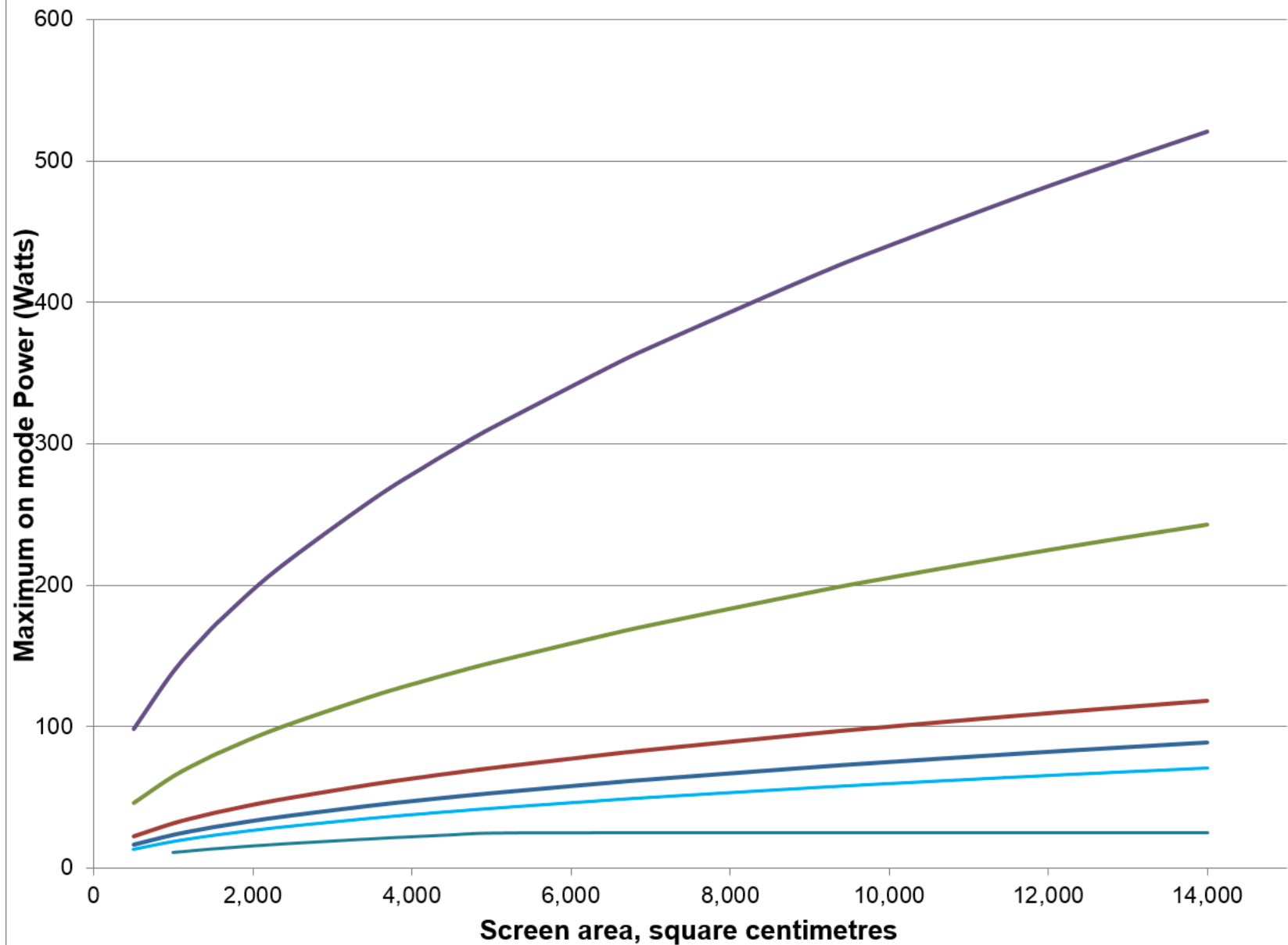
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