



LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

EUROPEAN LIGHTING SUMMIT

27 March 2025
13:30 - 18:00 CET

LightingEurope Members

Associations



Companies





Keynote: Opportunities for the lighting industry



Our speaker

Maurice Maes

Maurice Maes is Head of Standards & Regulations at Signify since 2015. He has over 25 years of experience in standardization and has served on various boards of industry consortia and associations. He is currently the President of the Global Lighting Association and LightingEurope. Maurice holds a PhD in Mathematics and has a strong background in lighting research and innovation.



Opportunities for the lighting industry

LE Summit, March 27, 2025

Maurice Maes

President LightingEurope

How LightingEurope is enabling Opportunities for the European lighting industry

LE Summit, March 27, 2025

Maurice Maes

President LightingEurope

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Light at Night

~15 years of ledification – what has it brought us?



On the threat/challenge side

- Commoditization
- Price pressure
- Low quality competition
- Long lifetime
- Industry disruption

○ Regulations



On the opportunity side

- Energy efficiency
- Freedom of design
- Digitization
- Better light quality
- Affordability

○ Regulations



Regulations – opportunity or threat?



On the opportunity side

- Energy efficiency wave
- Promotion of higher quality
- Sustainability
- **Also our professional customers are subject to CSRD, EU Taxonomy, EPBD, etc.**

- **Correcting this**



On the threat/challenge side

- Cost burdens of many kinds
 - Administrative
 - Data collection
 - Supply chain implications
 - Redesign
 - Testing
 - Reporting
 - Packaging
- Country-specific regulations
- **Lack of enforcement**
- **Unfair competition, esp. online**

Sustainability information

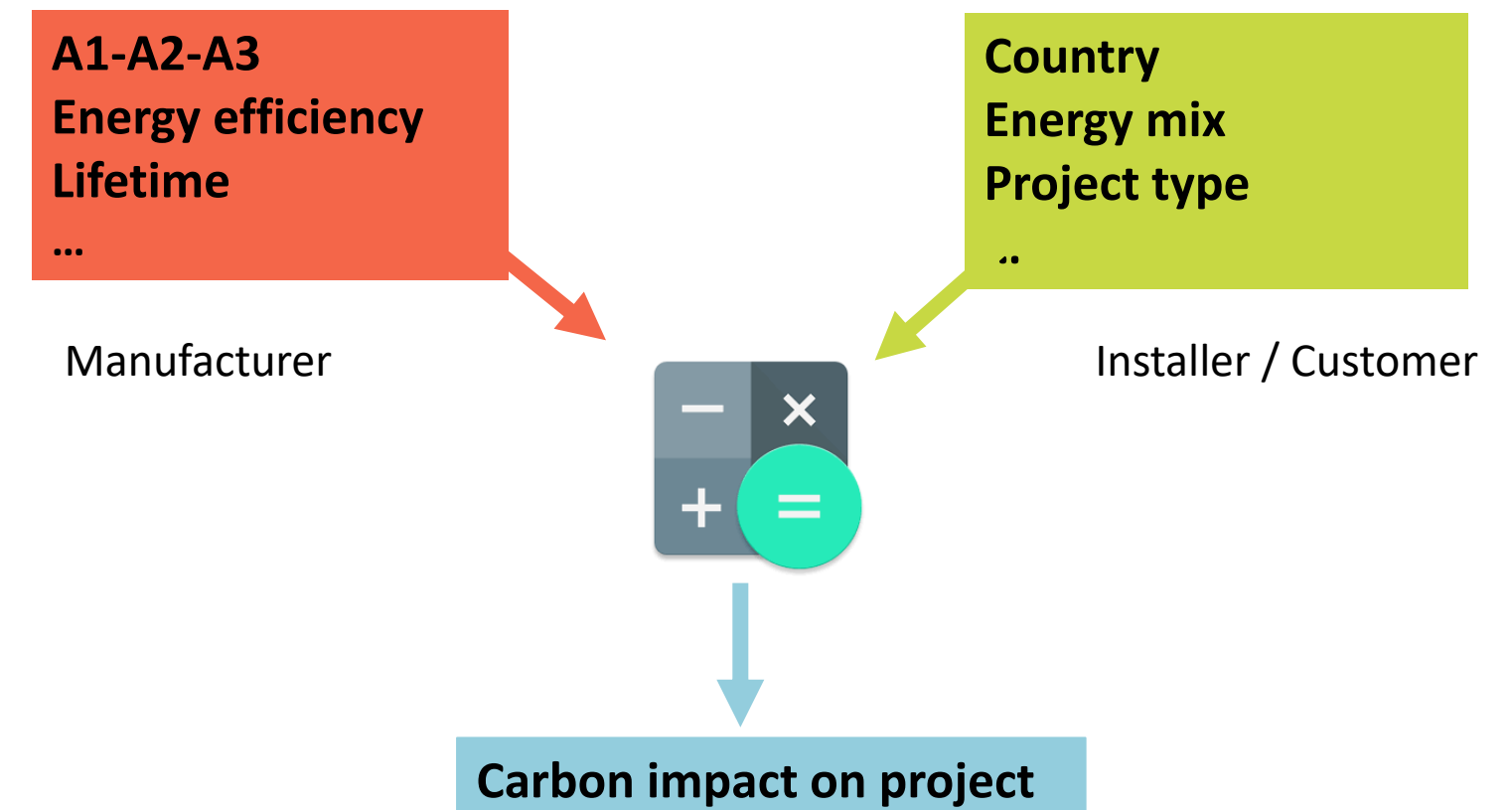
*Increasing demand for evidence-based sustainability information,
and for making it **simple, understandable and useable!***

LCA / EPD for lighting

- Lighting-specific rules
- Europe leading the way
- LightingEurope leading the way
- Setting de-facto standards for the industry – ahead of formal standardization!
- Promotion and education
- Functional unit, comparability

Taking it to the next level

- Address real customer needs
- Work with wholesalers
- Standardize information flow



Repairability / Durability / Circularity



*How to leverage our insights on repairability / durability / circularity
for better European competitiveness?*



Durability of Luminaires

NOTICE This is an internal draft document of LightingEurope and may not be distributed.

Version: 2.0 (Initial WG SPR review)

Brussels, September 2024 — This position paper presents the views of LightingEurope on how the next Ecodesign for lighting (successor regulation to “Commission Regulation (EU) 2019/2020 of 1 October 2019 laying down Ecodesign requirements for light sources and separate control

It's mostly a European thing

- Topic is regional almost by definition
- EU legislation most ambitious
- Industry initiatives (e.g. UK)
- It is not a big theme in other regions

Light Pollution



City of Eindhoven, November 1, 2024, at midnight, from Leenderstrijp, at 10km distance



Opportunities

- Better optics
- Connected
- Dimmable, tunable



Opportunities

- Better optics
- Connected
- Dimmable, tunable

Opportunities

- Make EU requirements harmonized and sensible
- Separation of responsibilities
- Team up!



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THANK YOU



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www.lightingeurope.org



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Q&A





Presentation: Regulating the Challenges of E-commerce



Our speaker

Frank Heijmann

Frank Heijmann is a senior executive with over 30 years of experience in customs legislation, international business, logistics, and e-commerce. He is known for his work in trade facilitation and enforcement, and has contributed to various innovative projects, including the Dutch Customs' multi-annual vision 'Pushing Boundaries'. He is also the author of the book '[Customs, Inside Anywhere Insights Everywhere.](#)'



Time: 00:00

NL: 0

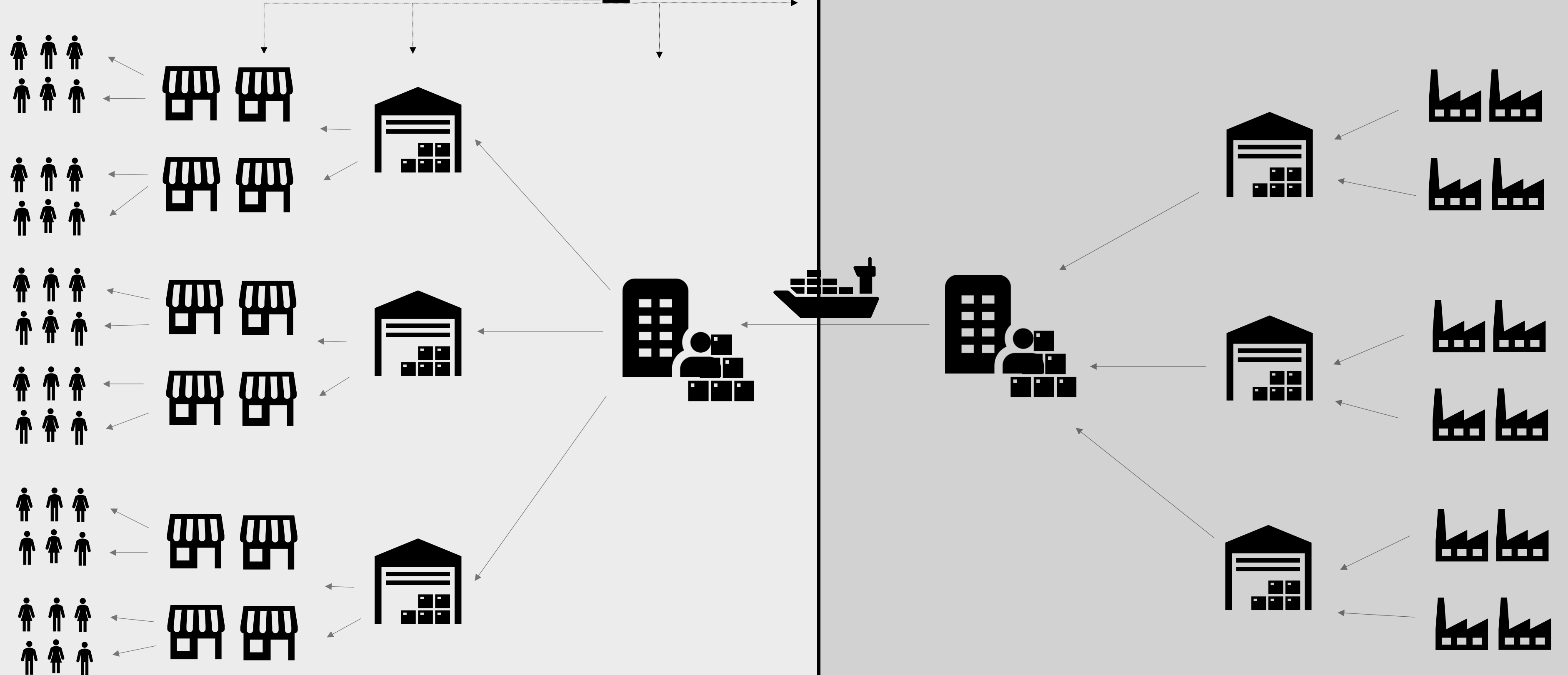
EU: 0

EU consumers

EU compliance

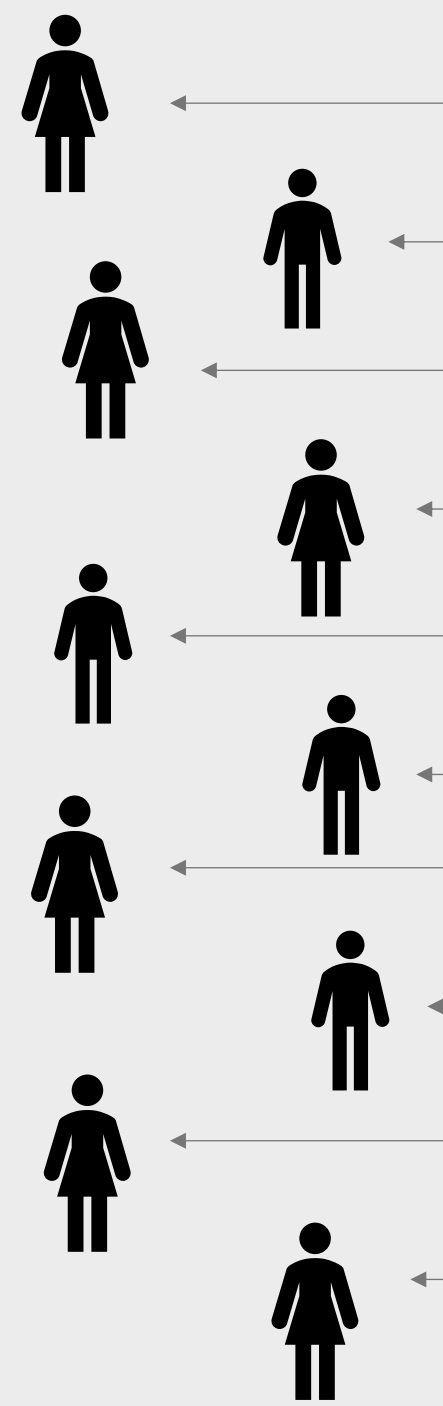


Non-EU sellers

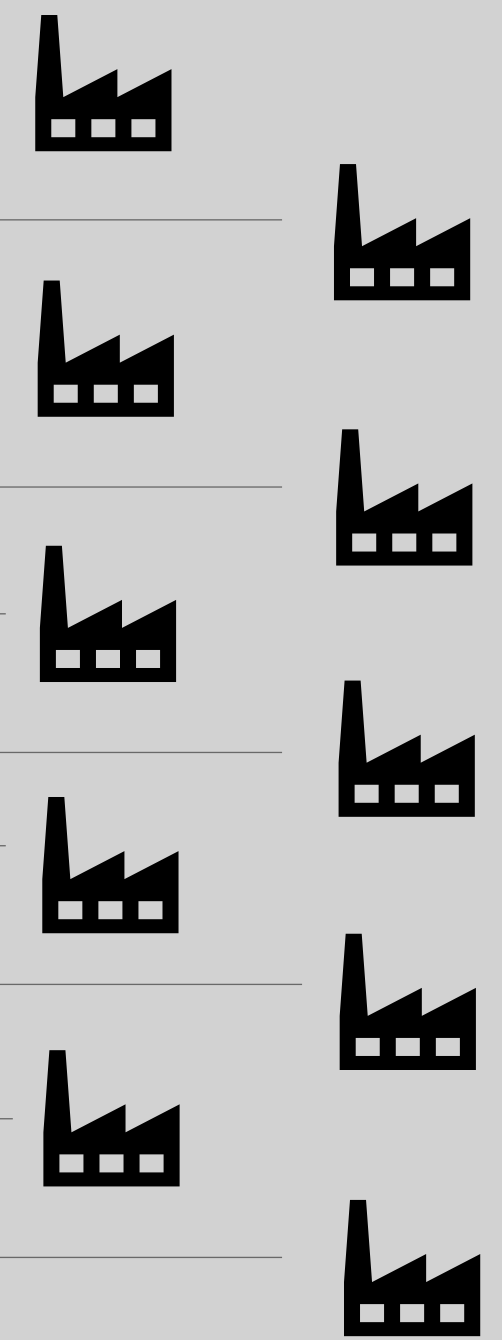


EU consumers

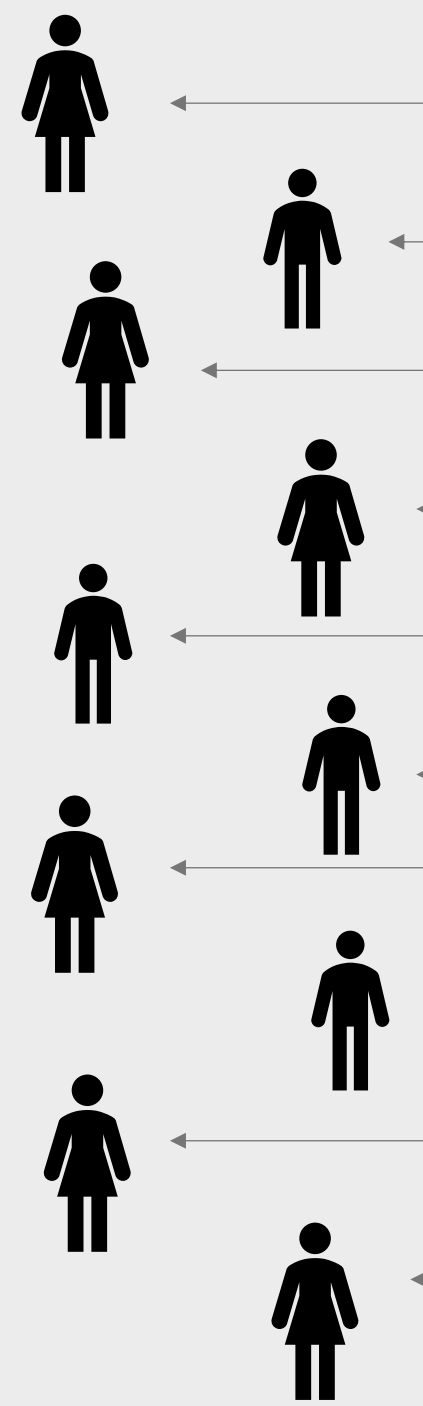
EU-compliance?

