



IEA 4E SSL Annex Summary 2010-2014

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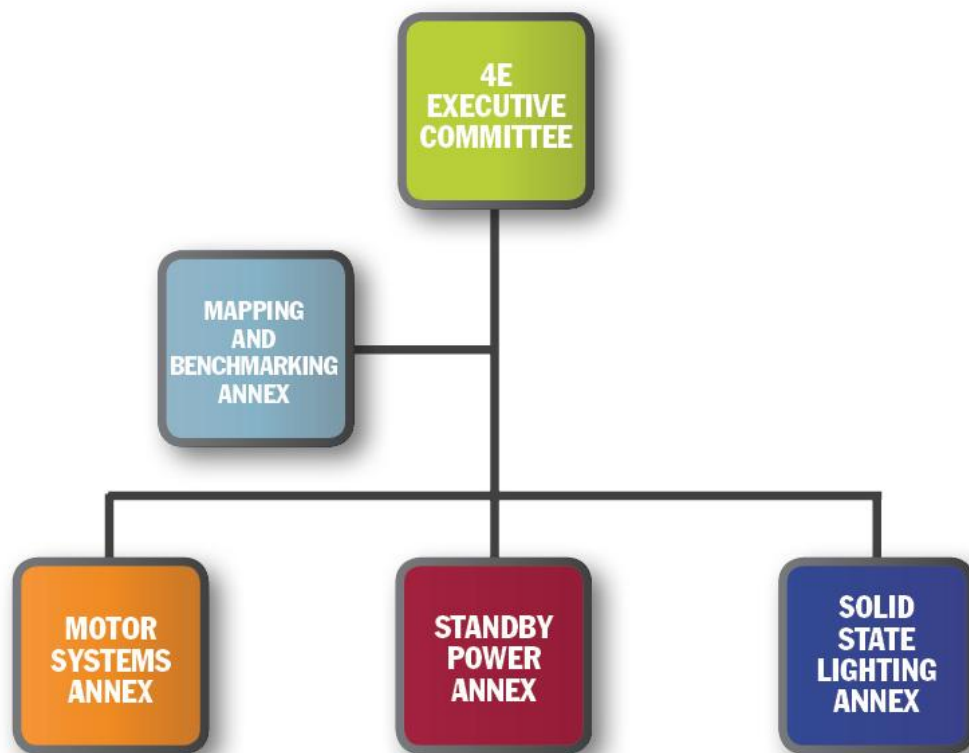
IEA 4E SSL Annex: Key People

- Peter Bennich Chair Management Committee
- Nils Borg Operating Agent
- Michael Scholand Operating Agent Support

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1	Background
2	Quality Assurance
3	Interlaboratory Comparison - 2013
4	Global Accreditation Scheme
5	International Cooperation

