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**INTERNATIONAL ENERGY AGENCY 4E
SOLID-STATE LIGHTING ANNEX**

**MARC FONTOYNONT, OPERATING AGENT
SINGAPORE, NOVEMBER 1-2, 2011**



**Asia-Pacific
Economic Cooperation**



Australian Government
**Department of Climate Change
and Energy Efficiency**

THE SSL ANNEX 2010-2014

- Preparatory document: France, USA, Japan
- 8 Funding countries:
 - France, Australia, The Netherlands, United Kingdom, Sweden, Denmark, Japan, USA
- Others member countries welcome

THE SSL ANNEX 2010-2014

Goal: to provide governments with the tools to assess the performance of SSL, inform energy-efficient lighting policies and harmonize test procedures and laboratory accreditation to increase confidence in Solid State Lighting.

- Definition of key performance characteristics
- Suite of minimum performance levels
- International specification for LED replacement lamp equivalency claims
- Test methods for testing performance characteristics
- Coordinate international accreditation of test labs

Management Committee (MC)

- The MC is comprised of delegated representatives of the **funding governments**
- Tasks:
 - Set the priorities for the SSL annex
 - Approve the timeline and budget
 - Validate and approve the results of the SSL annex expert group

Management Committee (MC)

Australia	Melanie Slade (David Boughey)
Denmark	Ture Hammar (Casper Kofod)
France	Bruno Lafitte
Japan	Masanori Sasaki (Norihiro Ozaki)
Netherlands	Daniel Bos
Sweden (<i>Chair</i>)	Peter Bennich
UK	Iain Notman
USA	Richard Karney

Participating Experts

United Kingdom
The Netherlands
Denmark

Sweden
Australia
France

China
Japan
USA



SSL Annex: Three main tasks

- Task 1: Develop SSL Quality Assurance
 - Create performance tiers, address equivalency claims
 - Collect data on Life Cycle Assessment, Health issues
- Task 2: SSL Testing
 - Harmonize testing protocols (CIE, IEC, ANSI, etc.)
 - Round Robin #1 to calibrate 4 Nucleus laboratories
 - Round Robin #2 to calibrate participating laboratories
 - Propose proficiency testing procedure for accreditation
- Task 3: Harmonize International Accreditation

Task 1: Quality Assurance

- Minimum Performance requirements for 4 product categories (released for comment November 1, 2011)