Non-EU sellers



EU consumers



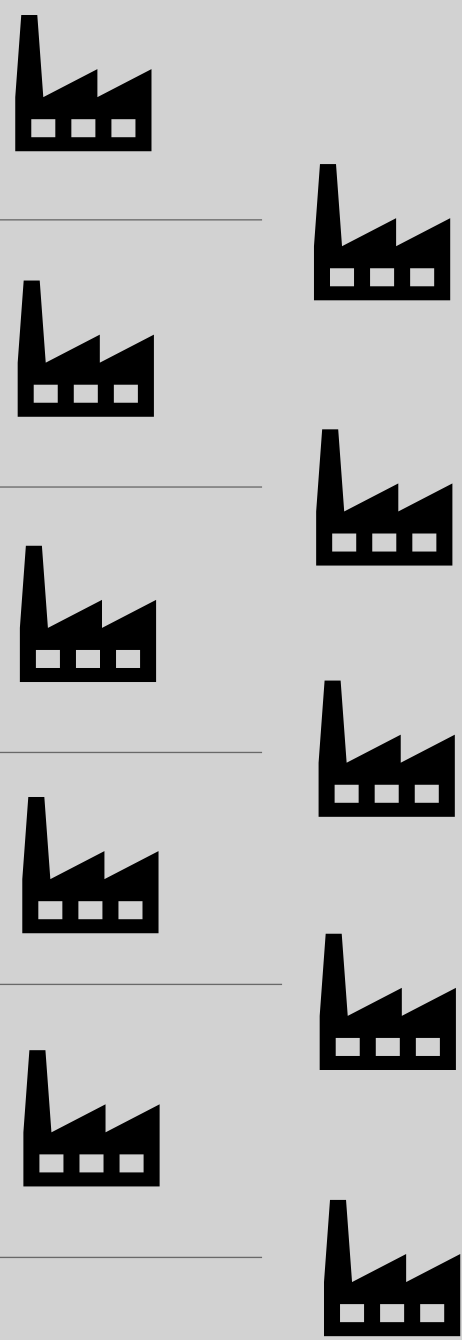
EU Customs Data Hub

EU-compliance?

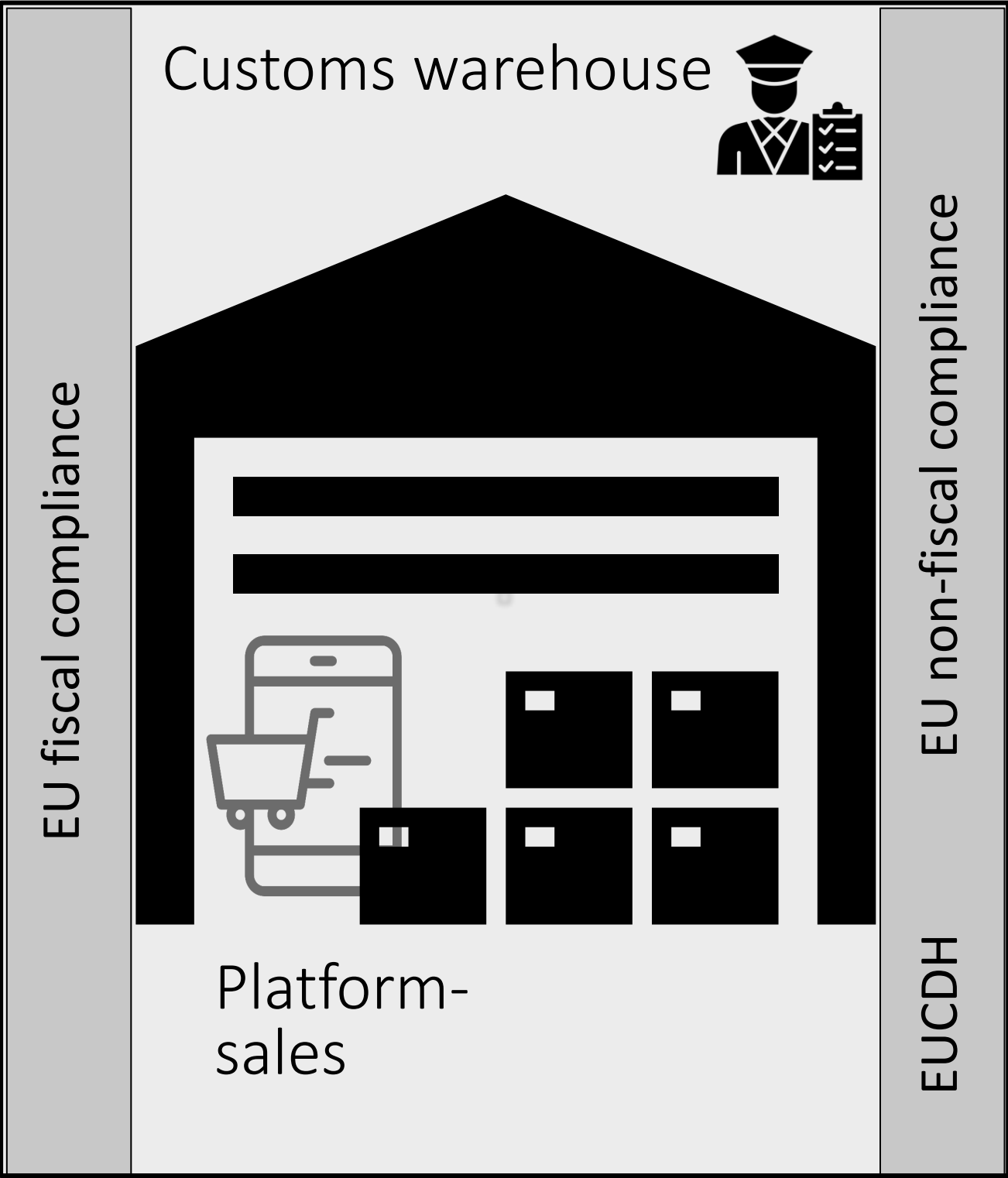
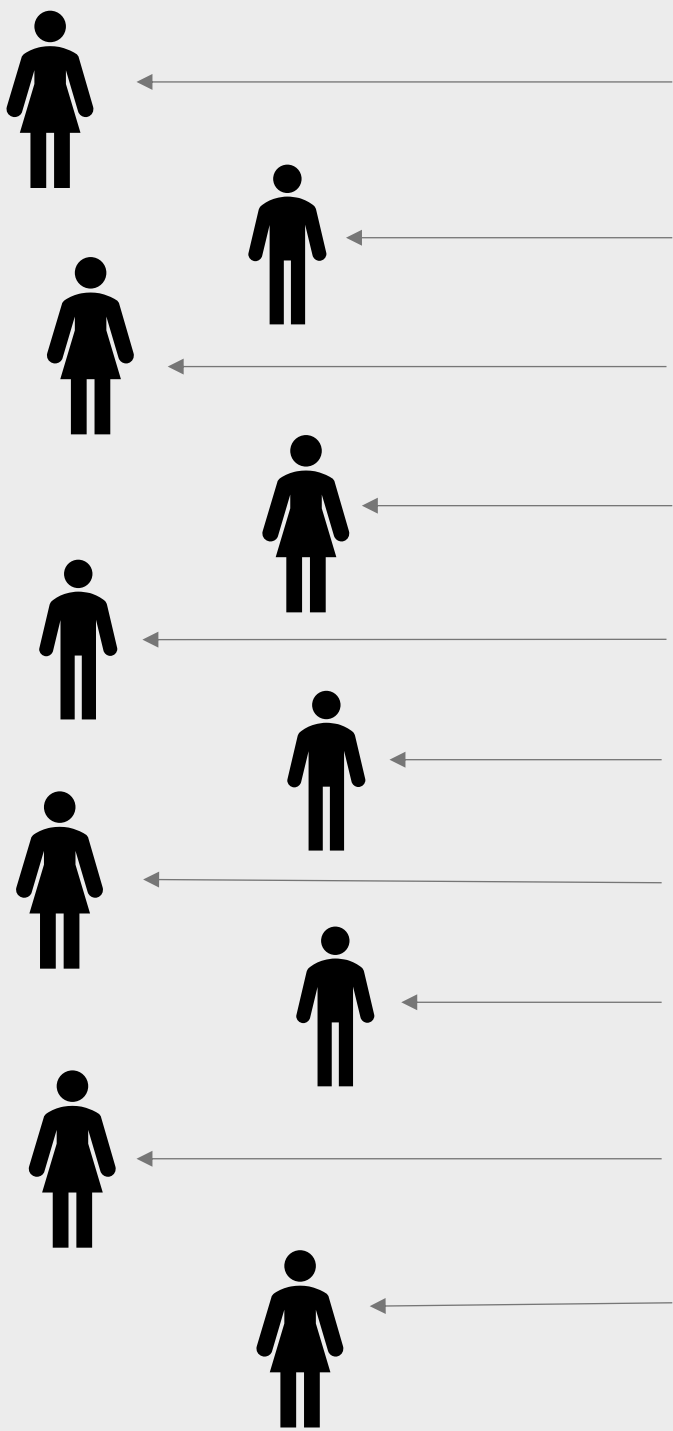


Platforms

Non-EU sellers



EU consumers



Non-EU sellers





Q&A





Presentation: The future of Ecodesign and Energy labelling for lighting



Our speaker

Niels Ladefoged

Niels Ladefoged is currently the Acting Head of Unit for the "Buildings and Products" unit at the European Commission's Directorate-General for Energy. He has extensive experience in energy efficiency policy, renewable energy, and clean air regulations. He holds a Master's degree in Mechanical Engineering with a specialization in energy conversion and emissions.





Updates on lighting products: Status update of regulations' review, standards and plans

– **EU Commission**

European Lighting Summit
27.03.2025

Status update of Regulations' review

Current state of play for review of Regulations (EU) 2019/2020 and 2019/2015:

- In the [Discussion document on ESPR and Energy Labelling working plan](#) of the Ecodesign Forum's first meeting, held in 19-20 February 2025, it is mentioned that Light Sources are among the products proposed in the first ESPR Working Plan, with a timeline of: **Study to be launched in 2025 or 2026 and Adoption in 2029.**

Energy-related products	Ecodesign requirements	Energy label	Indicative timeline
Light sources and (only for ecodesign) separate control gears	Yes	Yes	Study: 2025 or 2026 Adoption: 2029

Status update and policy context of **standards**

Existing state of play:

- Simultaneously, the adoption of the standardisation request to support the current legislation is taking place earlier, normally early 2025 and will last for three years. The draft request is at final stage and is currently published for consultation on the Europa website [DocsRoom - European Commission](#)

Technical issues that have frequently been raised

The most frequent questions received in 2024, indicating ambiguous points which may need clarifications in the legislation :

- Test method for measuring light chains
- Endurance test of light chains
- Definition of containing product
- Difficulty to understand the energy performance of a dismountable luminaire (today this is not a light source and thus it has no label)
- Battery-operated products

New issue with online marketplaces

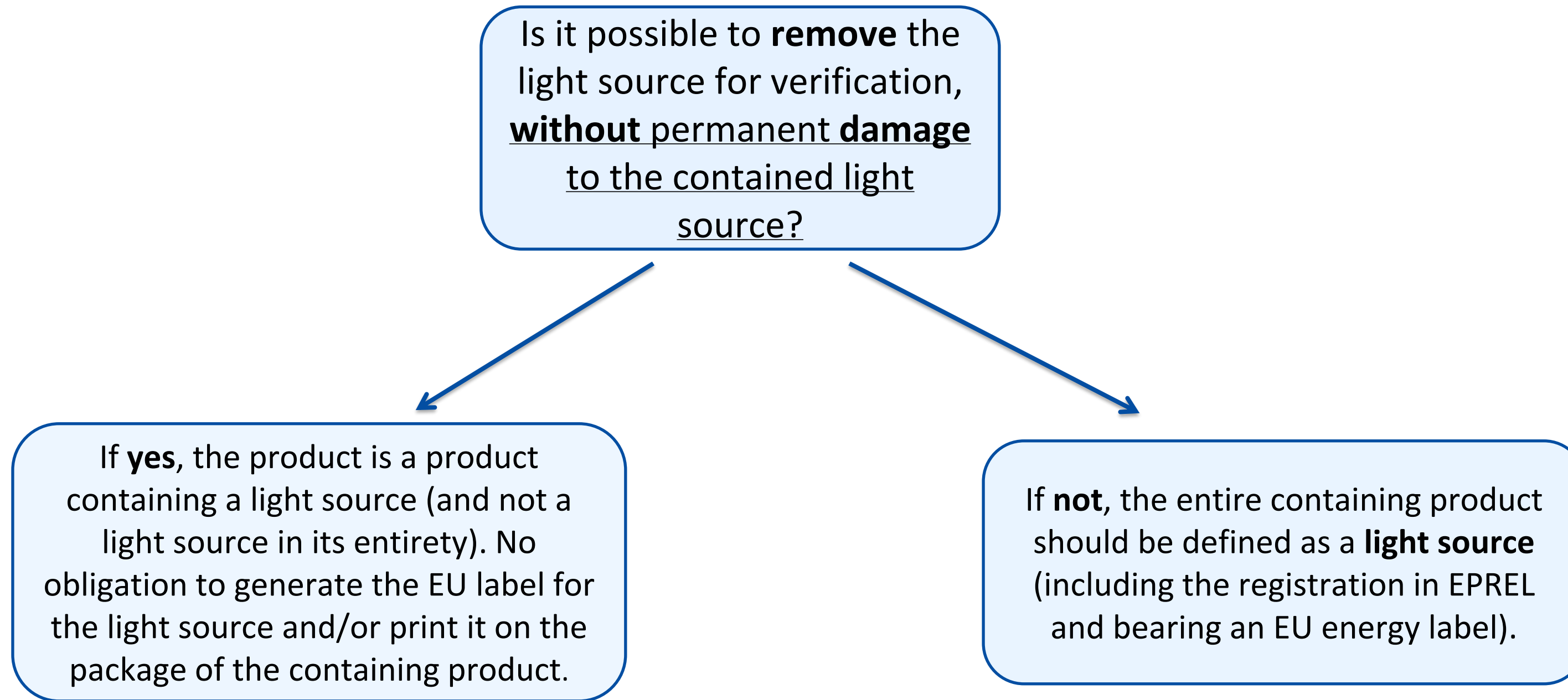
EPREL implementing act requests suppliers to communicate the EPREL model registration number to dealers or to distributors also in online stores.

→ This caused online marketplaces increasingly asking for energy labels of luminaires or other products out of scope of the lighting Regulations.

Reply: The energy label for **luminaires** is discontinued, no obligation for luminaires to bear an energy label since 25 December 2019.

It is the responsibility of the supplier to identify if their product is a light source according to Article 2(1), or a **containing** product according to Article 2(3) of [Regulation \(EU\) 2019/2015](#). (see schematic representation in next slide)

Containing products schematic representation



Review topics

Commission Regulation (EU) 2019/2020 on ecodesign requirements for light sources:

Article 9

Review

The Commission shall review this Regulation in the light of technological progress and shall present the results of this review, including, if appropriate, a draft revision proposal, to the Consultation Forum no later than 25 December 2024.

This review shall in particular assess the appropriateness of:

- (a) setting more stringent energy efficiency requirements for all light source types, in particular for non-LED light source types, and for separate control gears;
- (b) setting requirements on lighting control parts;
- (c) setting more stringent requirements on flicker and stroboscopic effects, while extending them to separate control gears;
- (d) setting requirements on dimming, including the interaction with flicker;
- (e) setting more stringent requirements on (networked) standby power;
- (f) lowering or abolishing the power bonus for colour-tuneable light sources and removing the exemption for high colour purity;
- (g) setting lifetime requirements;
- (h) setting improved information requirements concerning lifetime, including for control gears;
- (i) substituting the CRI colour rendering metric by a more adequate metric;
- (j) verifying the adequacy of lumen as a stand-alone metric for the quantity of visible light;
- (k) the exemptions;
- (l) setting additional resource efficiency requirements for products in accordance with the principles of the circular economy, especially concerning the removability and exchangeability of light sources and control gears.

Review topics

Commission Regulation (EU) 2019/2015 on energy labelling of light sources:

Article 8

Review

The Commission shall review this Regulation in the light of technological progress and present the results of this review, including, if appropriate, a draft revision proposal, to the Consultation Forum no later than 25 December 2024. The review shall among other matters assess the energy efficiency classes, methods to address the energy efficiency of light sources in containing products and the possibility to address circular economy aspects.

Keep in touch



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[@EuropeanCommission](https://www.masthead.com/@EuropeanCommission)



[EUTube](https://www.youtube.com/EUTube)



[EU Spotify](https://open.spotify.com/playlist/37i9ZQZEVXndM4Z0E04gJ9)

Thank you



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Q&A





Presentation: Cybersecurity policy: implications for the lighting industry



Our speaker

Tommaso Bernabo

Tommaso Bernabo is a Policy Officer in the Cybersecurity and Digital Privacy Policy Unit at DG CONNECT, focusing primarily on the implementation of the Cyber Resilience Act. He previously worked as a Parliamentary Assistant to a Member of the European Parliament, active in the Committees on Industry, Research and Energy (ITRE) and Transport and Tourism (TRAN).