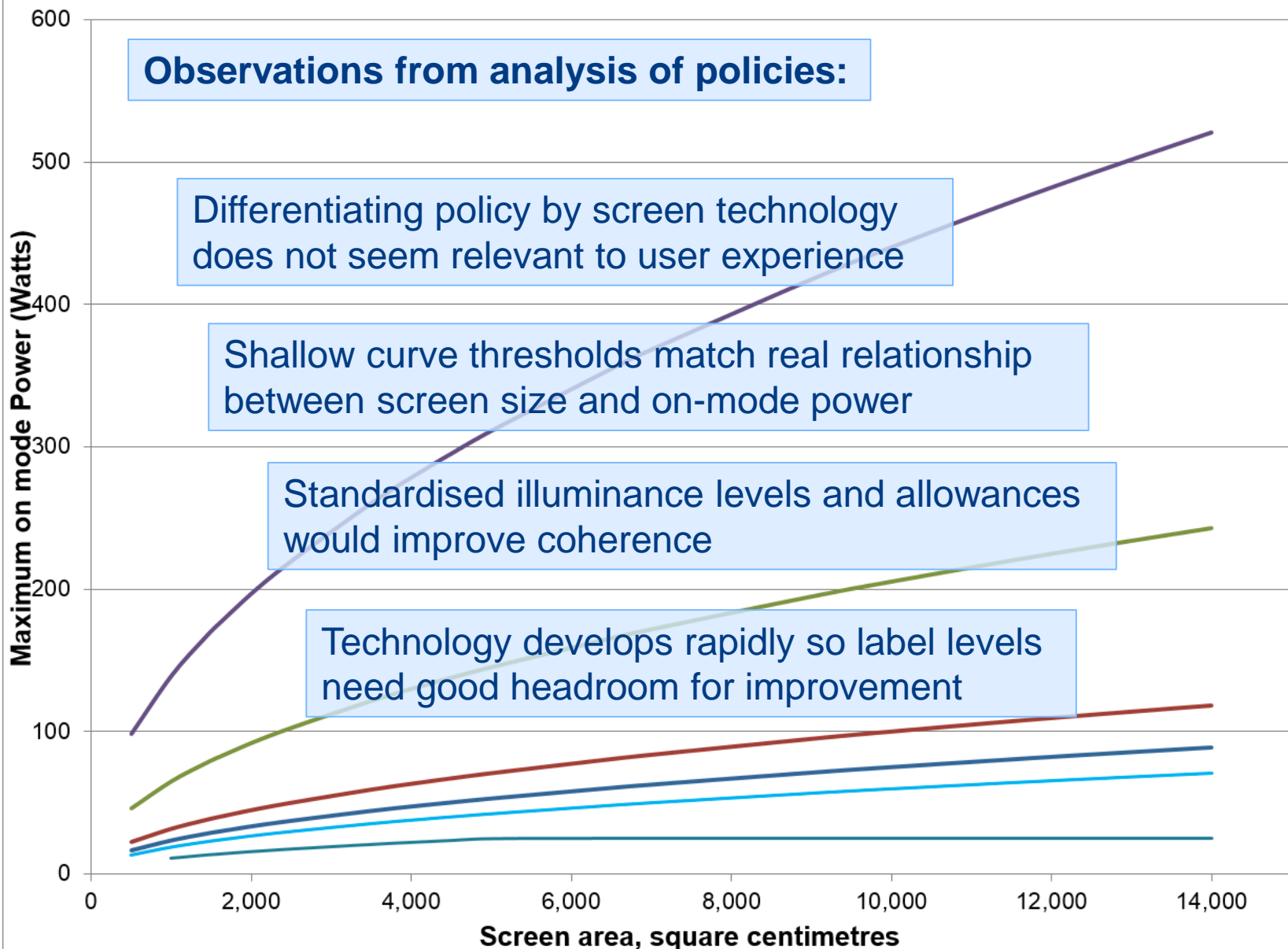