Non-directional Lamps



Directional Lamps



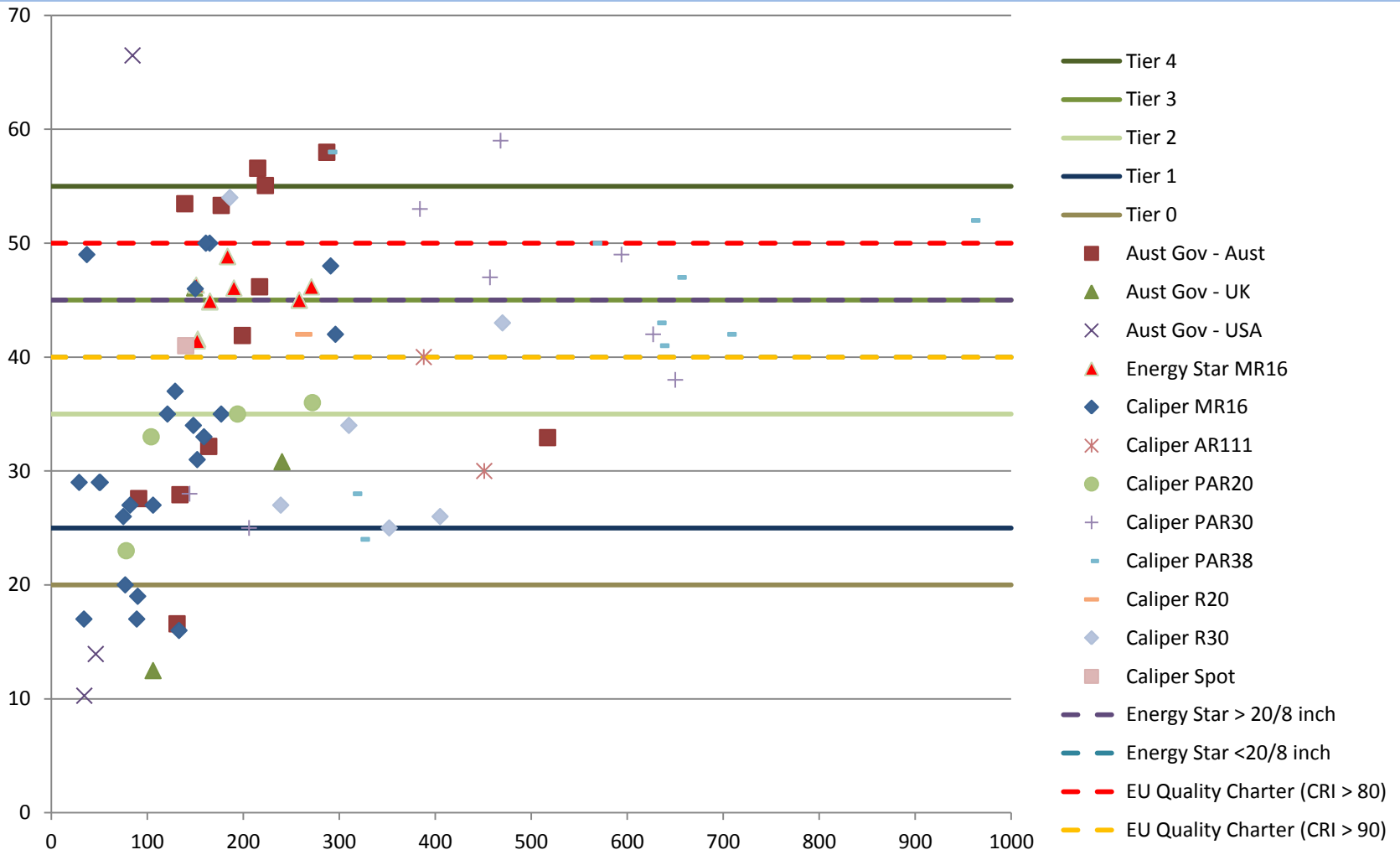
Downlight Fixtures



LED Linear Fluorescent replacement lamps

Defining Performance Tiers

- **Tier 0:** Minimum Acceptable Performance for Off-Grid Applications
- **Tier 1** Minimum Acceptable Performance for Grid-Connected Applications
- **Tier 2** Performance Required by Established Quality Programs
- **Tier 3** Current Highest Commercially Available Performance
- *Philosophy: health aspects non negotiable, SSL performance higher than product they replace.*



Life Cycle Assessment

- Greatest impact of lamp technology is related to luminous efficacy of system (energy, CO₂)
- LED non-directional lamps are not better than CFL lamps
- LED directional lamps are better than Halogen
- Minimum lamp life guarantees benefits

Proposal of extended summary on public Web Site (Issues for governments)

- Specify minimum luminous efficacy and product lifetime if compared with fluorescent lamps
- Specify minimum efficacy and possible lower lifetime if compared with halogen lamps