Cyber Resilience Act

CNECT.H2

European Commission, DG CONNECT

CRA in a nutshell



Main elements of the law

- ❖ **Cybersecurity rules** for the placing on the market of hardware and software
- ❖ **Obligations** for manufacturers, distributors and importers
- ❖ Cybersecurity **essential requirements** across the life cycle
- ❖ Harmonised **standards** to follow
- ❖ **Conformity assessment** – differentiated by product category
- ❖ **Reporting** obligations
- ❖ **Market surveillance and enforcement**

In scope: “products with digital elements”



Hardware products (including components placed on the market)

(laptops, smart appliances, mobile phones, network equipment or CPUs...)



Software products (including components placed on the market)

(operating systems, word processing, games or mobile apps, software libraries...)

...including their **remote data processing solutions!**

Outside the scope



Non-commercial products

(hobby products)



Services, in particular standalone SaaS (covered by NIS2)

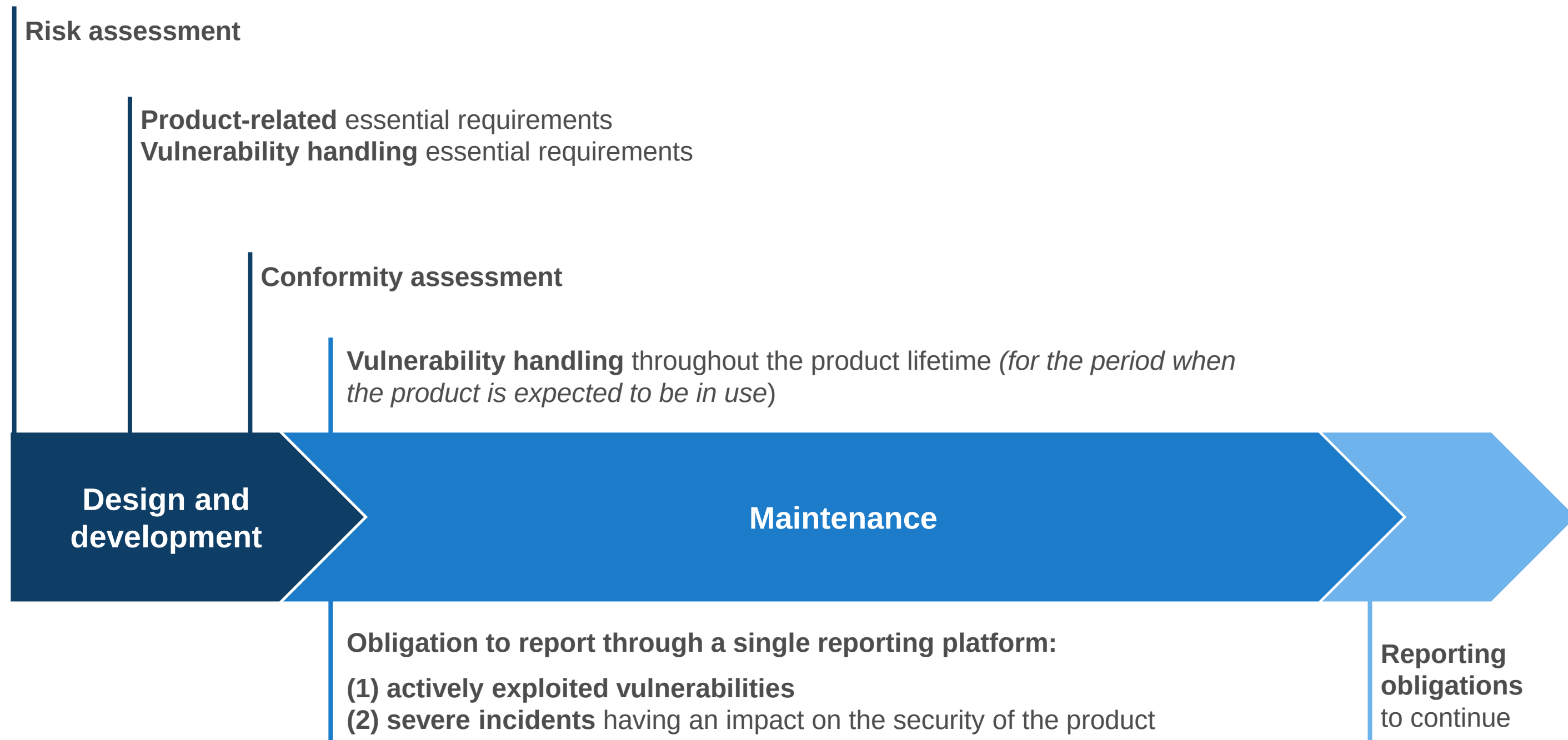
(websites, purely web-based offerings...)



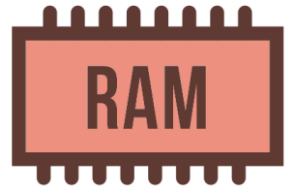
Outright exclusions

(cars, medical devices, in vitro, certified aeronautical equipment, marine equipment)

Obligations of manufacturers



Conformity assessment – product categorisation



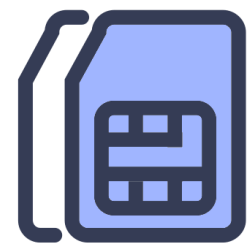
Default category — self-assessment

(memory chips, mobile apps, smart speakers, computer games...)



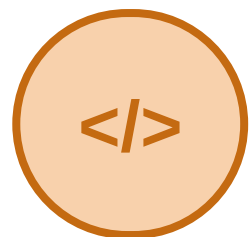
Important products — application of standards/third-party assessment

(operating systems, anti-virus, routers, firewalls...)



Critical products — in the future potentially certification

(smart cards, secure elements, smart meter gateways...)



FOSS — self-assessment (unless categorized as “critical products”)

(web development frameworks, operating systems, database management systems...)

CRA implementation underway

- ❖ Development of harmonised standards
- ❖ Technical descriptions of important and critical products
 - ❖ *To be adopted by 11 December 2025*
- ❖ Terms and conditions for CSIRTs to withhold notifications
 - ❖ *To be adopted by 11 December 2025*
- ❖ Single Reporting Platform by ENISA
 - ❖ *To be operational by 11 September 2026*

CRA implementation underway - continued

- ❖ Guidance to support implementation
- ❖ Member States to set up notifying & market surveillance authorities
- ❖ CRA Expert Group
 - ❖ First meeting on 12 February; additional fora for involvement

Standardisation

- ❖ Standardisation request for harmonised standards adopted by COM and notified to ESOs
- ❖ Building on existing international and European standards
- ❖ 2-tiered approach: horizontal and vertical standards
- ❖ Prioritising important/critical products (CRA Annex III/IV)
- ❖ First building blocks for product security ecosystem of standards

Deliverables requested

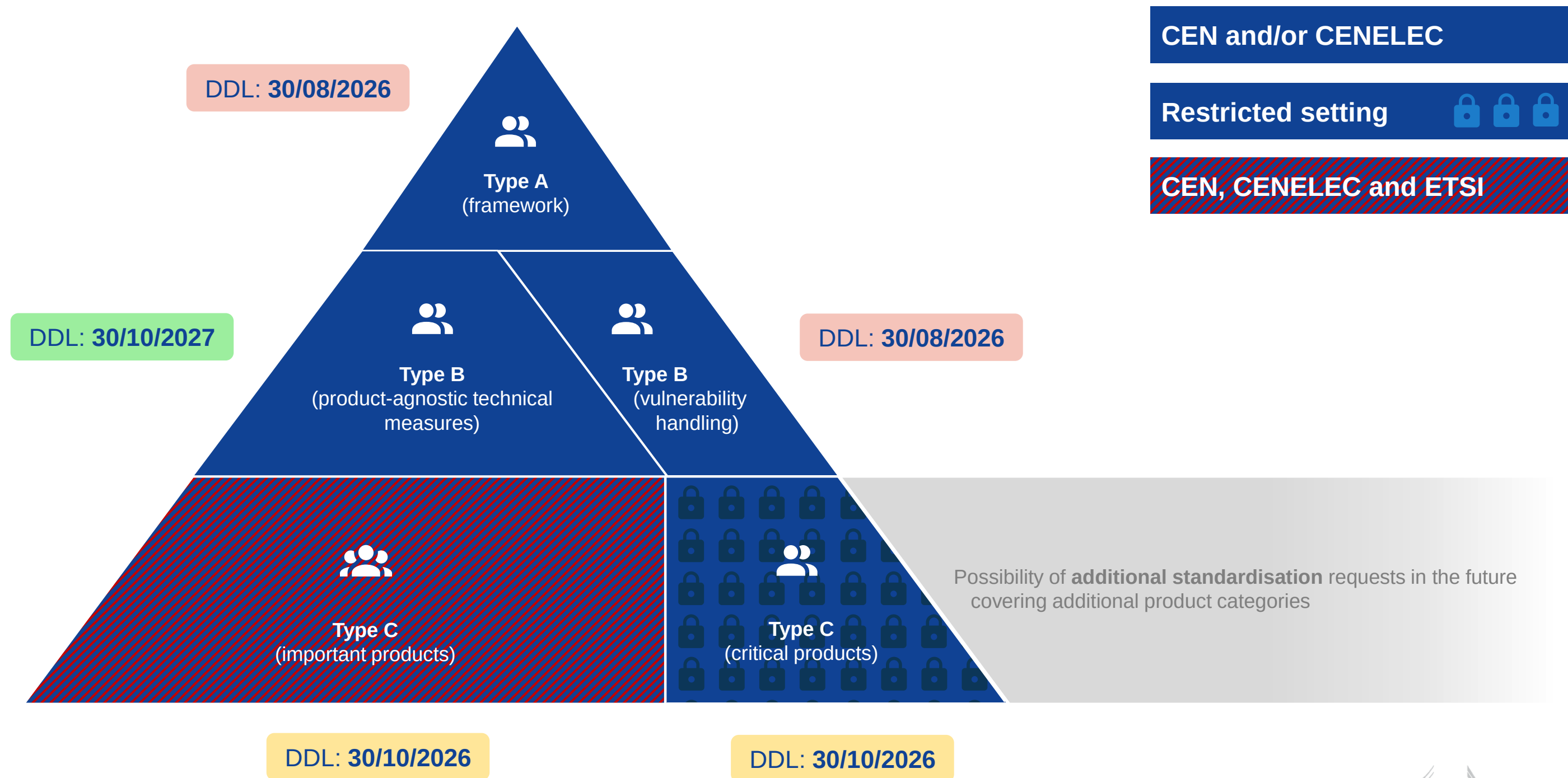
❖ **Horizontal standards (1-15)**

- ❖ Risk-based approach (CRA Annex I)
- ❖ Essential Requirements (CRA Annex I part 1)
- ❖ Vulnerability Handling (CRA Annex I part 2)

❖ **Vertical standards (16-41)**

- ❖ Important products class 1 (CRA Annex III)
- ❖ Important products class 2 (CRA Annex III)
- ❖ Critical products (CRA Annex IV)

CRA standardisation request in a nutshell



Thank you.



Q&A





Panel Discussion with Q&A: Implications for the manufacturing industry of upcoming PFAS phasing out



Our speaker

Iranda Chaki

Iranda Chaki is the Senior Policy Coordinator at SEMI Europe, responsible for the Environmental, Health, and Safety (EHS) portfolio. She represents SEMI Europe on key regulatory topics, including PFAS, F-gas regulations, and the REACH revision. She plays a vital role in advocating for the semiconductor sector within the European regulatory landscape.





PFAS in the Semiconductor Industry

European Lighting Summit 2025

Iranda Chaki / Senior Policy Coordinator /
27.03.2025

PFAS in the Semiconductor Industry

- Extensive use of PFAS in the semiconductor supply chain (1000+ applications)
 - **Semiconductor components** (Interconnects, capacitors and insulators)
 - **Manufacturing equipment** (Heat transfer fluids, filters and tubing)
 - **Process chemicals** for photolithography, etching and cleaning (Photoresists)
- Exceptional physiochemical properties of PFAS
 - High thermal stability
 - Low levels of friction and abrasion
 - Resistance to extreme temperatures and permeation
 - Extended service life (**“Forever chemicals”**)
- Lack of alternatives for most uses of PFAS in the semiconductor industry
 - High degree of functionality **across the supply chain**
 - Viable alternatives requiring **development cycles of 25+ years**

PFAS Restriction Process

- **European Chemicals Agency (ECHA)** put forward a **PFAS Restriction Proposal (Annex XV Dossier)** following an official request from 5 national authorities (Netherlands, Denmark, Germany, Norway and Sweden)
- Annex XV Dossier does not capture the latest state of knowledge on **PFAS use in the semiconductor industry (Table A49)** and does not consider the **extensive development cycles** required for alternatives
- PFAS restriction could **disrupt the European semiconductor supply chain** and jeopardize the EU's policy priorities (Industrial strategy, green transition and security)
- SEMI requests a **comprehensive derogation** for the semiconductor industry (**12-year derogation + 18-month transition period**) and **R&D funding** to support ongoing industry efforts

GENESIS Project

- **Type of Action:** Research and Innovation Action (RIA)
- **Total Budget:** 15,000,000 EUR
- **Consortium Members:** Companies, RTOs, universities and industry associations
- **Role of SEMI:** Work Package Leader for Dissemination and Communication



Horizon Europe
Chips Joint Undertaking
Innovations Actions (IA) &
Research and Innovations Actions (RIA)

Application Form
(HORIZON-JU-Chips-IA and RIA)
1st Stage – Project Outline (PO)

Project proposal – Technical description (Part B)
Proposal GENESIS

Version 1.0
14 May 2024



THANK YOU



Our speaker

Stefanos Geros

Stefanos Geros is a Public Affairs Manager at Cefic, where he works on PFAS, water and soil legislation, and Food Contact Materials. He previously worked for a Member of the European Parliament, focusing on economic and budgetary issues. He holds a Master's in Public Policy from University College London.



Who are we?

Membership



Represents producers, importers and users of the many potential substances that fall within the broad definition of PFAS.

FPP4EU
FluoroProducts and PFAS for Europe
A sector group of Cefic

AGC
Your Dreams, Our Challenge

ARKEMA

BASF
We create chemistry



Chemours™

DAIKIN

DERIVADOS DEL FLUOR
Minersa Group

DUPONT™

ExxonMobil

GFL™
GUJARAT FLUOROchemicals
VALUE THROUGH GREEN CHEMISTRY

Honeywell



سابک
sabik

SOLVAY

SYENSQO
ADVANCING HUMANITY

GORE



Our speaker

Zoltan Pilter

Zoltán Pilter has 25 years of experience in product regulatory compliance in the lighting industry. He is a chemical engineer and holds a PhD in environmental sciences. He has been active in the work of LightingEurope and Eucolight associations since their foundation. He is based in Budapest, Hungary, and currently works as a freelance consultant dedicated to sustainability matters.



Challenges:



The lighting industry **relies on suppliers**, limiting access to PFAS alternatives.



PFAS are used for crucial **safety and durability requirements** (e.g. insulation, flame resistance).



Risk of **regrettable substitutions** presenting new health risks.

Transition Needs:



Derogations for PFAS requiring time to implement replacements.



Support from legislators to develop **suitable alternatives**.



Spare parts exemptions to maintain certifications and product lifecycles.

LightingEurope Actions:



Regularly **inform legislators** on progress in transitioning away from PFAS.



Collect data and **plan substitution strategies** while engaging with supply chains.





Panel Discussion with Q&A: Implications for the manufacturing industry of upcoming PFAS phasing out





Iranda Chaki
SEMI Europe



Stefanos Geros
Cefic



Zoltan Pilter
LightTech





Q&A





Coffee Break





Presentation: Building a competitive Circular Economy in the EU: towards the Circular Economy Act



Our speaker

Paulina Dejmeck Hack

Paulina Dejmek Hack is the Head of Cabinet of Commissioner Jessika Roswall, responsible for Environment, Water Resilience, and a Competitive Circular Economy. She has extensive experience in financial services and regulatory policy within the European Commission, having worked in various high-level positions, including in the private offices of former Commissioners Michel Barnier and Jean-Claude Juncker.





Q&A





Presentation: Lighting designers' contributions to reducing light pollution



Our speaker

Carla Wilkins

Carla Wilkins is an independent Architectural Lighting Designer with over 35 years of experience. She is one of the founding partners of Lichtvision and has worked on a wide range of projects, including master planning, high-rise buildings, public memorials, and art installations. She is currently the President-Elect of the International Lighting Designers Association (IALD) and a board member of the Bruno Taut Forum.