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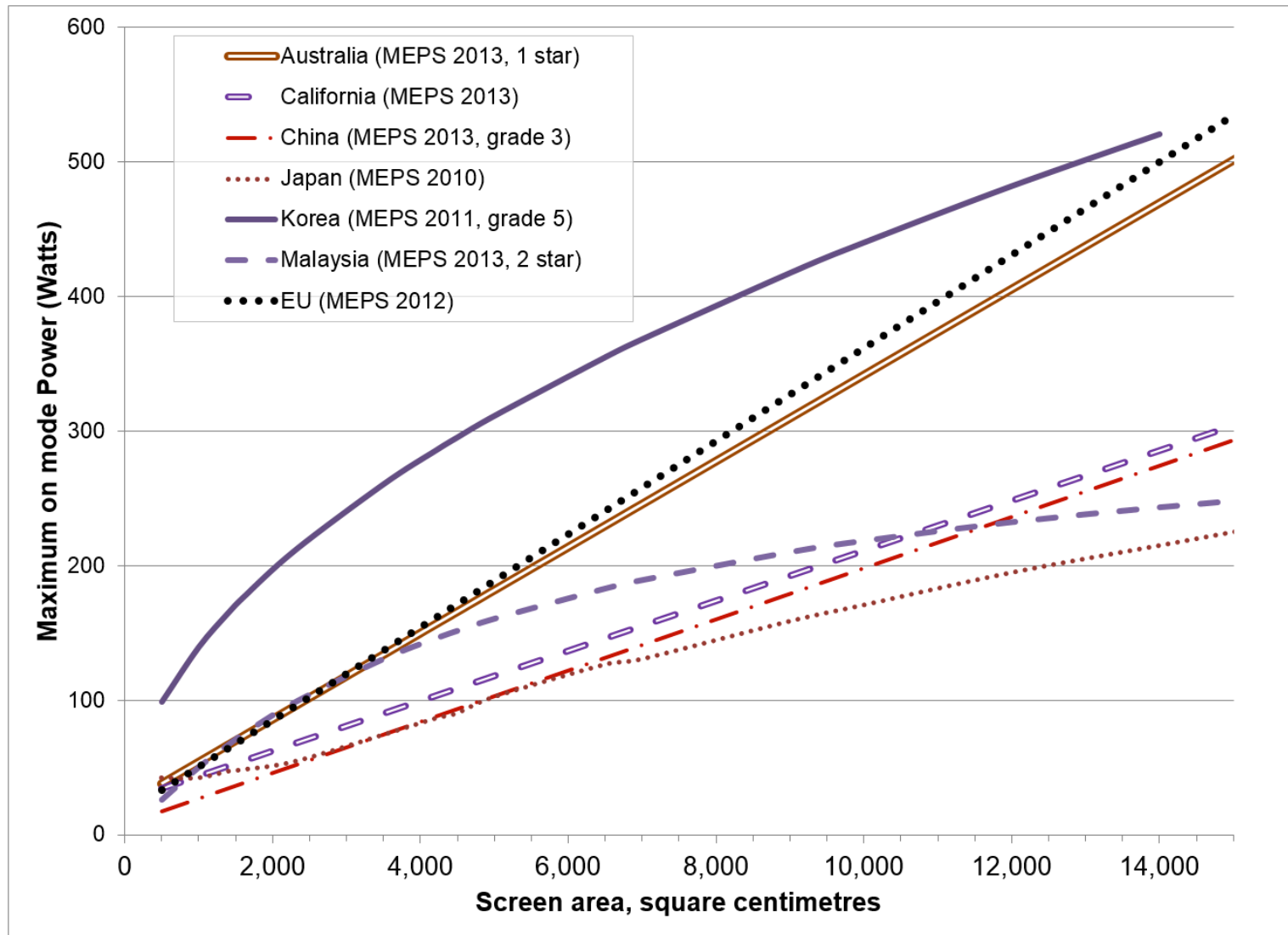