Health aspects

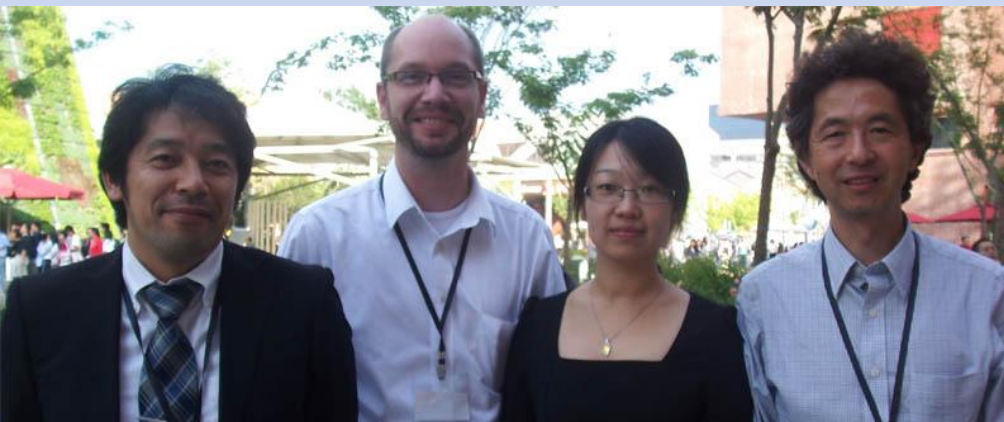
- Photo-biological safety standard should be revised for LEDs
- The standard doesn't take into account how lamps and lamp systems are really used
- Susceptible populations: children, ARMD patients, pseudo-physic, etc.
- Stroboscopic effects, EMF, circadian rhythms: poorly studied
- No labeling/marketing

Health aspects

- Proposal of extended **summary on public Web Site** (Issues for governments):
 - Refer to risk categories, compare with other technologies, suggest approach for testing procedures.
 - Introduce photo-biological safety requirements for all lighting systems
 - Consumer market allow only LED products in Risk Group 1
 - LEDs in Risk Groups ≥ 2 restrict to professional use only
 - Prevent direct viewing of naked LED beams at distance $< X m$
 - Avoid using cold white and blue light in places frequented by children