Lighting EUROPE SUMMIT 2025

Lighting designers' contributions to reducing light pollution

Carla Wilkins

IALD president-elect, CLD

carla.wilkins@lichtvision.com

MUSEION BRIDGE | BOLZANO, ITALY | Lichtvision Design | © Othmar Seehauser

EXPERIENCE NIGHT SKY . SAFETY . BIODIVERSITY .
COMFORT . LIGHT POLLUTION . LIGHT POVERTY .
LIGHT ENTERTAINMENT . TEMPORARY LIGHT INSTALLATIONS
COMMUNICATION
ARCHITECTURAL LIGHTING DESIGN ENHANCES SOCIAL
OUTDOOR ACTIVITIES WITHIN THE COMMUNITY

DESIGN INTELLIGENCE

NIGHT

LIGHTING DESIGN

NIGHT

CONTENT DESIGN



MUSEION | BOLZANO, ITALY | Lichtvision Design | © LUDWIG THALHEIMER



IWD Light Up: One World Trade Center, New York



Image source IWD webpage

NIGHT

LIGHTING DESIGN

.....



SAAR POLYGON | DUHAMEL, GERMANY | Lichtvision Design | © TOM GUNDELWEIN



GUANYANG ISLAND | CHONGQING, CHINA | Lichtvision Design | © STUDIO J



GUANYANG ISLAND | CHONGQING, CHINA | Lichtvision Design | © STUDIO J



HUMBOLDTFORUM | BERLIN, GERMANY | Lichtvision Design | © FLORIAN SELIG



HUMBOLDTFORUM | BERLIN, GERMANY | Lichtvision Design | © FLORIAN SELIG



ZOOM | BERLIN, GERMANY | Lichtvision Design | © LICHTVISION



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AUDREY HOUSE | LONDON, UK | Lichtvision Design | © SOPHIE MUTEVELIAN

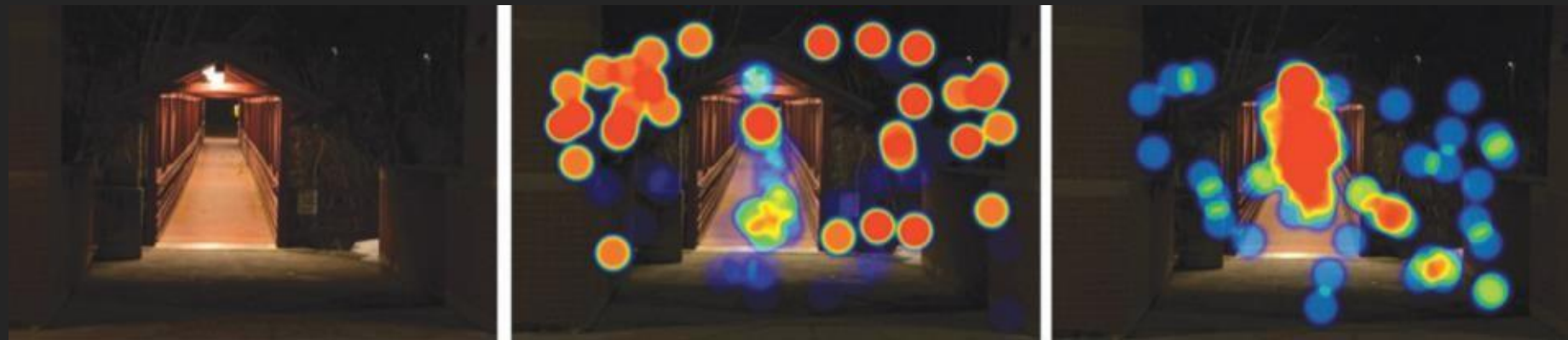
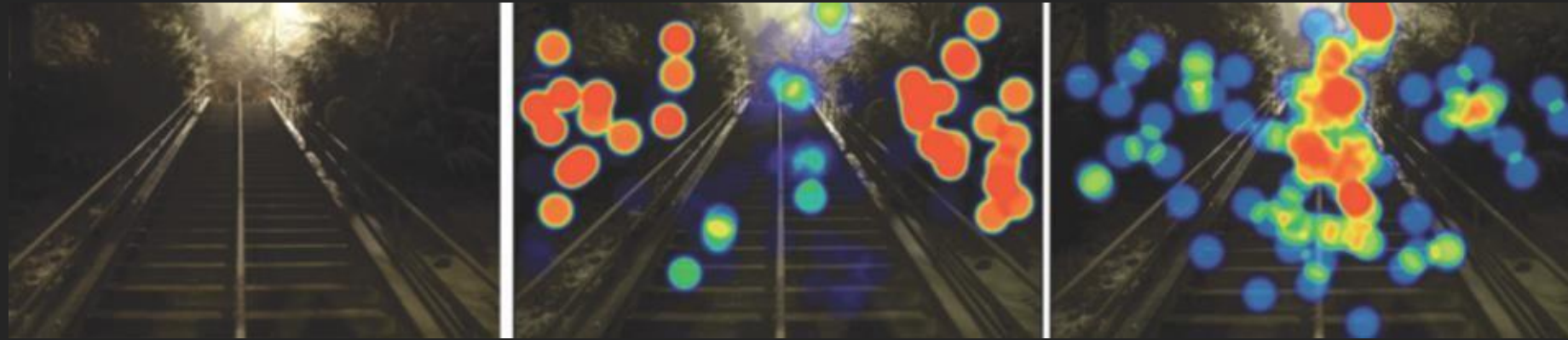


AUDREY HOUSE | LONDON, UK | Lichtvision Design | © SOPHIE MUTEVELIAN

Displayed image
from survey

Female responses

Male responses



Gender-Based Heat Map Images of Campus Walking Settings: A Reflection of Lived Experience

Robert A. Chaney, PhD,¹ Alyssa Baer, MPH,² and L. Ida Tovar, MPH³

VIOLENCE AND GENDER
Volume 11, Number 1, 2024
Mary Ann Liebert, Inc.
DOI: 10.1089/vio.2023.0027

Five Lighting Principles for Responsible Outdoor Lighting



1 Useful

Use light only if it is needed

All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.



2 Targeted

Direct light so it falls only where it is needed

Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.



3 Low Level

Light should be no brighter than necessary

Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.



4 Controlled

Use light only when it is needed

Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.



5 Warm-colored

Use warmer color lights where possible

Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.



Responsible outdoor lighting is

SOURCE : **Illuminating Equality** , Exploring Gender, Safety, and Sustainability in Lighting Design by ELISA ROCCHI

RECOMMENDATION

Lighting Masterplan

Research on social, cultural structure

Develop lighting narrative of the plot

Implement lighting controls related to time and occupancy as smart solution

Sensible choice of light color

create an overall respectful balanced environment

BALANCE

THE NEEDS AND EXPERIENCES

of all stakeholders

HUMANS - FLORA - FAUNA

create an overall respectful environment

BY QUALIFIED EXPERTS IN THE FIELD OF LIGHTING DESIGN

THANK YOU & JOIN US





Presentation CEN WG 15

Technical specifications on light pollution measurement methodologies & Results of a Study on light pollution in outdoor lighting



Our speaker

Gianpiero Bellomo

Gianpiero Bellomo is an expert in lighting design and light pollution. He has over 30 years of experience in the lighting industry, having worked at Philips Lighting and later as a freelancer. He is currently the Chair of CEN WG 15, which focuses on the assessment and control of obtrusive light in outdoor spaces.



Light pollution: Causes, Effects, Mitigation Strategies and Control Tools



Light pollution, defined as the artificial alteration of natural light levels outdoors, is a pervasive environmental problem, with more than 99% of Europe's population residing under skies with high light pollution.

This diffused lighting has far-reaching consequences, affecting not only the aesthetic beauty of the night sky, but also:

1. fragile ecosystems;
2. human health;
3. astronomical observation.

The optimization of electric night light can lead to less energy waste, contributing to both environmental protection and climate change mitigation efforts.

Sources of Light Pollution

Examples of areas by type of lighting in the outdoor environment:

- Road
- Architecture
- Residential
- Sports facilities
- Production facilities
- Parking, Storage area, Logistic Hub
- Billboards
- Greenhouses ⁽¹⁾
-

CBC News

It's not the northern lights — it's a borealis of greenhouse glows

Photo taken from a driveway in Ruthven, within the municipality of Kingsville. (Submitted by Rosemary Tako)



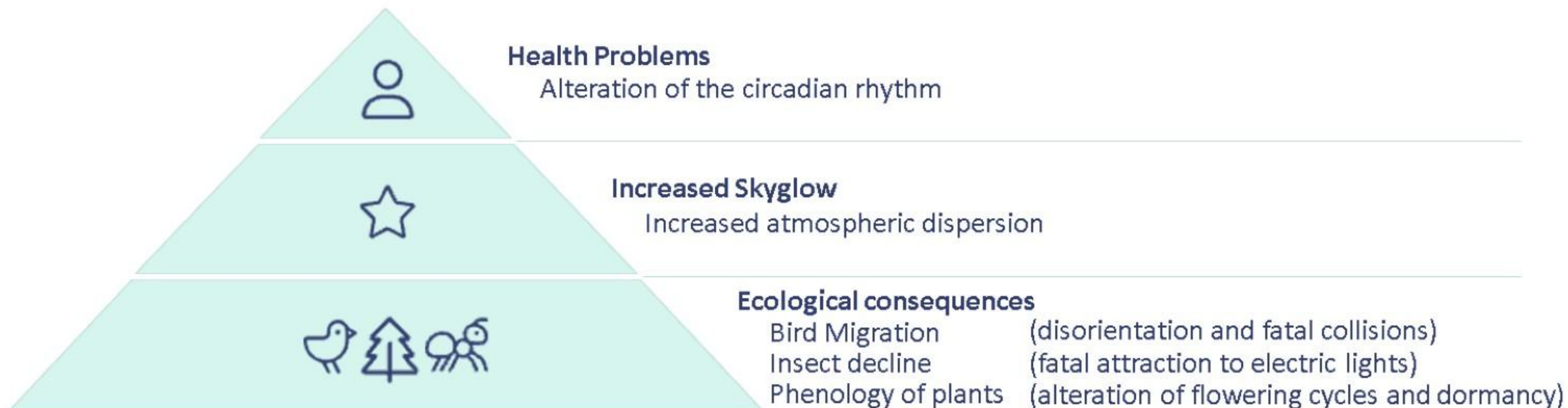
⁽¹⁾ Lighted greenhouses are a major source of light pollution in some European regions, particularly in the Netherlands and Belgium. The intense lighting required for plant growth creates localized hot spots of light pollution, while the glass itself exacerbates the problem by allowing light to escape upwards.

Physical Characteristics of Light and Impacts



Europe's recent shift from traditional yellow sodium lamps to more energy-efficient but often bluer LEDs in street lighting has unfortunately led to an increase in blue light pollution across the continent, highlighting the importance of considering spectral characteristics in addition to energy efficiency.

Spectral Distribution and Light Pollution



Insect populations across Europe are facing a significant decline, and light pollution is increasingly recognised as a contributing factor.

Emitting more blue light can intensify negative effects on nocturnal ecology and human health, increasing the risk of sleep disorders and other problems associated with disruption of biological rhythms.

A larger blue component in the LED emission spectrum is directly related to an increase in skyglow, due to the increased scattering of blue light into the atmosphere. This phenomenon is amplified by the scotopic (night) vision of the human eye, which is more sensitive to blue and green wavelengths

Main Effects of the Spectral Components of Light

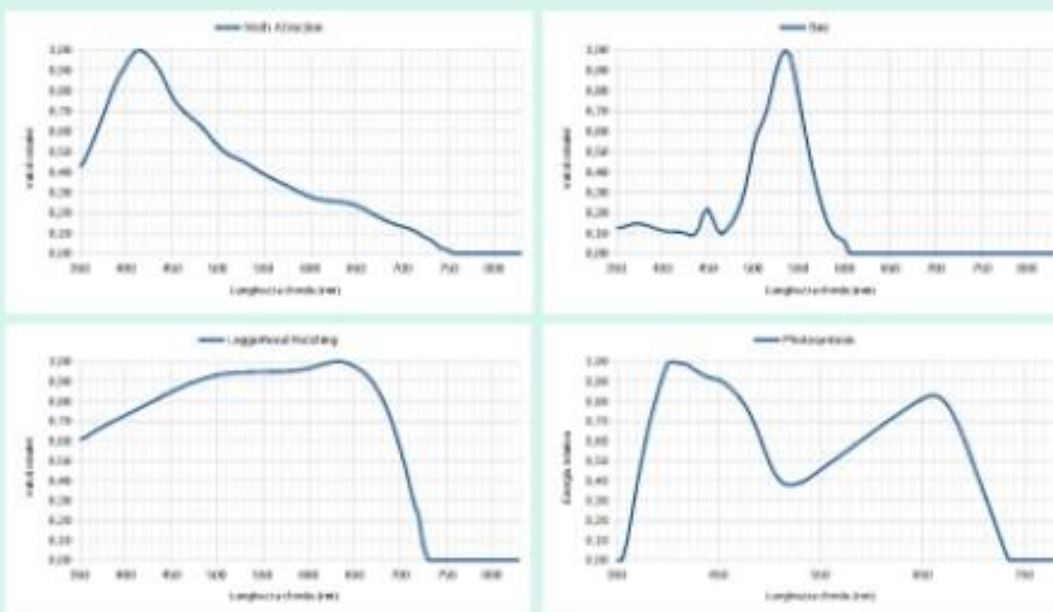
Fauna & Flora

Electric light can interfere with the natural behaviors of flora and fauna: search for food, growth, migration and reproduction.

Insects are attracted to light, migratory birds can become disoriented, and marine life can be negatively affected.

Blu (350-480 nm)

Rossa (680-830 nm)



(Cleve-1964; Menzel & Greggers-1985; Witherington-1992; DIN-2016)

Skyglow

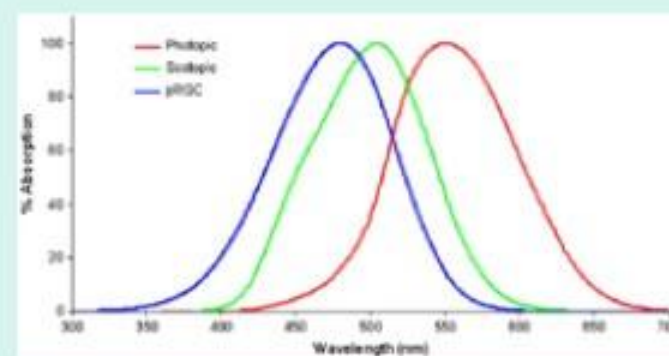
Blue light scatters more easily in the atmosphere through Rayleigh scattering. This contributes significantly to skyglow, i.e. the diffuse brightness of the night sky over inhabited areas, making astronomical observation more difficult.

Blu (350-480 nm)