IEA Implementing Agreement Energy Efficient End-use Equipment



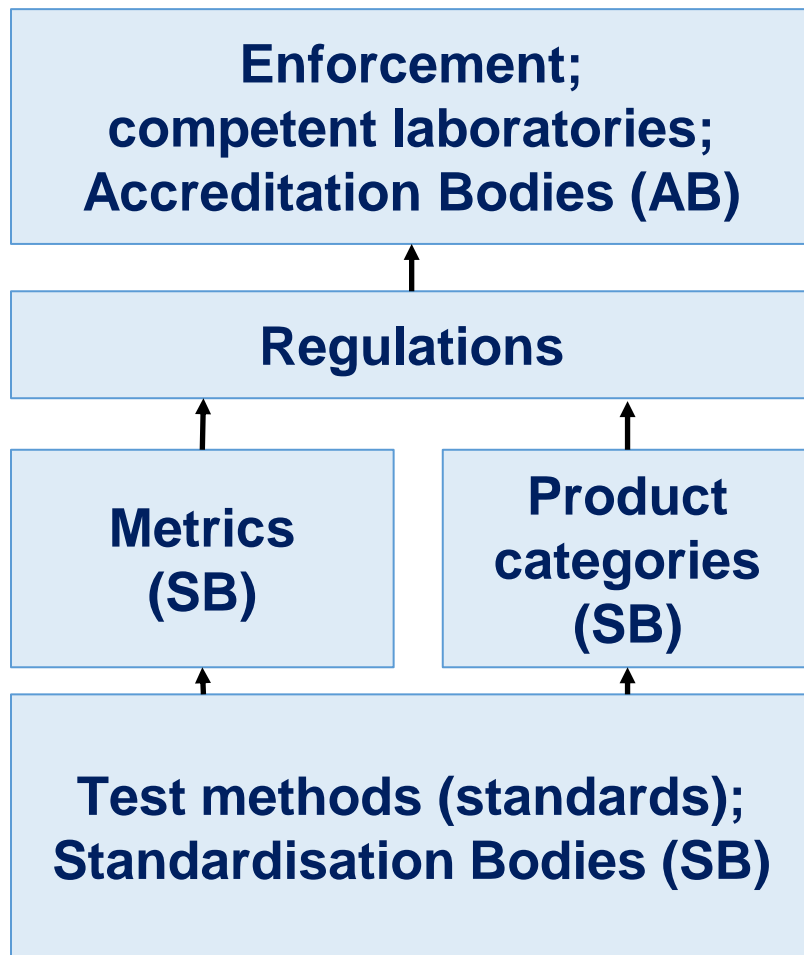
First term: 2009-2014

Second term: 2014-2019

*Here focus on the
IEA 4E SSL
Annex*

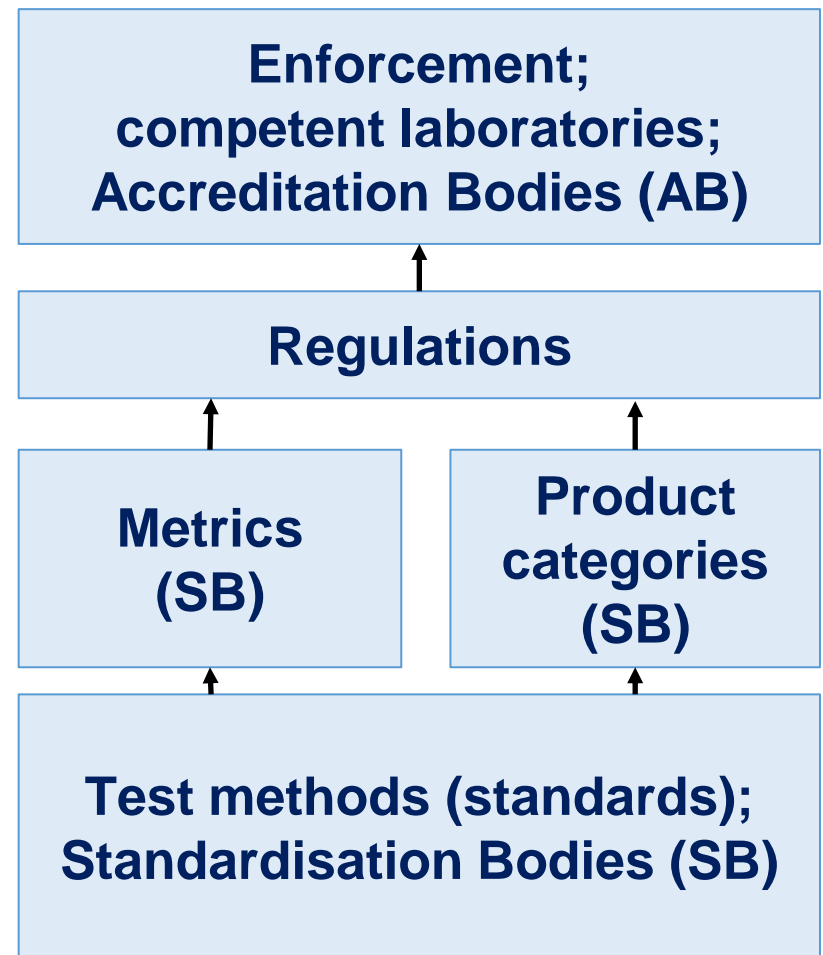
From Test Methods to Enforcement (current situation)

Economy A



≠

Economy B



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SSL Annex first term 2010 - 2014: Three Main Tasks

Task 1: Develop SSL product quality assurance

Task 2: Harmonised SSL testing and lab comparison

**Task 3: Provide for harmonised International
Accreditation**

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2	Quality Assurance
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Task 1: Harmonised Specifications

- Proposals for Quality requirements for 5 product categories



Non-
Directional lamps



Directional
lamps



Downlight
fixtures



Fluorescent
replacement lamps



Street
lighting

- New products in development with Annex Experts
 1. Planar luminaires
 2. Troffer retrofit kits
- High- and low-bay luminaires
- Off-grid requirements broken out separately
- ... To serve as a basis for regulations for governments and regions

