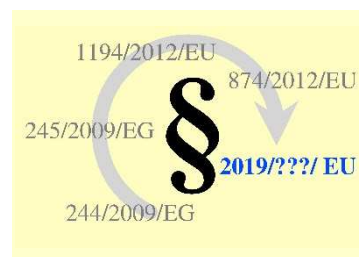


Texte zu den geplanten neuen EU-Regelungen zur umweltgerechten Produktgestaltung und zur Energieverbrauchs-kennzeichnung in der Beleuchtung – Zusammenstellung * des Umweltbundesamtes (UBA), Deutschland



Entwürfe der EU-Kommission vom 13. November 2017

Konsultationsforum am 7. Dezember 2017

– Vortrag von Herrn Leo Wierda, Van Holsteijn en Kemna –

Hinweis: Bitte beachten Sie, daß der angehängte Text nur in Englisch verfaßt ist.

EN: Information on the coming EU Lighting Regulations – Ecodesign and Energy Labelling – Compilation * of the Federal Environment Agency (UBA), Germany

The EU Commission's drafts of 13 November 2017

**Consultation Forum on 7 December 2017 —
Presentation by Mr. Leo Wierda, Van Holsteijn en Kemna**

FR: Informations sur les futures réglementations de l'UE concernant l'éclairage – l'écoconception et l'étiquetage énergétique – Compilation * de l'Agence Fédérale de l'Environnement (UBA), Allemagne

Les projets de la Commission Européenne du 13 novembre 2017

**Forum consultatif du 7 décembre 2017 —
Exposé de M. Leo Wierda, Van Holsteijn en Kemna**

Indication: Veuillez noter que le présent texte n'est disponible qu'en anglais.

* <https://www.eup-network.de/de/eup-netzwerk-deutschland/offenes-forum-eu-regelungen-beleuchtung/dokumente/texte/>

Liste der Dokumente zum Konsultationsforum am 7. Dezember 2017 und Kennzeichnung des vorliegenden Textes

EN: List of the documents on the Consultation Forum on 7 December 2017 and identification of the text at hand

FR: Liste des documents du forum consultatif du 7 décembre 2017 et marquage de le présent document

Diskussion ◇ **EN:** Discussion ◇ **FR:** Discussion

- Protokoll ◇ **EN:** Protocol ◇ **FR:** Protocole
- Schwerpunkte der Diskussion; Notizen von Christoph Mordziol, UBA ◇ **EN:** Focuses of the discussion; notes by Christoph Mordziol, UBA ◇ **FR:** Thèmes principaux de la discussion; notes de Christoph Mordziol, UBA

Vorträge und Hintergrundinformationen ◇ **EN:** Presentations and background information ◇ **FR:** Exposés et informations de fond

- Vortrag von Herrn Leo Wierda, Van Holsteijn en Kemna ◇ **EN:** Presentation by Mr. Leo Wierda, Van Holsteijn en Kemna ◇ **FR:** Exposé de M. Leo Wierda, Van Holsteijn en Kemna
- Vortrag von Frau Orsola Mautone, EU-Kommission ◇ **EN:** Presentation by Mrs. Orsola Mautone, EU Commission ◇ **FR:** Exposé de Mme. Orsola Mautone, Commission européenne
- Vortrag von Frau Ourania Georgoutsakou, Lighting Europe ◇ **EN:** Presentation by Mrs. Ourania Georgoutsakou, Lighting Europe ◇ **FR:** Exposé de Mme. Ourania Georgoutsakou, Lighting Europe
- Vortrag von Herrn Michael Scholand, CLASP (der Vortrag konnte aus Zeitgründen nicht mehr gehalten werden) ◇ **EN:** Presentation by Mr. Michael Scholand, CLASP (due to lack of time, the presentation could not been held) ◇ **FR:** Exposé de M. Michael Scholand, CLASP (faute de temps l'exposé n'a pas été donné)

Es folgt ein unveränderter Originaltext.

EN: The following is an unmodified original text.

FR: Ce qui suit est un texte original.