Human Health

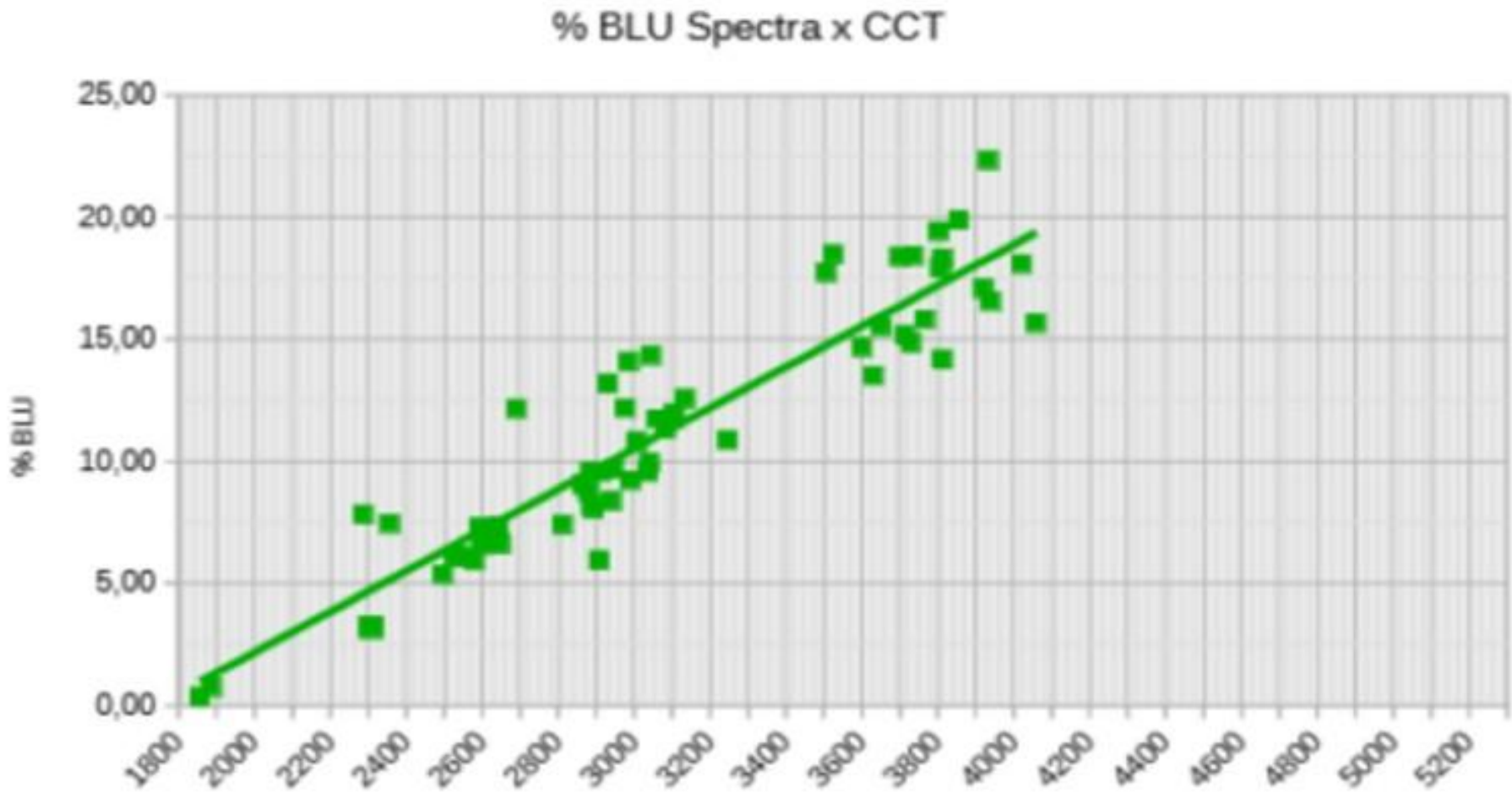
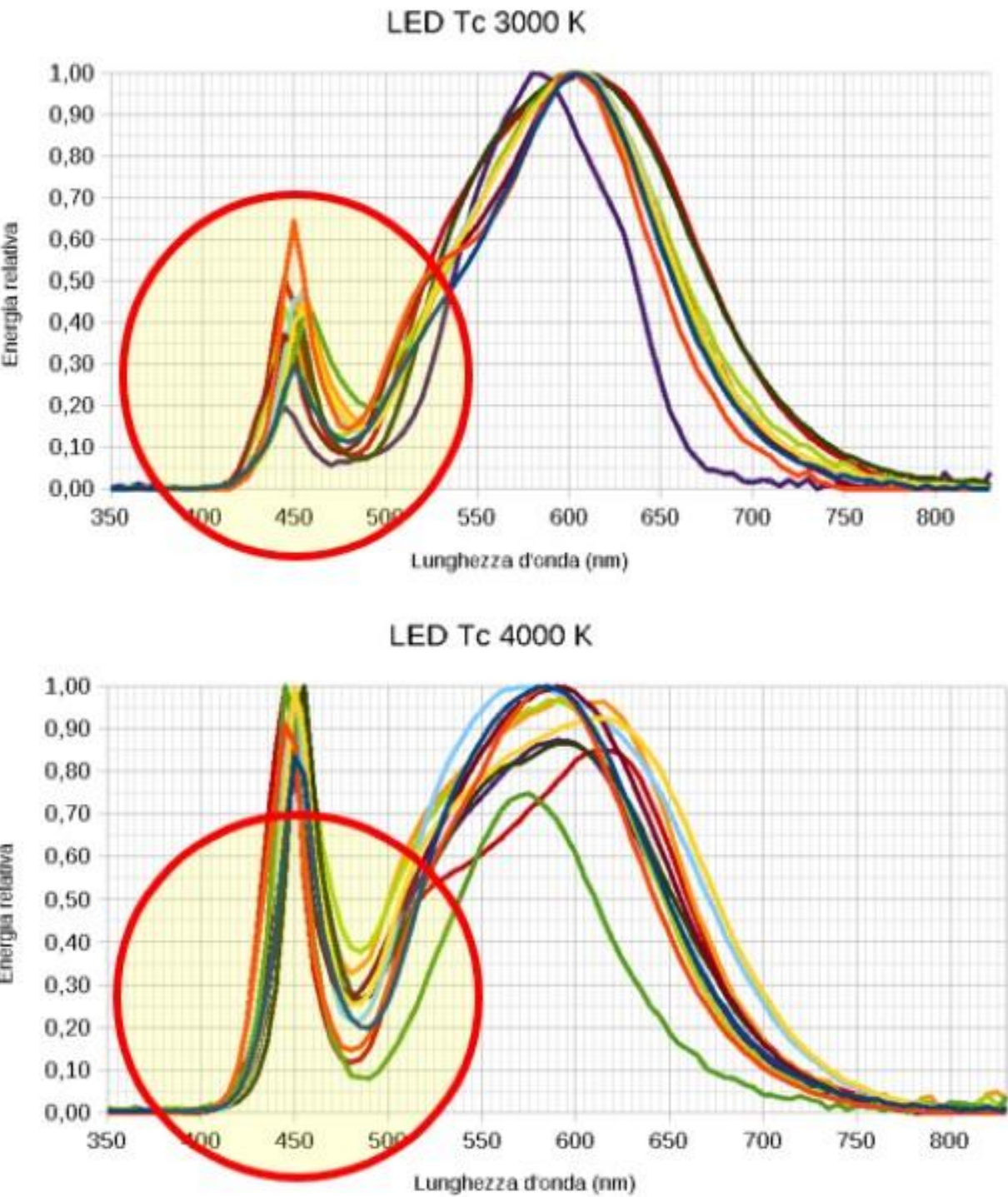
Blue light, especially when present at night, can suppress the production of melatonin, a hormone that regulates the sleep-wake cycle. This suppression can lead to sleep disorders, depression, obesity, diabetes, and cardiovascular disease.

Blu (350-480 nm)

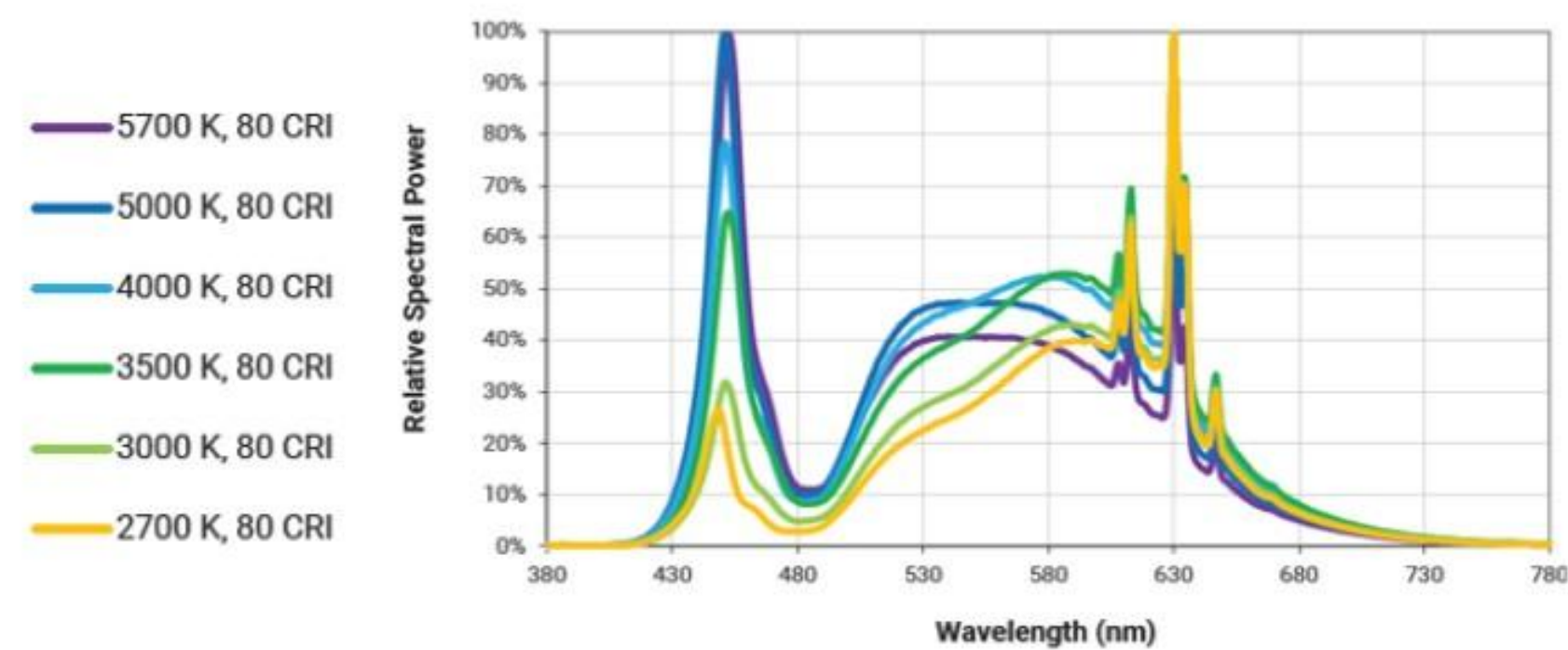


Spectral sensitivity curves for photopic vision, scotopic vision, and pRGCs.)

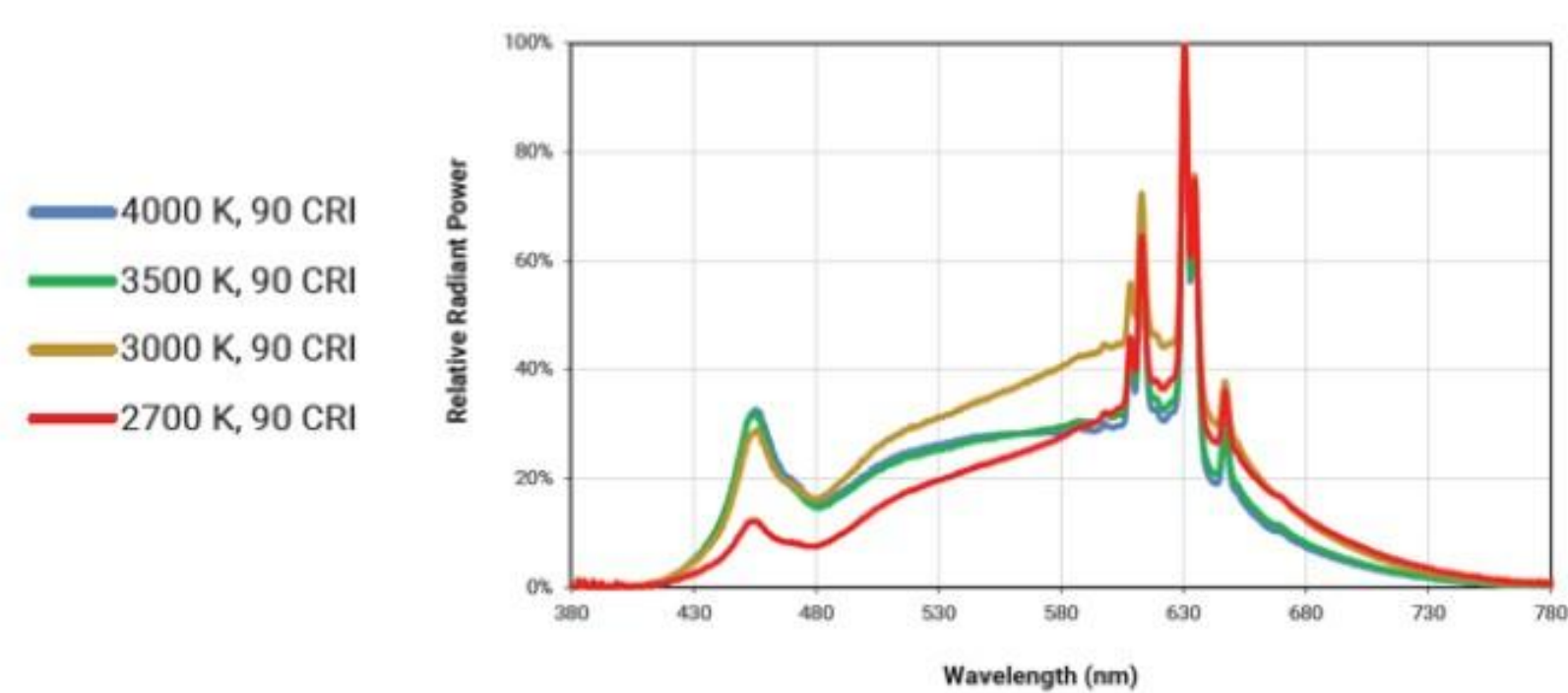
Spectral Distribution of Light



Spectral Distribution of Light

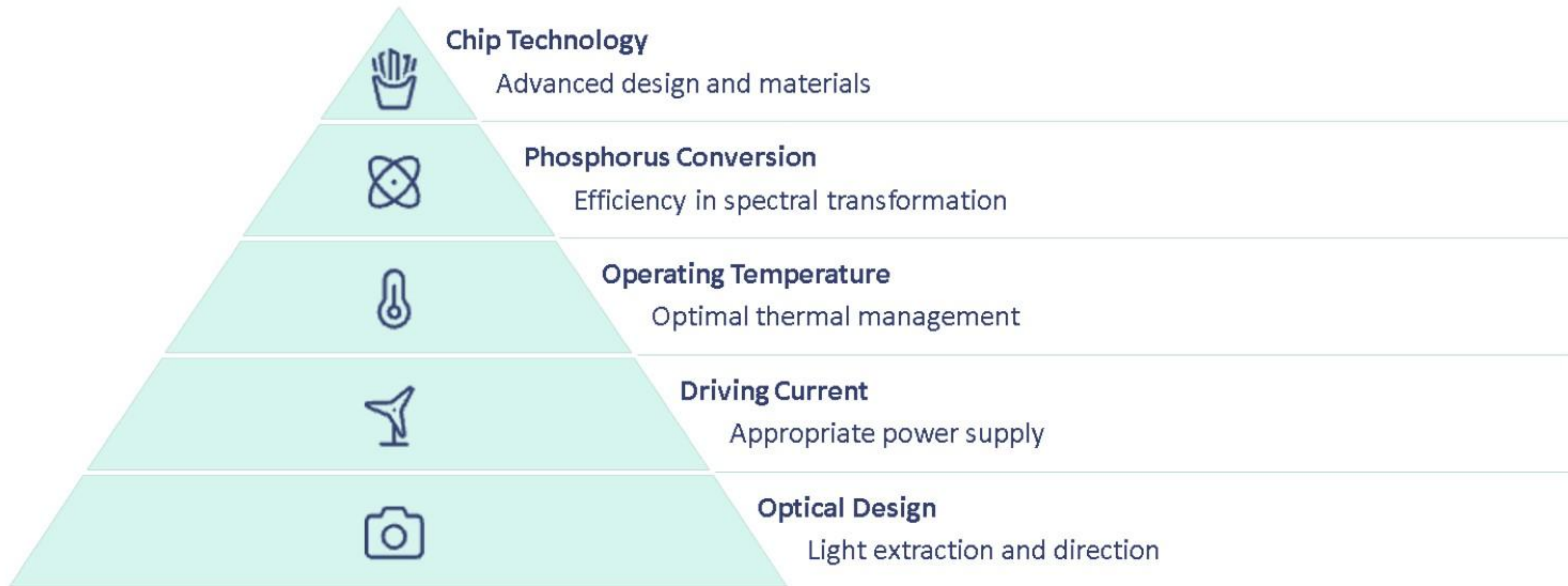


Fonte CREE



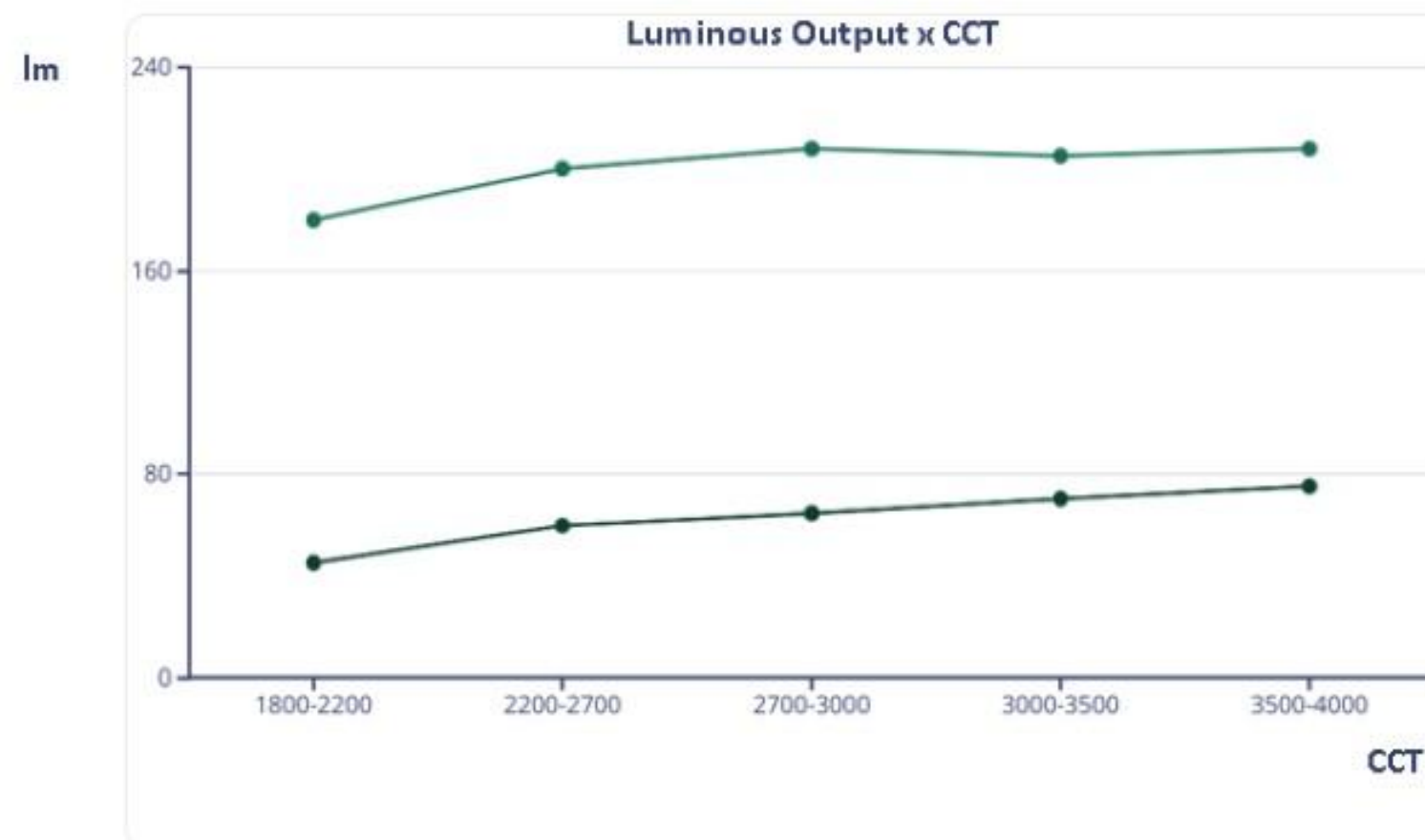
Fonte CREE

Factors Affecting Luminous Output



The luminous efficiency of LEDs is not determined solely by their CCT. Significant variations can occur even between LEDs with the same color temperature due to multiple factors. The specific type of LED package (SMD, COB, high-power LED), the proprietary design and manufacturing processes employed by different manufacturers, and the semiconductor material technology all contribute to these variations.