Task 1: Life Cycle Assessment – Environmental Impacts



Task 1: Life Cycle Assessment (cont)

- Greatest impact of lamp technology is related to luminous efficacy of system (energy, CO₂,...)
- LED non-directional lamps were not better than CFL lamps in 2012, but expected to be significantly better than CFLs by 2017.
- Main methodology is through literature studies from Annex Member governments
- **Report published in the next few months providing summary of key findings for member governments' consideration during efficient lighting policy development**

Task 1: Health Issues

- Health aspects being investigated – the main methodology is through literature studies
- Neither CIE S009 nor IEC 62471 takes into account the sensitivity of certain specific population groups, which can be characterized by an accrued sensitivity to visible light
- New results on long term blue-light exposure at low levels?
- Possible perturbations of circadian rhythms
- Glare phenomena
- Light flickering

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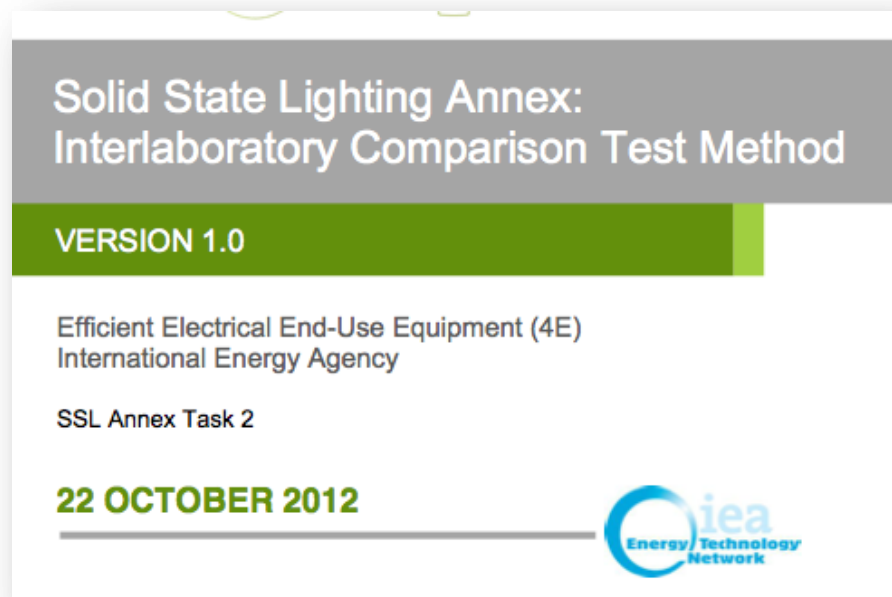
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Task 2: Harmonised Testing and Laboratory Comparison

- Task 2 looks at test methods and laboratory comparison
- Three-step approach:
 - Collect the best test standards from around the world in one document
 - One interlaboratory comparison test between the nucleus labs (4 labs): 2011-2012
 - Then a larger interlaboratory comparison test between many labs with the nucleus labs as core sites: 2012-2014

Task 2: IC 2013 Test Method

- The Annex developed a test method for the 2013 Interlaboratory Comparison
- Incorporates strictest requirements from Chinese, Japanese, US and International LED test standards (draft and current)
- Published October 2012



[http://ssl.iea-4e.org/files/otherfiles/0000/0051/SSL Annex 2013 IC Test Method v.1.0.pdf](http://ssl.iea-4e.org/files/otherfiles/0000/0051/SSL%20Annex%202013%20IC%20Test%20Method%20v.1.0.pdf)

Task 2: Harmonised Laboratory Testing

- The 2013 Interlaboratory Comparison (2013IC)
- Run by four Nucleus Labs
 - Participants register, conduct tests on artefact set, have their results compared to the Nucleus laboratory
 - 110 Laboratories in total – 56 register directly and 54 linked through NIST's NVLAP/MAP and NLTC-CNAS APLAC PT
 - Largest ever cohort of labs in LED lamp test calibration
- Three key documents:
 - Test Method (Task 2.1) – stringent test procedure
 - Generic Test Protocol – procedure laboratories follow
 - Quality Policy (ISO/IEC 17043 compliance)