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Relative stringency of some MEPS

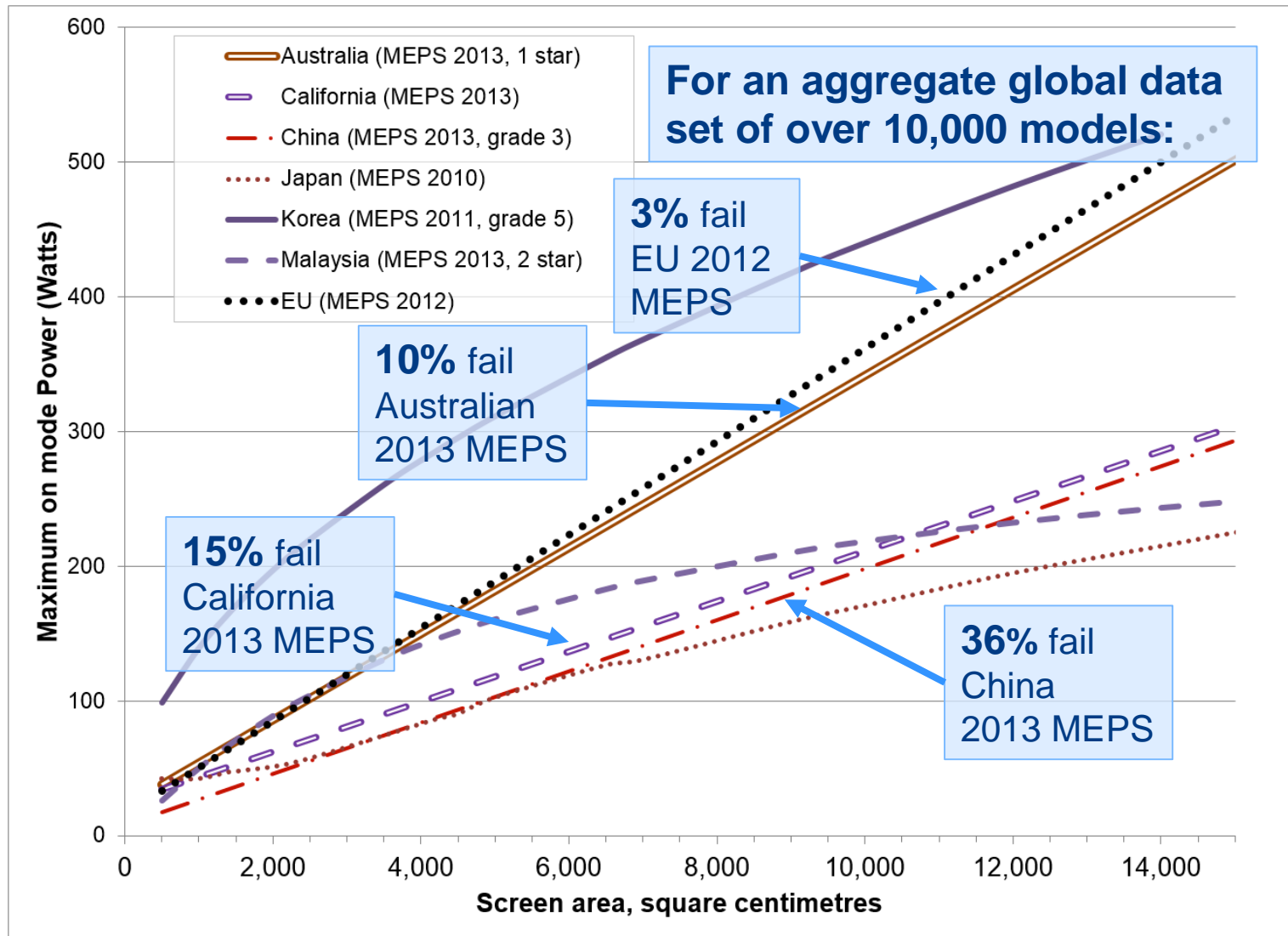