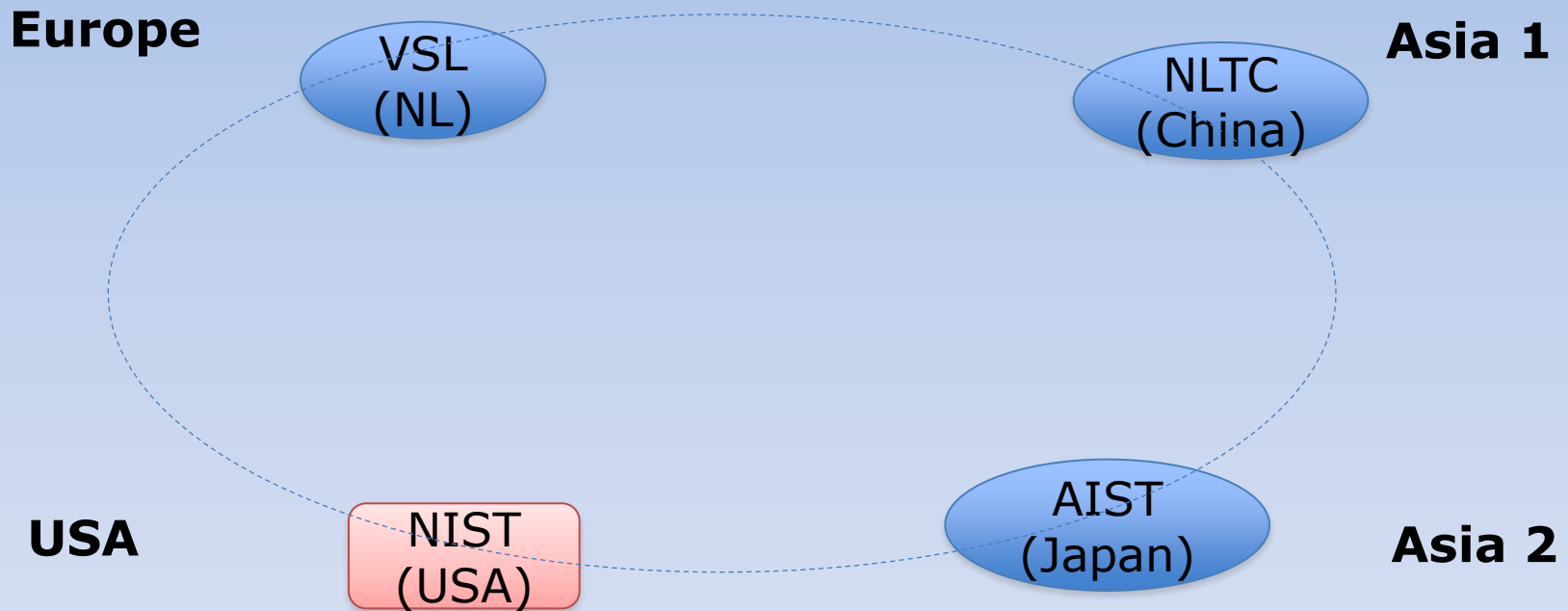
Task 2: SSL Testing

- Harmonize testing protocols (CIE, IEC, ANSI, etc.), suggest improvement
- Round Robin#1 will cross-calibrate 4 Nucleus laboratories
- Round Robin#2 will verify proficiency of participating laboratories
- Propose proficiency testing procedure for accreditation bodies