Task 2: IC 2013 Comparison Testing

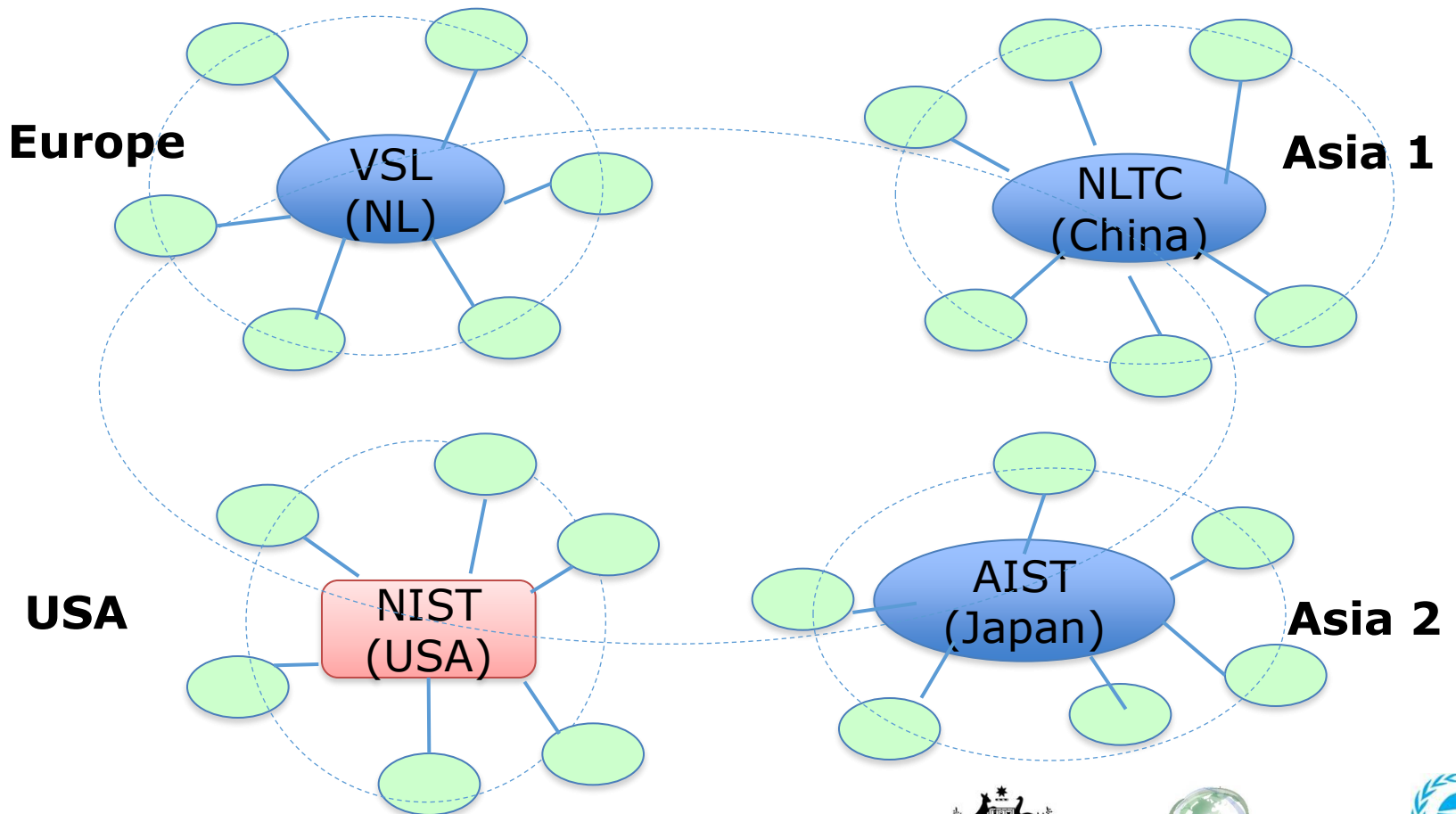
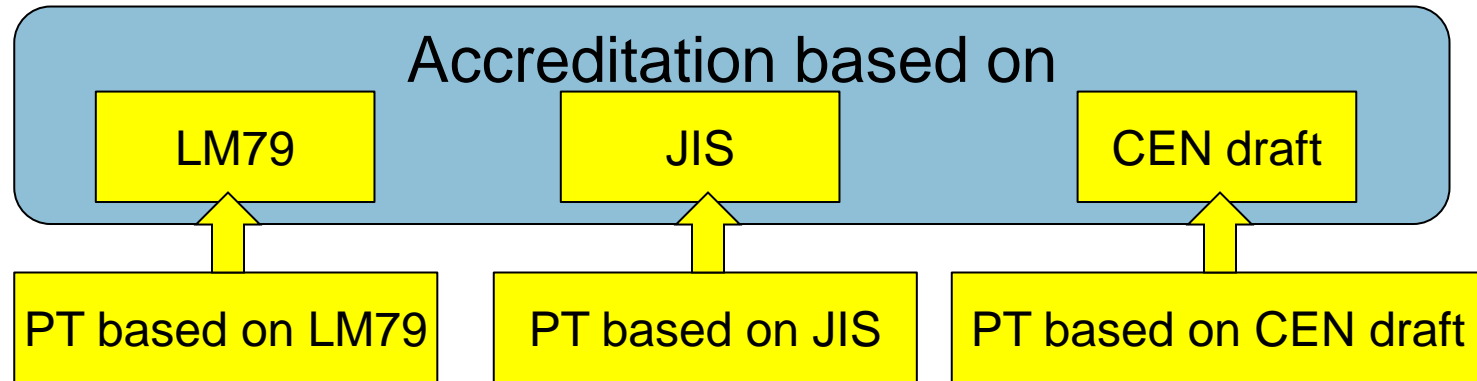