Ecodesign and Energy Labelling of Light Sources

(background and technical aspects)

Presentation for the
Ecodesign Consultation Forum
Brussels, 7 December 2017



Presented by
Leo Wierda, René Kemna (VHK)



Presented topics:

- **Milestones** (development history)
- **Survey of the Compromise** (phase-outs)
- **Efficiency Requirements** (max power formula)
- **Scenario Analysis** (savings)
- **Energy Labelling** (sales distribution over classes)

Milestones

(development history)

Milestones [1]

- **2014-2015**: Lot 8/9/19 Preparatory Study (VHK)
Assignment by EC (ambitious):
 - explore feasibility of **unifying existing lighting regulations**
 - **review definitions** of SPL, minimise possible misuse
 - **more ambitious** targets for all regulated lighting products
 - **expand scope**: luminaires, lighting controls, lamps > 12000 lm
 - harmonize projections for past and future lighting energy
- **Feb. 2015**: 1st Stakeholder meeting
- **June 2015**: 2nd Stakeholder meeting
 - unifying regulations generally appreciated
 - facilitate / **improve market surveillance**
 - **6000 h test for LEDs** too long / too expensive
- **Dec. 2015**: Consultation Forum
 - **ambitious EC proposal**, targeted combination of light source + control gear + lighting controls (always mains input), same minimum efficiency requirement for all technologies, for lamps and luminaires, 3 stages 2018, 2020, 2024 → **LED-only scenario**

Milestones [2]

- **Apr.-Aug. 2016**: Impact Assessment Study (VHK)
 - detailed analysis stakeholder comments
 - **No consensus** on EC proposal of Dec. 2015 (details, general approach)
 - no agreed scenario for the IA → work changed

→ EC asked **VHK to act as intermediair** to try to find a **compromise proposal** that could count on support from majority of stakeholders.

 - bilateral meetings with representatives of stakeholders
 - VHK initiative, informal, on personal title, not binding
 - additional data collection → expansion VHK database of light sources
 - updated study on availability of LED retrofit lamps
 - updated analysis model (MELISA), in cooperation with industry
 - various VHK-drafts for Ecodesign regulation, discussed, adapted
 - reporting to Commission on progress
- **Sept. 2016 – Mar.2017**: stand still; ED and EL under discussion

Milestones [3]

- **Apr.-Sept. 2017**: Impact Assessment Study, phase 2 (VHK)
 - continued role as intermediary
 - 'draft final VHK proposal' of July 2017 send to discussion partners
 - **VHK compromise proposal for ED → Commission in Aug. 2017**
(with doubts and alternatives, still choices to be made)
- **July 2017**: Framework Regulation 2017/1369 on Energy Labelling
 - new rules for labelling finally clear
 - analysis of subdivision of light sources over label classes (2020, 2030)
 - updated projections for development of LED efficacy
 - **VHK proposal for EL → Commission in Sept. 2017**
 - mainly based on EC Dec. 2015 proposal, adapted for 2017/1369
(discussion partners not involved; lack of time)
- **Sept.-Oct. 2017**: Commission made choices, applied changes to VHK proposal, green light from Cabinet to present to Consultation Forum
→ **current proposal for ED and EL regulation**

Survey of the Compromise (phase-outs)

Compromise [1]

- Luminaires and Lighting Controls not in scope.
- Focus not on combined lighting product taking 230 V as input, but separately on **light sources** and **separate control gears**.
- **LED-only scenario (2024) abandoned:** some classic lamp types 'protected' until review in 2022.
- **No phase-out of LFL T5 and HID**
 - recent investments made; give time to amortize
 - scarce availability of adequate LED retrofit lamps
- **No phase-out of CFLni**
 - retrofit LED not available for all types / caps (and expensive)
- **No phase-out of Halogen Linear R7s with flux < 2700 lm**
 - LED retrofits available, but larger dimensions

Compromise [2]

- Phase-out of most LFL T8 by 2020 (2-, 4-, 5-feet lengths)
 - retrofit LED available
 - also phased-out for mercury content by RoHS
 - most important point of proposal; main energy saver
 - U-shaped FL and other length LFL are not phased-out
- Phase-out of CFLi by 2020
 - retrofit LED available
- Phase-out of Halogen capsules (LV, MV) and HL LV DLS by 2020
 - dimension/flux problems of LEDs expected solved by 2020
 - exemption for beam angle less than 10 degrees
- Phase-out of Halogen Linear R7s with flux > 2700 lm
 - adequate and convenient LED floodlight luminaires available