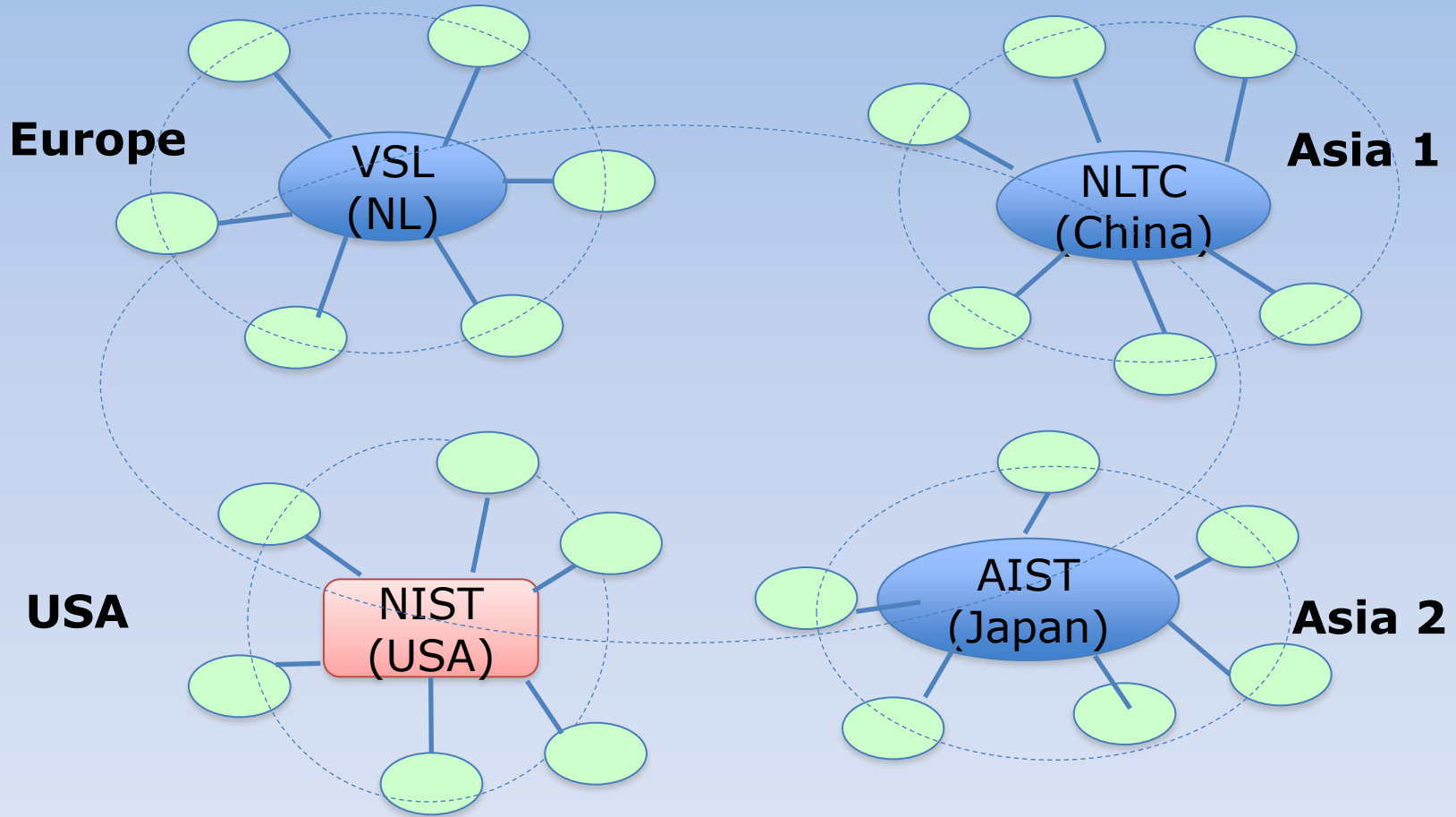


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Wouter Koek (VSL, NL)
Qian Liu/ Hua Shuming (NLTC, China)
Yoshi Ohno (NIST, USA)

Round Robin 1: Calibrating Nucleus labs



Round Robin 2: Calibrating SSL labs



Round Robin #1

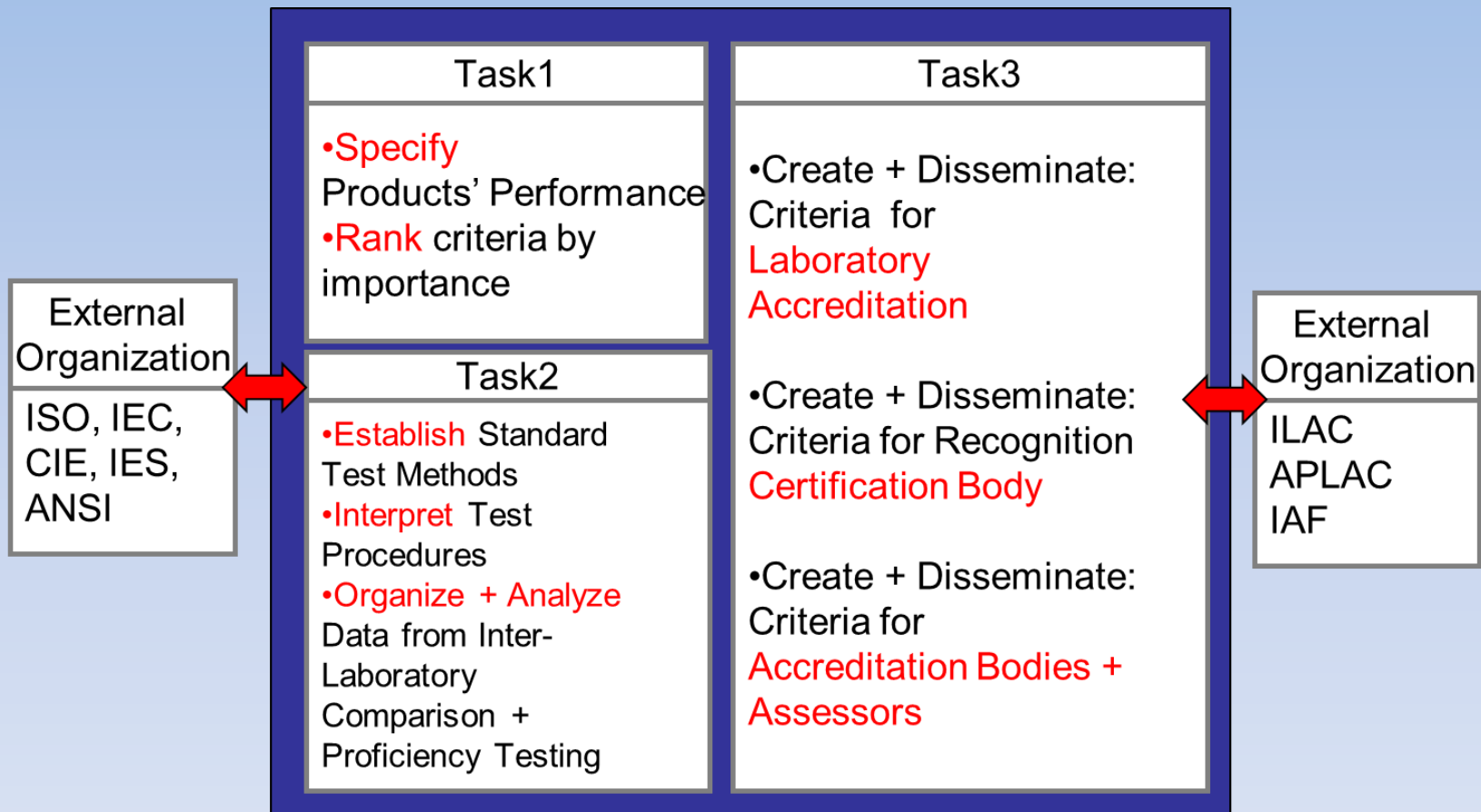
- **6 lamps test labs' ability to competently test SSL**
 - Philips lamp: measure remote phosphor products
 - LSI-G25 lamp: measure current waveform with large THD
 - CREE LR6: measure active feedback
 - Sylvania PAR20 : measure directional lamp
 - LED DC Linear replacement lamp: Measure high CCT
 - Incandescent standard lamp compares fundamental laboratory photometric measurement quality