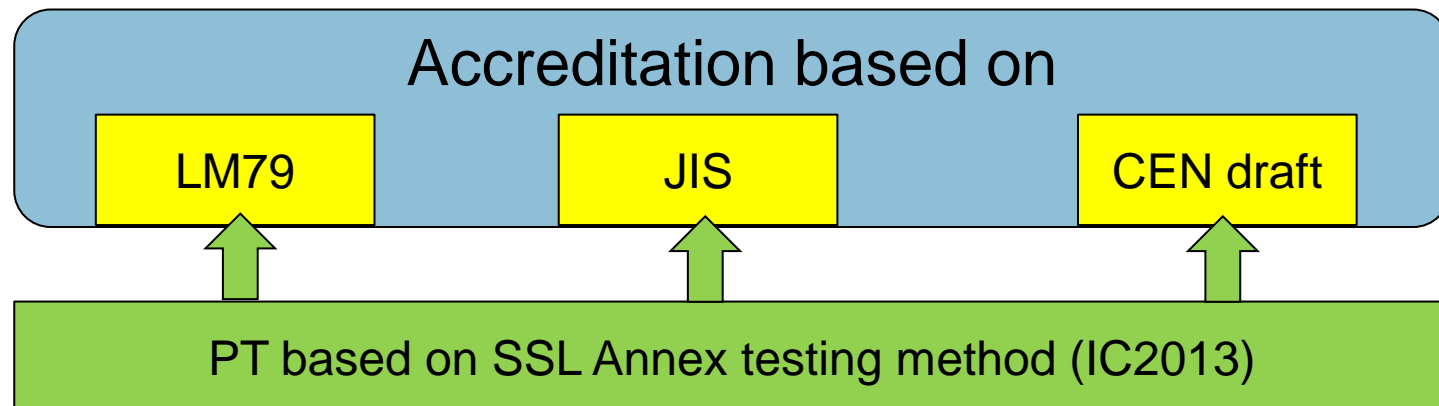
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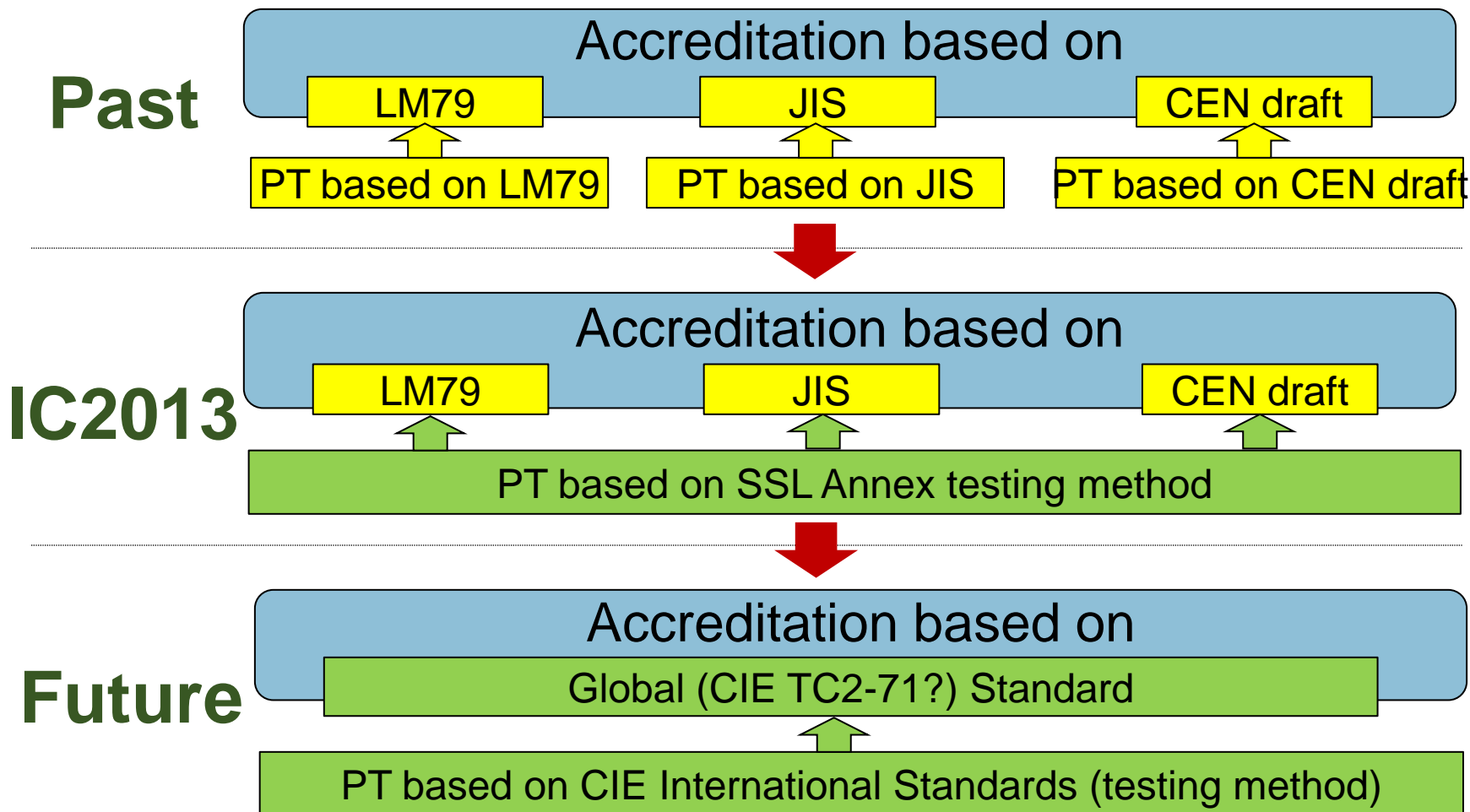
3. Accreditation Scheme: One Stop SSL PT programme can be realised