Efficiency Requirements

New formulation of Efficiency Requirements

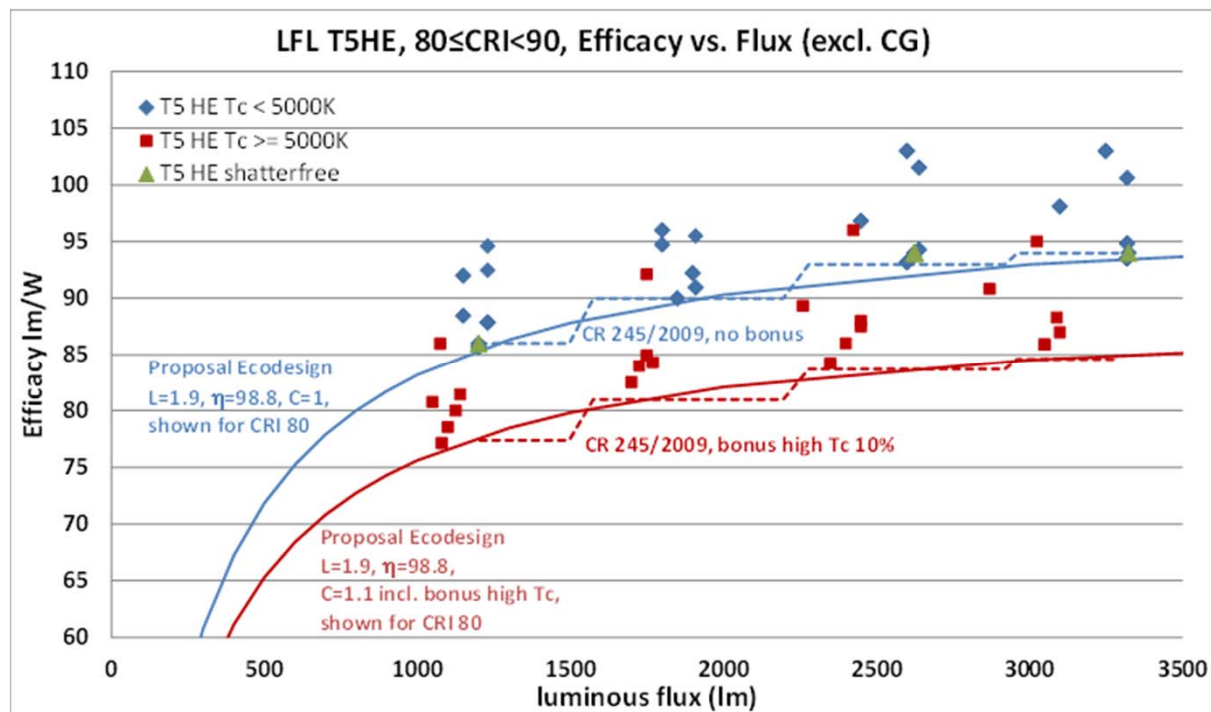
- Single 'efficiency' formula for all light source types
$$P_{onmax} = C * (L + \Phi_{use} / (F * \eta)) * R$$
- Defines max allowed power P_{onmax} for a given luminous flux Φ_{use}
Total flux for non-directional ($F=1$)
Flux in cone for directional ($F=0.85$)
- Two parameters, values depend on light source type:
 L = end loss factor (\rightarrow lower flux requires lower efficiency)
 η = threshold efficacy (required efficacy at very high flux)
- Power bonus for CRI > 80; penalty for CRI < 80 (factor R)
- Corrections (factor C):
8% higher power allowed if light source works on Mains
15% higher power allowed if light source is Directional
10-20% higher power allowed for special features

P_{on} : Power of lighting control parts and non-lighting parts is excluded.

P_{on} : For reference control settings (out-of-box) of tuneable light sources.