Typical Parameters for different CCTs



CCT (K) Typical Luminous Output (lm/W)

1800-2200 45-180

2200-2700 60-190

2700-3000 65-200

3000-3500 70-205

3500-4000 75-210

Δ Efficiency

Min

Max

≅ 5 %

≅ 69 %

It is important to note that these ranges are indicative and can vary significantly based on the specific characteristics of the LED, such as the type of package, the manufacturer, and the technology used. The data show that while there is a general trend for yield to increase as CCT increases, the variability within each band is considerable.

Analysis of data from different manufacturers reveals that for some specific LED packages, there may be a trend towards increased throughput with CCT, but this is not a universal rule. Effectiveness is significantly influenced by the specific design of the LED and other technical factors.

Considerations for LED Selection



Evaluate the specific application

Consider the environment and purpose of the lighting to determine the most appropriate color temperature.



Consult the Technical Data Sheets

Analyze data provided by manufacturers to obtain precise information on the light output at the desired CCT.



Balancing Performance and Quality

Evaluate potential trade-offs between light output and other parameters such as CRI for the specific application.



Consider energy efficiency

Use luminous efficiency (lm/W) as the main parameter for energy consumption decisions.

Although there may be a tendency for some types of LEDs to slightly increase light output with cooler colour temperatures, this is not a hard and fast or universally consistent rule. The light output in the range of 1800K-4000K shows significant variability, highlighting the importance of factors that go beyond simple color temperature.

Advances in LED technology have led to high-efficacy solutions available even at very warm color temperatures, challenging traditional assumptions about the relationship between CCT and efficacy. When selecting LED light sources, it is critical to carefully consider the specific requirements of the application, including the desired color appearance and the required color accuracy.

Guidelines for effective and efficient lighting solutions



Harmonized Regulatory Instruments of Prevention and Control

Develop stronger and harmonised regulatory frameworks at local, national and EU levels to establish clear standards for outdoor lighting.



Smart lighting

Implement motion sensors, timers, and dimmers to reduce unnecessary lighting, ensuring that lights are only turned on when needed.



Optimized systems

Develop lighting systems, not only shielded to prevent the dispersion of the luminous flux towards the Sky, but also outside the areas necessary for the performance of the visual tasks for which they were designed and created.



Spectral Control

Switch to LEDs with spectral emissions that reduce both the share of blue and red light where necessary to reduce minimizes the damage by maximizing the energy efficiency of the system.

Through collaborative and concerted action, Europe can commit to preserving its night skies for future generations and protecting the continent's health and ecological integrity, while simultaneously achieving synergistic benefits such as reduced energy waste and greenhouse gas emissions.

CEN-TS 18182 – scope

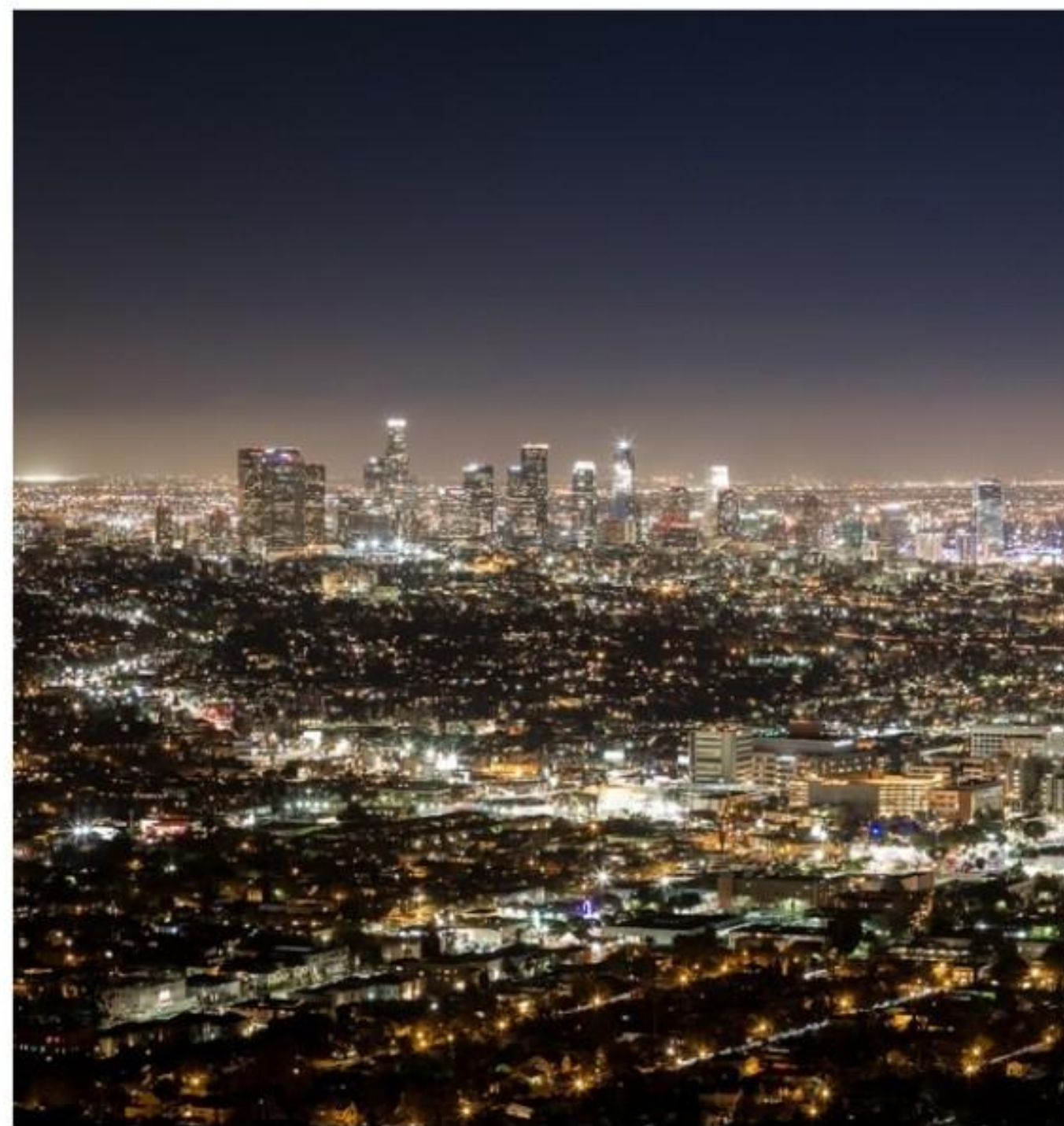
This standard prescribes evaluation methods (calculation and verification) for the evaluation of the poured/intrusive luminous flux coming from the electrical light sources of lighting systems in outdoor areas.

The calculation methods are complementary to the lighting design and are suitable for assessing compliance with legislative requirements, if any.

For the purposes of this standard, only outdoor lighting systems are considered in all areas of application.

The standard that changes the approach throughout the document:

- provide simplified procedures for the evaluation of invasive light;
- provide the legislator with the tools to define prescriptive limits;
- It does not define performance limits, avoiding overlaps with current national/regional regulations;
- The toolbox includes calculation and measurement methods, depending on the difficulties that may arise in the field.



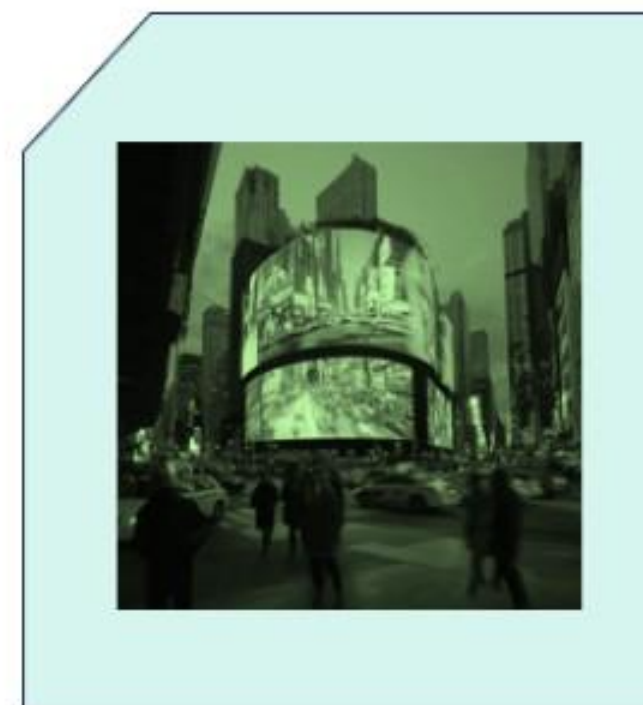
CEN-TS 18182 – scope



This standard also prescribes calculation methods for the evaluation of the intrusive light emitted by street lighting systems and other systems covered by this standard, both in public and private areas



It does not consider atmospheric conditions, such as air pollution, due to the complexity of the phenomena and the numerous elements of alteration.



Its standard also considers illuminated signs and illuminated advertising systems in outdoor areas.

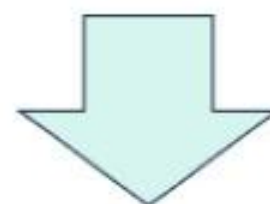


It does not apply to lighting systems for tunnels and underpasses and to all light signalling devices such as traffic lights, active traffic signs and the like, as well as to vehicle headlights.

CEN-TS 18182 - Toolbox



Application areas		R _n	R _{us}	L _m	I _a & I _{nf}	E	X%	I _{sg}	Flux regulation	E (time, frequency and spectrum)	Glare	q _{inst}
		4.2.1	4.2.3	4.2.4	4.2.2	4.2.5	4.2.5.1	4.2.6	4.2.7	4.2.8	4.2.9	Annex C
Outdoor Workplaces	calculated											
	measured											
Roads	calculated											
	measured											
Sports areas	calculated											
	measured											
Architecture, monuments	calculated											
	measured											
Parks, gardens and residential areas	calculated											
	measured											



Application areas		R _n	R _{us}	L _m	I _a & I _{nf}	E	X%	I _{sg}	Flux regulation	E (time, frequency and spectrum)	Glare	q _{inst}
		4.2.1	4.2.3	4.2.4	4.2.2	4.2.5	4.2.5.1	4.2.6	4.2.7	4.2.8	4.2.9	Annex C
Architecture, monuments	calculated		X	X	X	X	X	X	X	X	X	
	measured			X		X	X	X		X	X	

CEN-TS 18182

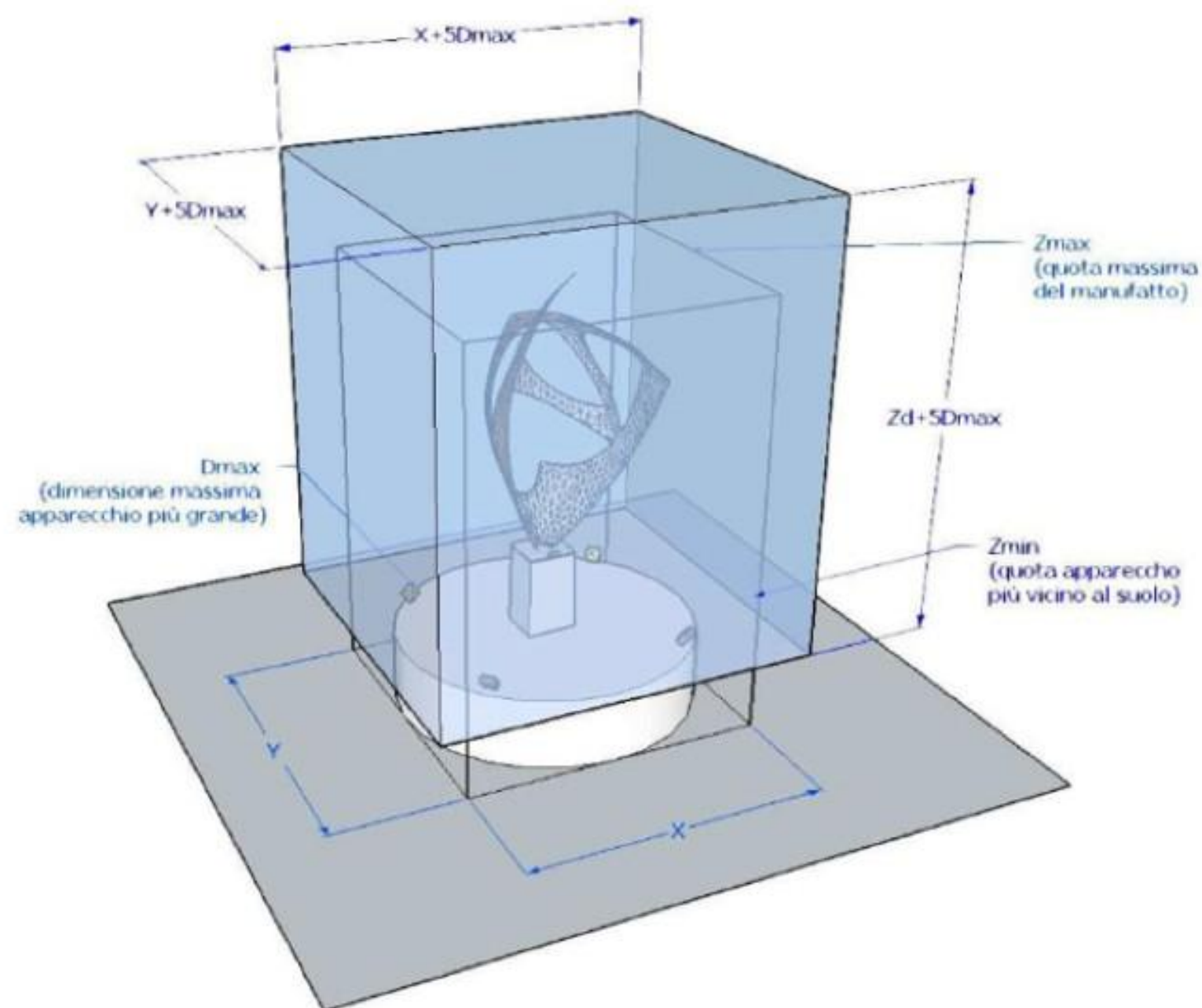
R_{su} Method (Black Box)

A "software independent" method has been defined to evaluate in a sufficiently precise way (in relation to the purpose) the scattered luminous flux of a system of any type and complexity.

Example:

- Architectural facades
- Monuments
- sports facilities
- outdoor workplaces,
- complex road intersections,
- Etc..

Application area		R_{us}
		4.2.3
Architecture, monuments	calculated	X
	measured	



Conclusions and Recommendations



Conscious Selection

When choosing LED lighting, particularly for outdoor applications, it is crucial to carefully consider the spectral characteristics of the light sources, balancing energy efficiency with environmental responsibility.



Balanced Approach

Responsible lighting requires a balance between human needs for safety and visual comfort and the need to protect the natural environment and public health.



Continuous research

Further research could focus on the precise quantification of the spectral component of different LED sources and the assessment of the specific impacts of different wavelengths on the ecosystem and human health.