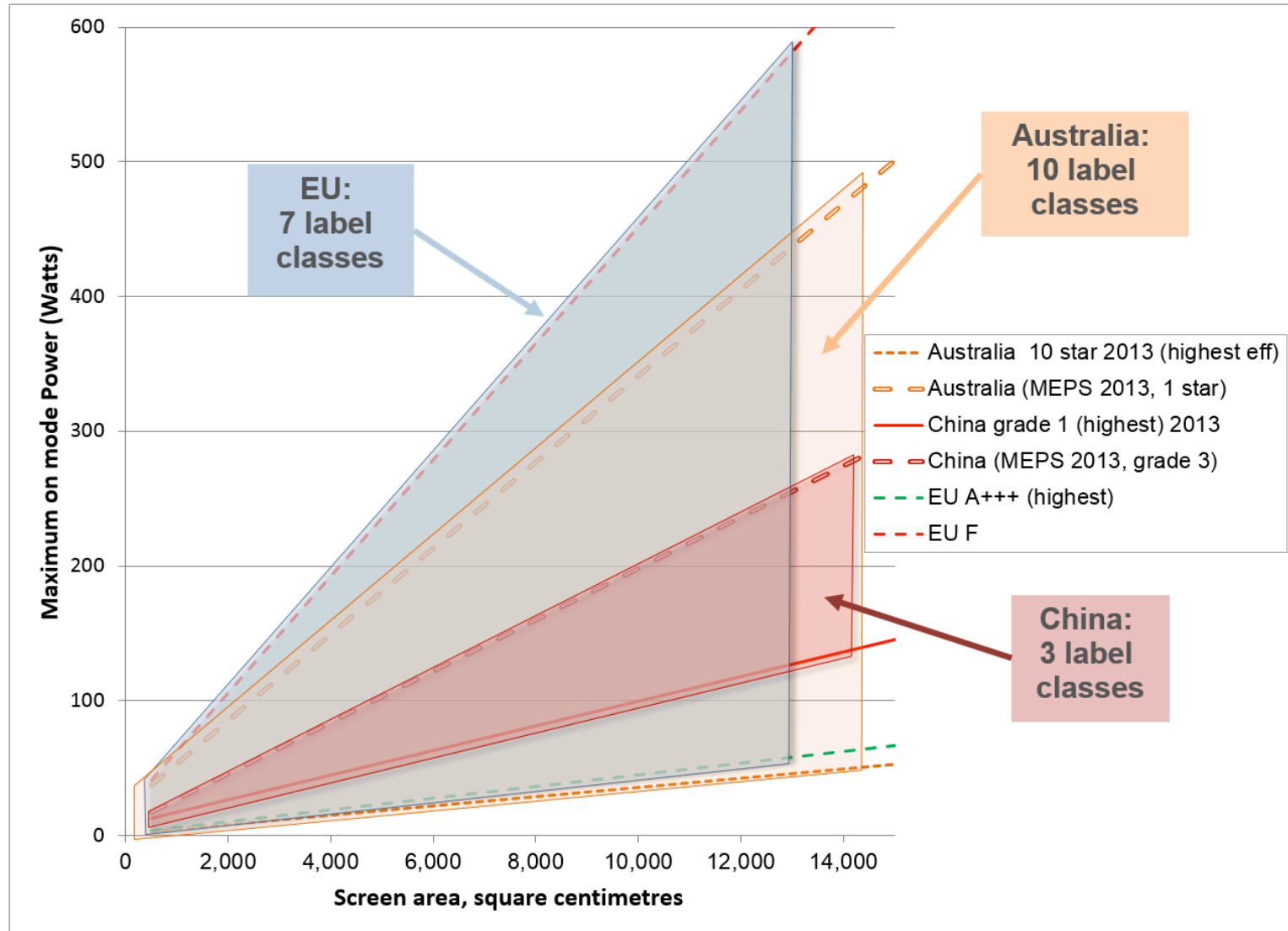
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Relative stringency of some MEPS