Testing procedures

- Photometric measurements:
 - Improve and transform IES-LM-79 into a new CIE international standard method of measurement.
 - CIE Technical Committee 2.71, chaired by Dr. Yoshi Ohno, has 30 international members. It is expected to propose the standard in 2012.
 - Link with CEN TC169WG9 established
- Lumen maintenance and lifetime:
 - Work with IEC TC 34, transfer experience of IES-LM-80 and IES-TM-21.
- Photometric performance as a function of temperature:
 - IES LM 82, (IEC TC) published in 2012?

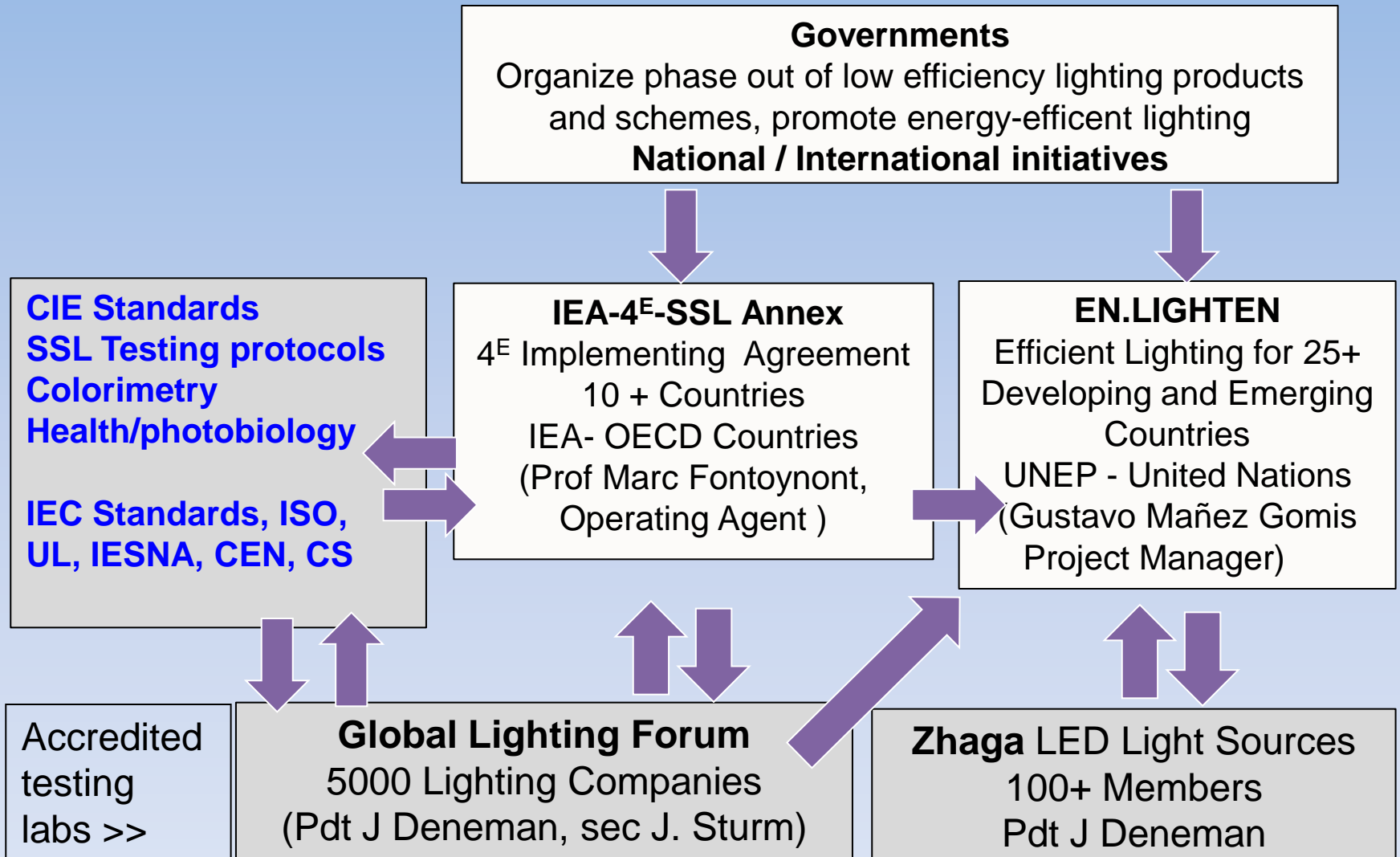
TASK 2+3 LINKS WITH LABS /ACCREDITATION ORGS



Task 3: Standards for Testing Reliability

- Propose proficiency test procedure, based on the procedure used in IEA-4E-SSL Annex Round Robin Campaign #2.
- Approach global accreditation organizations to determine if they will recognize Round Robin2 as valid Proficiency Testing.

Linking Initiatives



Interest Matrix

Manufacturer Interest	IEA 4E SSL Annex	National/International Initiatives
GLF (5000 + mnfrs) Zhaga (100+ mnfrs) Performance Standards Orgs: IEC, ANSI, ISO, UL etc.	Task 1: Performance	National EE Programs SEAD/CLASP en.lighten (UNEP) lites.asia APEC
Manufacturer /Third Party Labs Measurement Standards Orgs: IES, CIE, ANSI/UL etc.	Task 2: Testing	National Metrology Labs National Market Surveillance Programs
Manufacturer /Third Party Labs Independent Accreditation Bodies	Task 3: Accreditation	National/International Accreditation Organizations National Market Surveillance Programs National Metrology Labs

Thank you!

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

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PAPER FROM:

**APEC LED WORKSHOP: *POLICIES TO PROTECT AND
EDUCATE CONSUMERS***

APEC#212-RE-04.1

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