- versus -



3. Achieving Ideal Scheme for Global Laboratory Accreditation



Summary of 4E SSL Annex Contributions

Challenges and Barriers

- Different test methods, performance metrics
- No international test standard
- No global accreditation scheme for LED test laboratories
- New manufacturers entering the market
- High level of innovation, new products



SSL Annex Solutions

- Harmonised quality and performance Tiers
- Compilation of rigorous standards – 2013IC Test
- Support accreditation to local test standard through global program
- Making information accessible / available
- Revising Tiers as new data becomes available

Recent Examples of Cooperation

- **Communique between CIE and SSL Annex**
 - Declaration of mutual support for work on Testing and Accreditation and intention to support CIE TC2-71
- **Technical Support to SEAD Global Efficiency Awards for Solid-State Lighting**
 - Provision of expert support from the SSL Annex to SEAD; later, promotion of programme
- **Draft MOU between UNEP en.lighten and SSL Annex**
 - Recognises the common interests of promoting energy-efficient LED lighting; seeks to formalise



IEA 4E SSL Annex Extension 2014-2019



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From three to 11 Tasks

IEA 4E SSL Annex
2014-2019

Task 1. Application of New CIE Test Method

Task 2. Characterisation of Product Lifetime

Task 3. Guidance on Lifetime Testing

Task 4. Interlaboratory Comparison (Goniophotometer)

Task 5. Market Lessons Learned

Task 6. Quality and Performance Tiers

Task 7. New Features that Impact Energy Consumption

Task 8. Benchmarking Performance of SSL Products

Task 9. Lighting Facts International Database

Task 10. Best Practice in International MV&E Programmes

Task 11. Communications and Outreach Activities
(Cross-cutting)

Thematic groups of tasks

- Test Standards and Laboratory Testing – 4 Tasks
- Market Support and Performance – 3 Tasks
- Monitoring, Verification and Enforcement – 3 Tasks
- Communications and Outreach – 1 Task

However...