Thank you for your attention!

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Presentation: Global and European Strategies for Implementing Responsible Lighting Solutions



Our speaker

Ruskin Hartley

Ruskin Hartley is the CEO of DarkSky International, an organization dedicated to protecting natural night skies by advocating for responsible outdoor lighting. He has over 20 years of experience in environmental conservation and has held leadership roles at organizations such as Fair Trade USA and Save the Redwoods League. He holds degrees from the University of Cambridge and the University of East Anglia.



European Lighting Summit

27 March 2025

Global and European Strategies
for Implementing Responsible
Lighting Solutions

Ruskin Hartley, CEO





“In these very uncertain times the night sky can provide beauty and comfort”

~ Nancy, DarkSky member

The value of natural darkness



Enontekiö, Finland
Photo credit: Timo Oksanen

For exploration:
Unlocking the mysteries of the cosmos



Mount Lemmon, Arizona
Photo credit: Bettymaya Foott

For people:

Better sleep, circadian health, inspiration, awe
and wonder



Seeing Stars
Photo credit: Daan Roosegaarde

For aesthetics:

Enhances contrast, depth, and
brings beauty and focus



Café Terrace at Night, 1888| Van Gogh



A Great Horned Owl is perched on a dark, textured branch against a black background. The owl's face is illuminated, showing its large, orange-brown eyes and white facial disc. Its feathers are mottled with dark and light brown patterns. The branch it sits on extends diagonally from the bottom left towards the top right.

For nature:

Wildlife depends on darkness

Who's out at night?

90% amphibians

69% mammals

60% invertebrates

30% birds

For sustainability:
Reducing wasted light saves energy
and emissions



Innovation



Cheaper

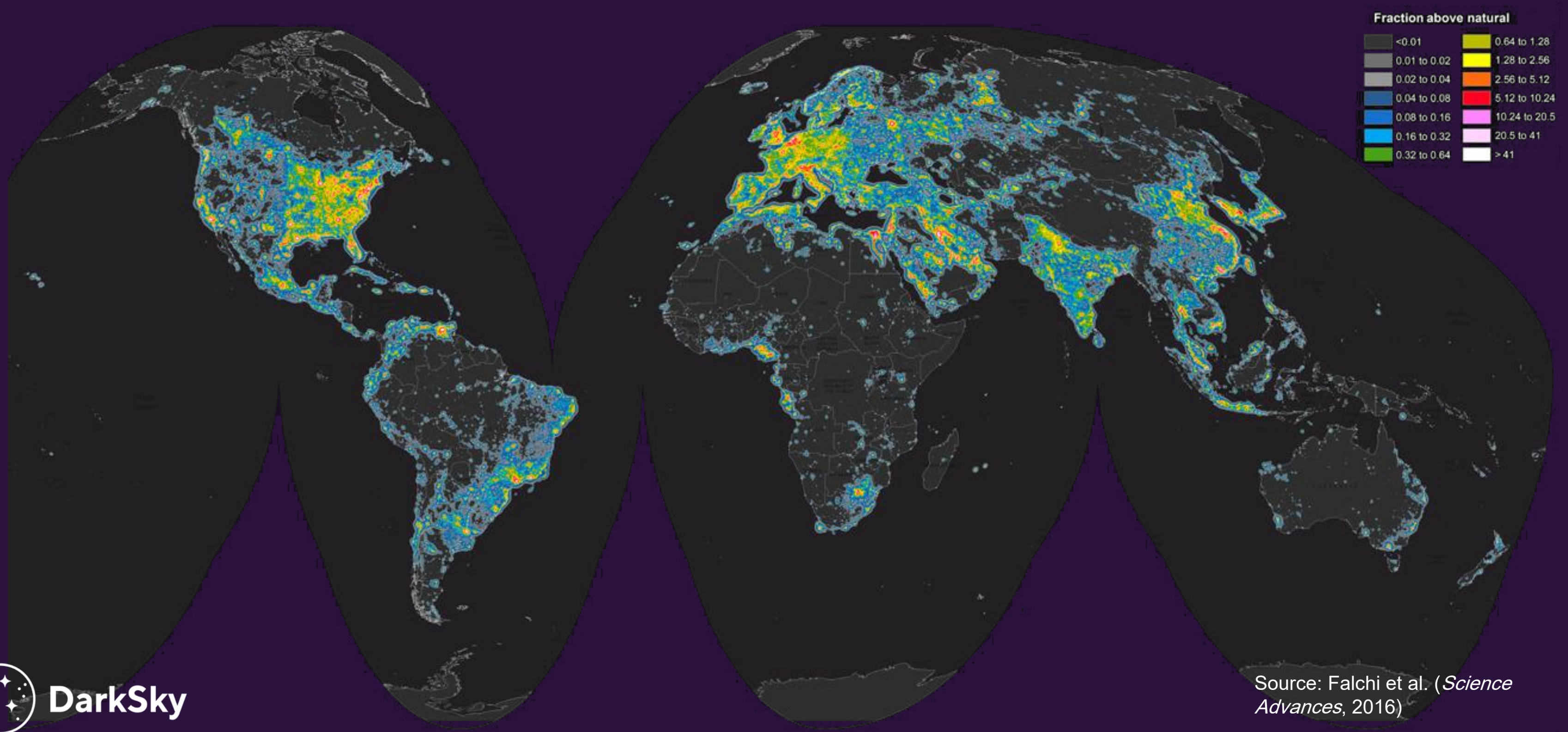


Brighter

Perpetual twilight



Light pollution is a global issue...



...and is doubling
every eight years

Annual growth

9.6% Global

6.5% Europe

10.4% North America

7.7% Rest of world



RESEARCH

Science | AAAS

LIGHT POLLUTION

Citizen scientists report global rapid reductions in the visibility of stars from 2011 to 2022

Christopher C. M. Kyba,^{1,2*} Yiğit Öner Altıntaş,^{1,†} Constance E. Walker,³ Mark Newhouse⁴

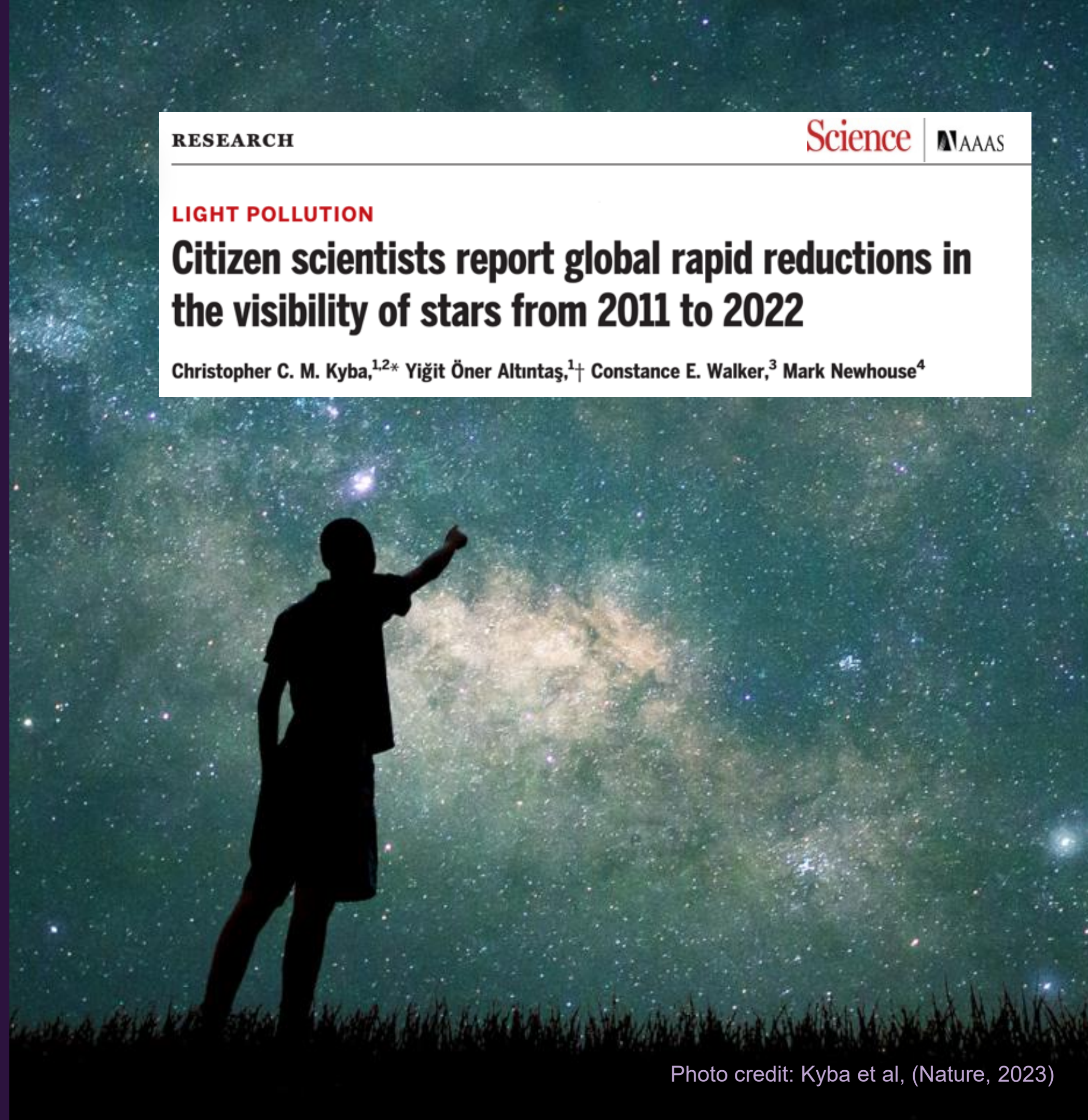


Photo credit: Kyba et al, (Nature, 2023)

The problem

Poor lighting choices



The problem:
more $\approx$ better



The solution:
Designing with darkness in mind



Five principles for Responsible Outdoor Lighting At Night

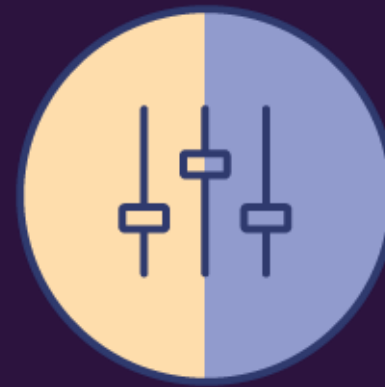
Start with natural darkness, add light only where it is needed.



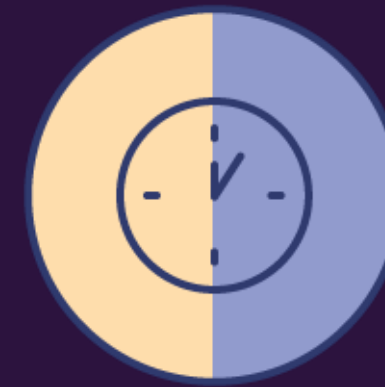
useful



targeted



low level

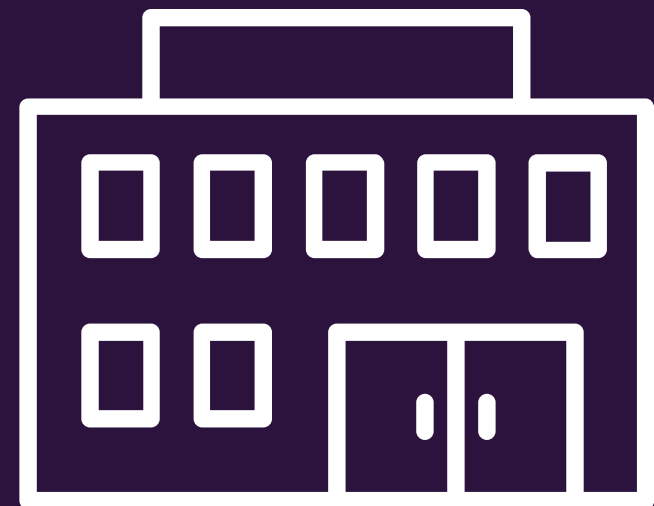
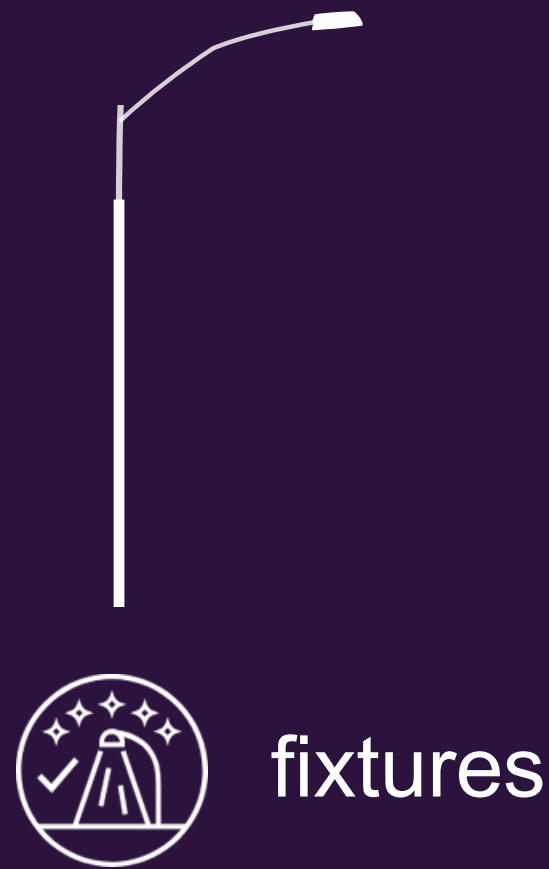


controlled



warm colored

A scalable approach





fixtures



UNACCEPTABLE

Completely unshielded



VERY BAD

Poorly shielded



BAD

Partially shielded



BETTE

Fully shielded
(Light source fully covered)



BES

Fully shielded
timer/motion sensor



View from Carlsbad Caverns, New Mexico, USA. ~100 miles distant

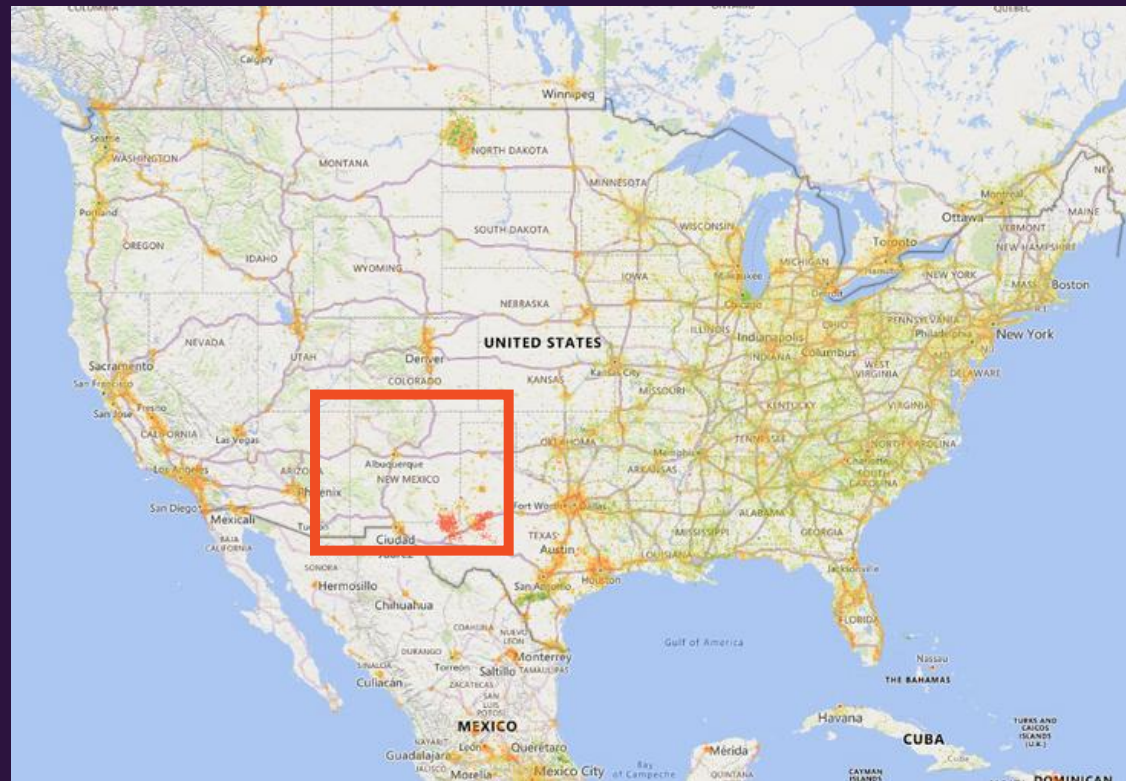




projects

The brightest spot on the map?