Relative spread of labels and ability to differentiate efficiency



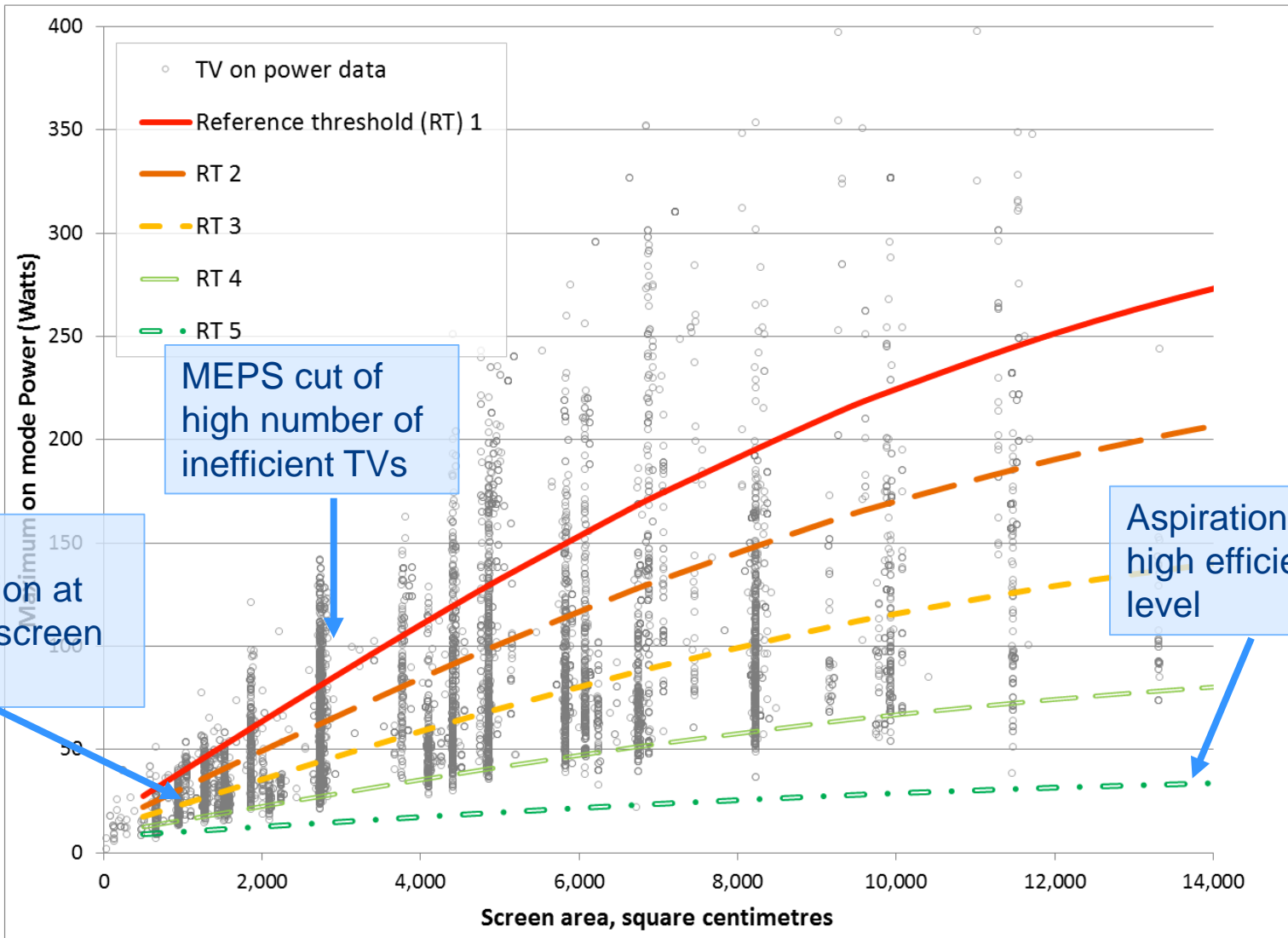
Proposed benchmark performance levels

- Efficiency metric formula can be easily manipulated to fit data
- More fairly classifies TVs across different screen sizes
- MEPS cut off least efficient, particularly at most popular screen sizes
- More even distribution across levels
- Aspirational high efficiency threshold