- Several tasks serve multiple purposes

Today's Talk – Three New Areas

- New: Market monitoring, verification and enforcement
 - Task 8. Benchmarking Performance of SSL Products
 - Task 9. Lighting Facts International Database
 - Task 10. Best Practice International MV&E Programs
- New focus, same approach: Global interlaboratory comparison with goniophotometer focus
 - Task 4. Interlaboratory Comparison (Goniophotometer)
- New: New features in SSL products that affect energy consumption
 - Task 7. New Features Impacting Energy Consumption

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Market Monitoring

- Supporting countries in their national activities with monitoring, verification and enforcement (MV&E) of SSL programmes:
 - Task 8: Benchmarking Performance of SSL Products - an internal product performance database, populated by Annex member countries test results
 - Task 9: Lighting Facts International - make the existing US DOE Lighting Facts programme into an international database with bespoke country portals
 - Task 10: Best Practice in International MV&E Programmes

Task 8: Benchmarking Performance of SSL Products (1 of 2)

- An internal (SSL Annex) benchmark database of SSL products
 - Light output, wattage, power factor, CCT, CRI, dimensions, weight, and other critical physical and performance-related data points
- Collate test data information from Annex member governments around the world
- Performance (claimed and verified) data over time; constantly updated



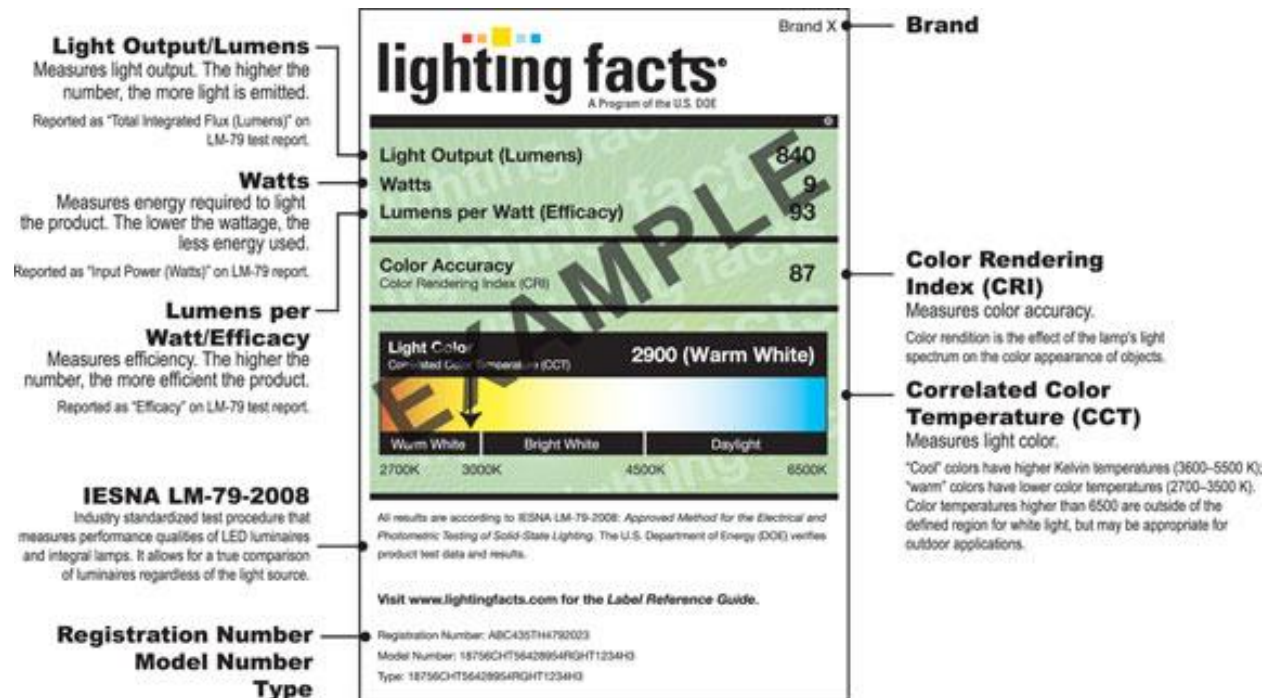
Task 8: Benchmarking Performance of SSL Products (2 of 2)