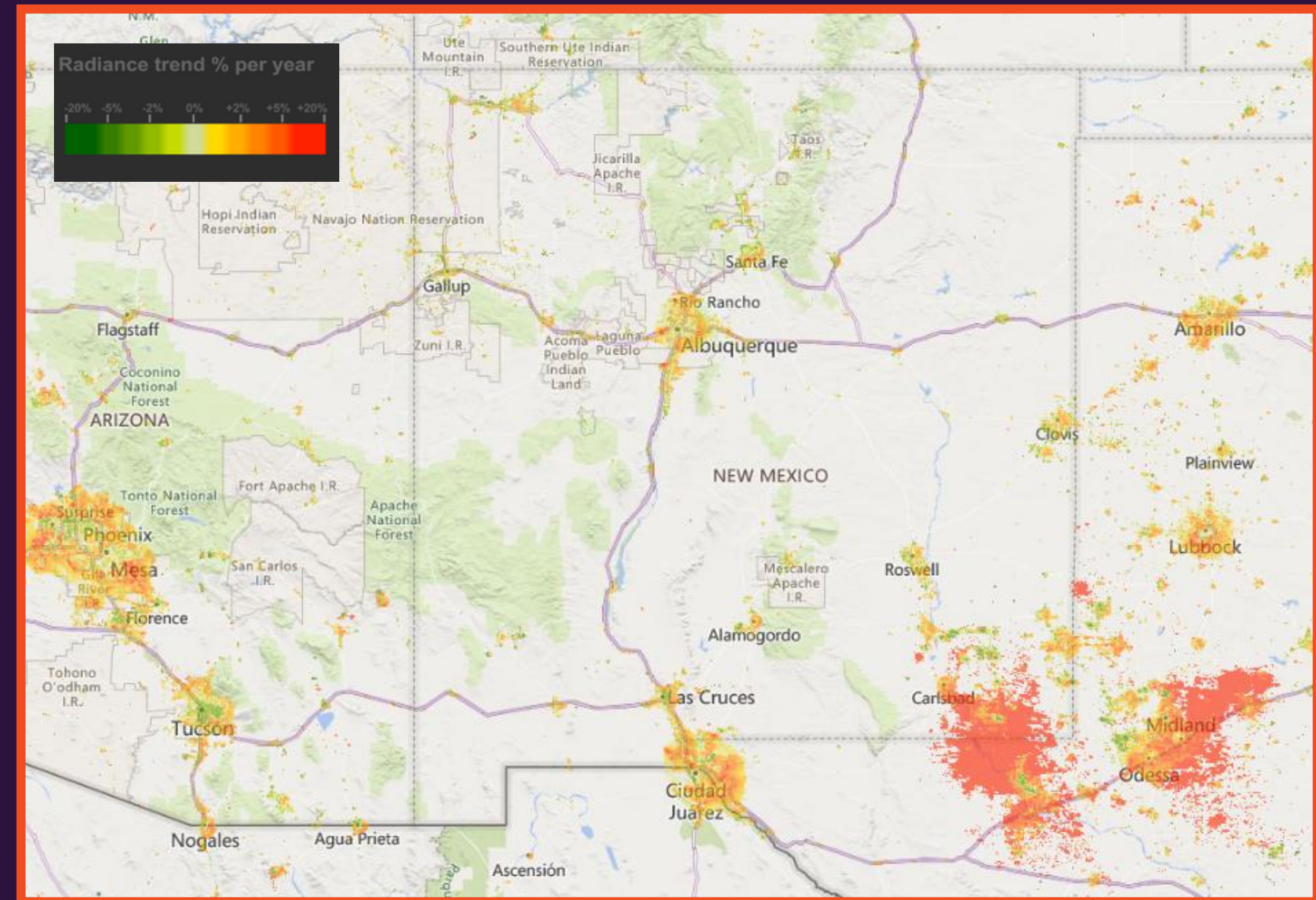
Urban expansion and explosive growth of the oil and gas industry—the highest growth in light pollution in the USA, and among highest globally.



Projected +2500 facilities per year for the foreseeable future.



DarkSky





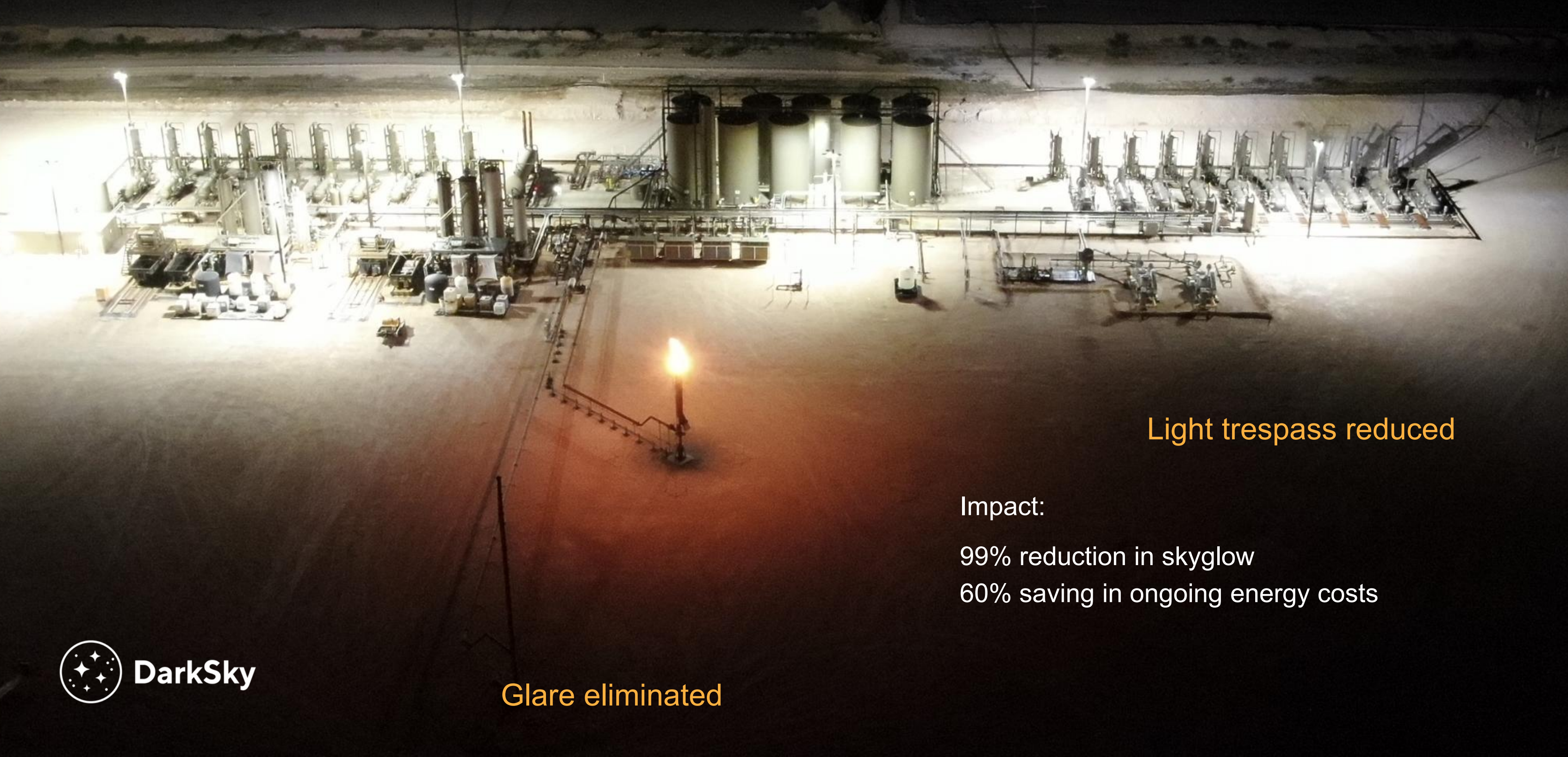
projects

BEFORE



DarkSky

Direct up-light eliminated



Light trespass reduced

Impact:

99% reduction in skyglow

60% saving in ongoing energy costs

Glare eliminated



Flagstaff

AZ, USA

searchlight law (1958)



National, regional, local

Croatia, Slovenia, France, Germany, Spain, Czechia, Italy, Netherlands, Finland
various laws (2025)

DarkSky Codes and Statute Templates

While the templates were written around US governance, the provisions are universal.

Regional Template

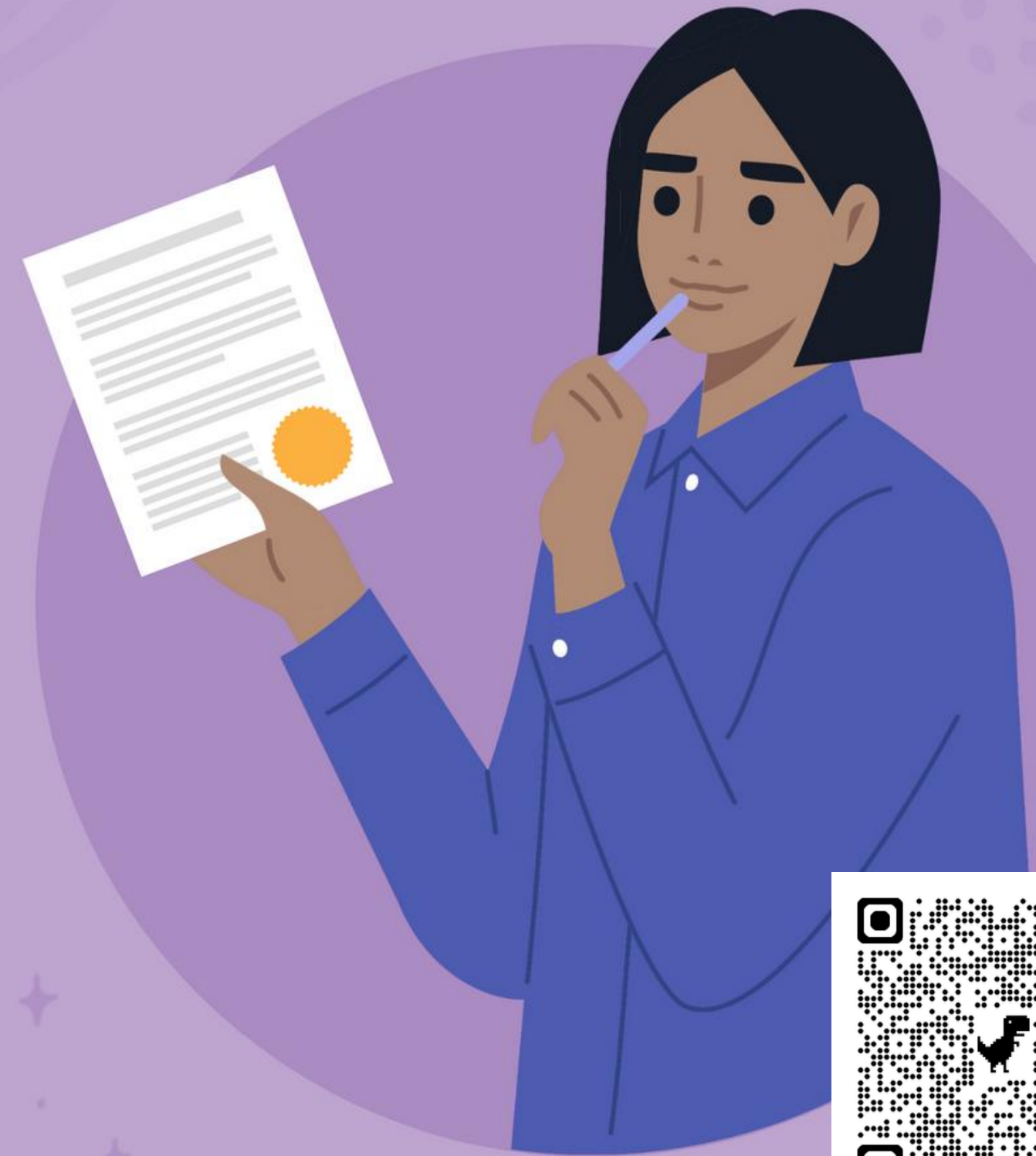
States
Territories
Provinces

Large areas that have governing authority over smaller municipalities

Municipal Template

Cities
Counties
Townships

Local areas that with enforcement ability at more discreet level





policies

simple - effective - enforceable

Principle

Sample technical requirement



Useful

Limited prohibitions, e.g. searchlights.



Targeted

1 lux trespass limit for residential



Low-level

No more than 25% over national lighting standards



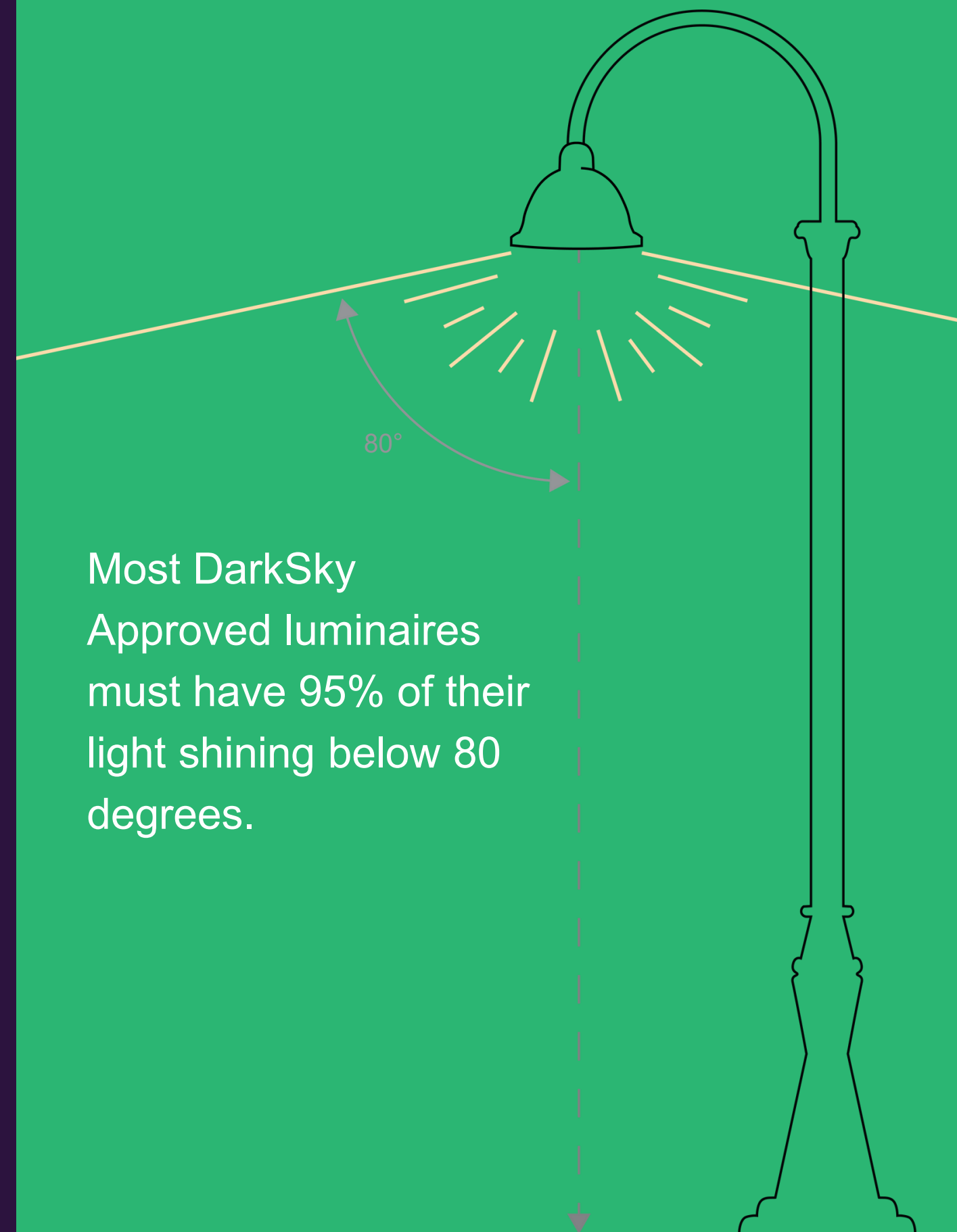
Controlled

Turn off non-essential lights between 10 pm and sunrise



Warm-colored

3000K max, with exemptions for safety



Responsible Lighting

a simple solution to Europe's priorities

Cooperation towards solutions that provide consistency, certainty, and open market access.



Save energy
and money



Improve nighttime
visibility



Protect the
environment



Ruskin Hartley
ruskin@DarkSky.org

DarkSky.org



The best lighting designs don't just add light—they reveal the night.



Q&A





Panel discussion with Q&A: Challenges and opportunities of harmonising light pollution regulations



Our speaker

Oscar Deurloo

Oscar Deurloo is a Standardization and Regulation Manager at Signify, with over 38 years of experience in the lighting industry. He has held various engineering and management roles and is actively involved in standardization efforts at both the European and international levels. He holds an engineering degree in digital electronics.





Oscar Deurloo
Signify



Carla Wilkins
IALD representative



Ruskin Hartley
DarkSky



Gianpiero Bellomo
CEN WG 15





Q&A





CONCLUSIVE REMARKS





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THANK YOU



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