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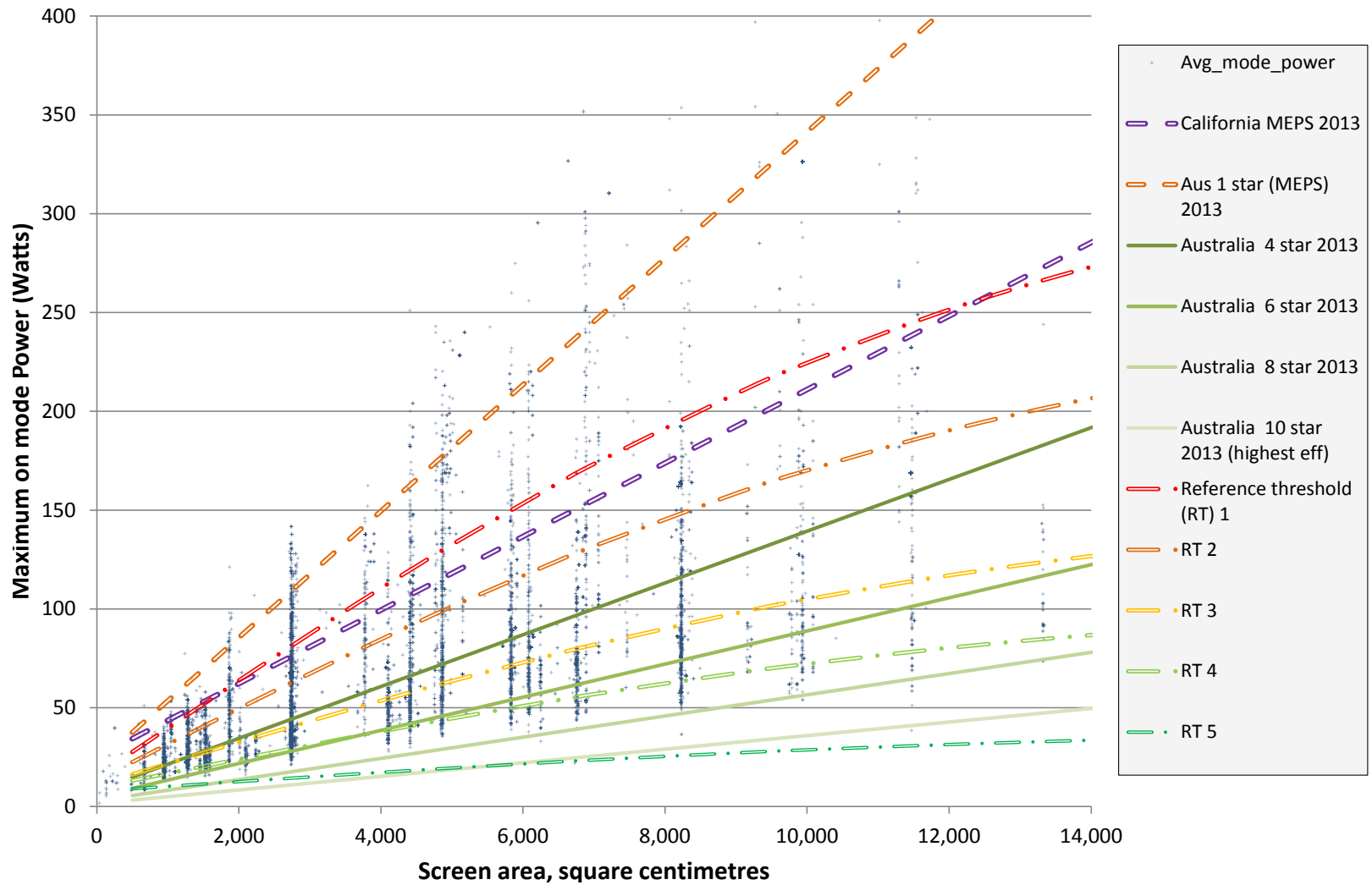
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Update on EC Policy developments

- EC redraft of regulation on television energy efficiency and of regulation on television energy labelling
 - Integration of displays and TVs in each
 - Use of tanh formula based on Reference Threshold approach
 - Stringent labelling requirements
- Next stages...

Conclusions

Presenter: Jeremy Tait



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Conclusions

- Global harmonisation of TV test methods could be a reality within a few years
- Globally coherent policies (a common framework) could also be achieved and still allow local flexibility. This would:
 - Enable transparency for best practice
 - Decrease barriers to trade
 - Reduce costs to manufacturers and enforcement agencies
 - Make global policy more effective through wider adoption
- Moving towards harmonisation:
 - Work first to align test methods and standardise information
 - Standardise illuminance, ABC testing and peak luminance methods
 - Guidance for policy makers, including a global framework

Improving evidence for policy makers

Analysis from global aggregated data sets (such as that used in this analysis) can help policy-makers regarding:

- Impact of screen sizes on energy consumption
- Range of energy efficiency by technology and screen size
- Risks of not implementing energy efficiency policies
 - e.g un-regulated markets receiving poor products from elsewhere
- Deciding which reference threshold approach would work best locally through electronic tools and training.

Meet us!

- Display at eceee 2015 Summer Study 1–6 June 2015
 - Club Belambra Les Criques, Presqu'île de Giens, Toulon/Hyères, France
 - <http://www.eceee.org/summerstudy>



- Presentation at EEDAL 8th International Conference on Energy Efficiency in Domestic Appliances and Lighting
 - 26-28 August 2015,
 - Lucerne-Horw, Switzerland
 - <http://www.eedal-2015.eu>



Questions?

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