- Assist with establishing the performance Tier levels (strong link to Performance tiers!)
- Share results of compliance testing and enforcement, prioritise and better target MV&E activities
- Every six months prepare a 'product performance brief' that looks across this database and Lighting Facts International
- Different from Lighting Facts because this database is government agency test results, not supplier test results



Task 9: Lighting Facts International

- Takes the US DOE Lighting Facts database to a global platform
- Any government (not only Annex) can opt-in to use this as a central pillar of their domestic SSL promotion programme



Task 9: Lighting Facts International – Country Portals

- Create country-specific portals using language and sponsoring agency names / logos
- Some customisation of requirements too e.g., humidity or higher temperature operation (e.g., lites.asia)
- Manufacturers add products to database will indicate in which countries products are sold
- Verification testing costs paid by manufacturers (random selection)
- Global Lighting Association (GLA) expressed interest in this concept in Tokyo, March 2013



Task 10: Best Practice in MV&E Programmes

- Help member governments develop more cost-effective and efficient MV&E activities
- Systematic gathering and exchange of good practice
- Offer guidance for policy makers around programme design and cost-saving measures
- Study the findings and prepare policy recommendations and share experiences
- Information like cost of programmes, focus areas, sample sizes, and other relevant information



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Interlaboratory Comparison – Goniophotometer

- Design and conduct a global interlaboratory comparison
- Using a new artefact set possibly including:
 - Directional lamps (requiring a goniophotometer for measurement of flux according to beam angle and angular colour uniformity),
 - Light engines (e.g., Zhaga Consortium modules, etc.) and
 - Road/street light luminaires



Interlaboratory Comparison

- New IC test will include new measurement quantities that were not tested in 2013IC, e.g., “useful flux” for directional light sources and spatial colour uniformity measured with a goniophotometer
- Consider new features or aspects of lamps that should be tested



Interlaboratory Comparison

- Consider adding new nucleus laboratories
- Ensure all work is compliant with ISO/IEC 17043 and liaise with regional accreditation organisations
- Improve upon the outputs of the first interlaboratory comparison to improve the value of the exercise to participants and accreditation organisations
- Provide on-going support for accreditation of labs that participated in the IC 2013 and this new interlaboratory comparison.



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New Features that Impact Energy Consumption

- LED products can bring many new features to the market that are not commonly associated with lighting
→ possible on-mode and associated stand-by energy consumption
- Features such as colour-tunability, network access to controls, active thermal control (i.e., regulation of drive current) may increase energy consumption



New Features that Impact Energy Consumption

- Seek to understand the energy-related impact of some new features including:
 - (a) active thermal control;
 - (b) dimming quality;
 - (c) regulation of drive current;
 - (d) colour-tunability and
 - (e) wireless operation

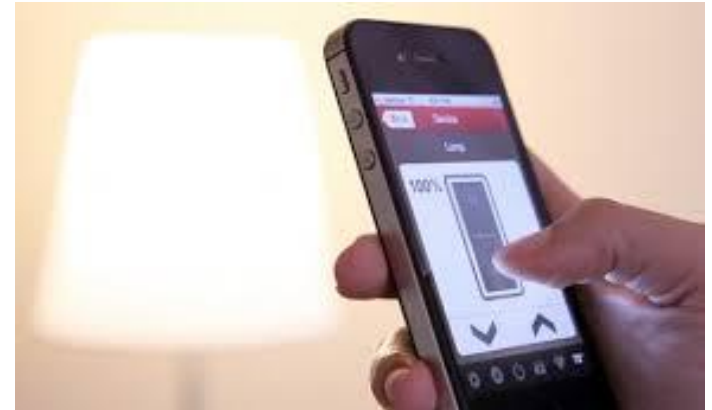


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Member Governments

- SSL Annex 2010-2014 had 10 Countries:
 - Australia, Denmark, France, Japan, The Netherlands, Republic of Korea, Sweden, United Kingdom, United States, and China (expert status)
- New Member Governments are invited to join
 - Please contact us if you would like more information about the possibility of your country joining the SSL Annex

Thank you...

- <http://ssl.iea-4e.org/>

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