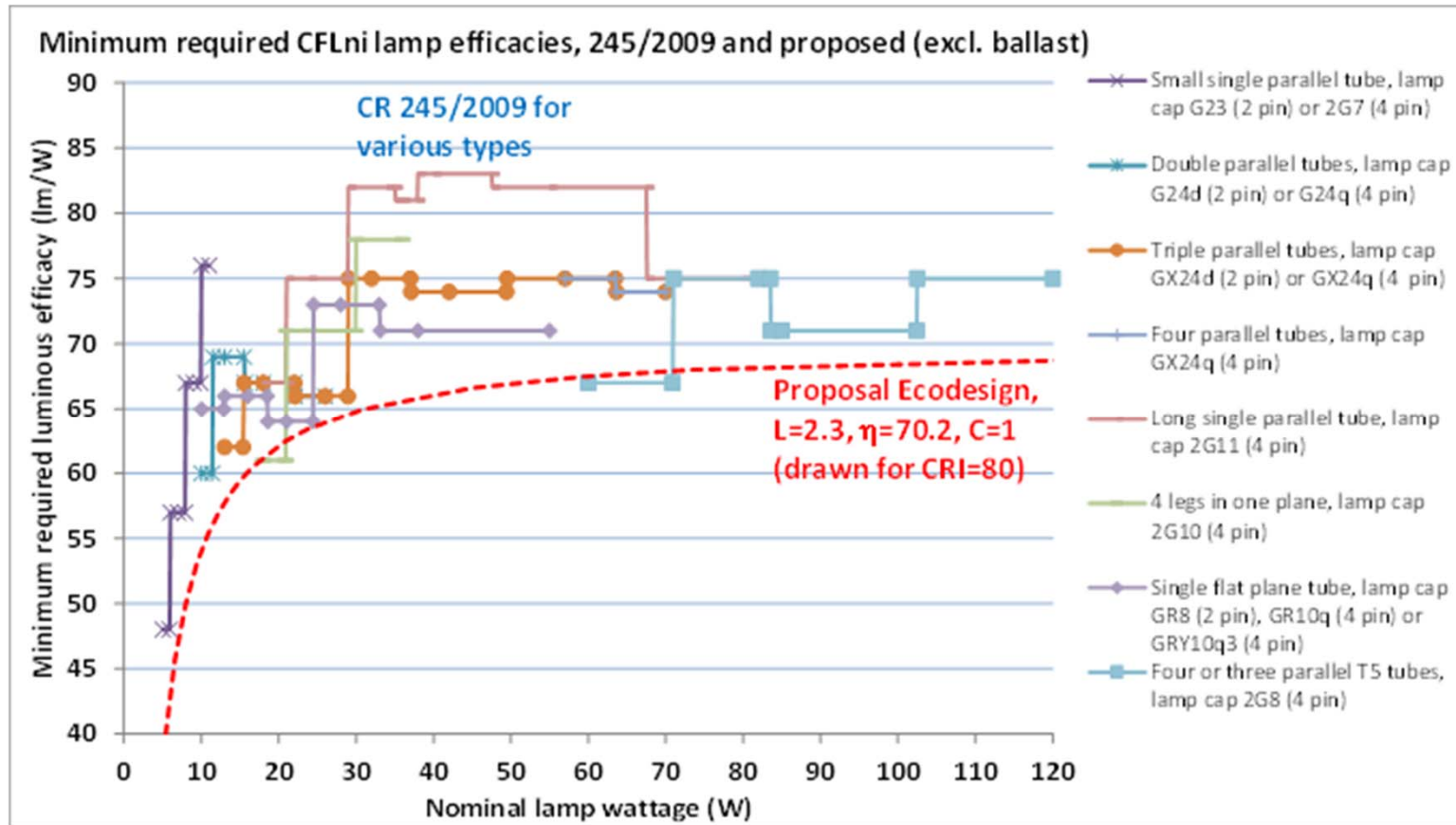
Existing vs. new requirement [1]

- For 'protected' light sources (LFL T5, CFLni, HID) efficiency requirements differ per type and match existing requirements
 - parameters L and η (and correction C) chosen to match existing requirements as closely as possible
 - backsliding of requirements minimized
 - agreed with industry
- Example LFL T5 HE: good match existing and new requirements



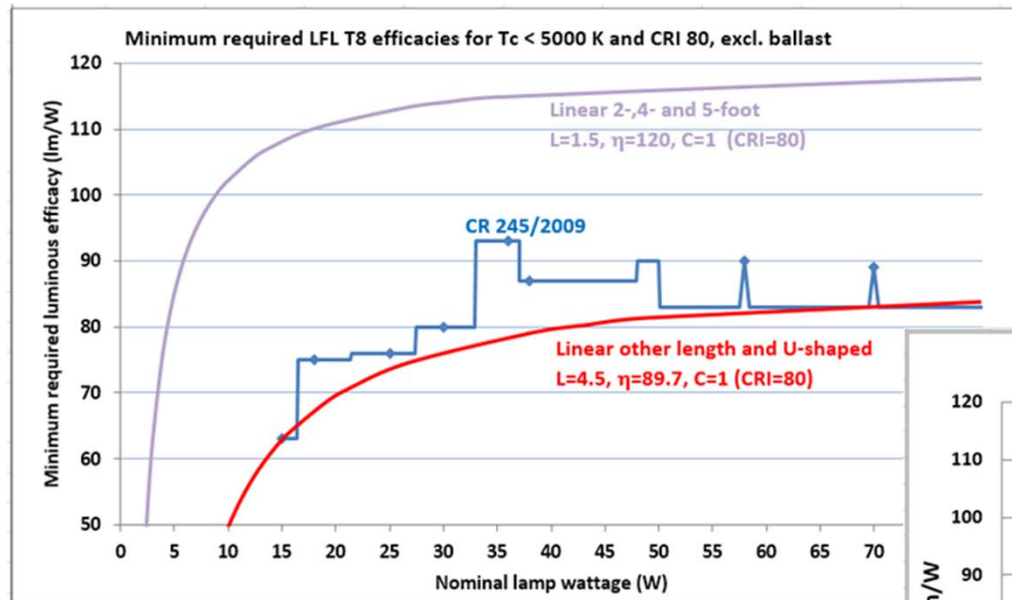
Existing vs. new requirement [2]

- Example CFLni: new requirements are lower envelope of existing

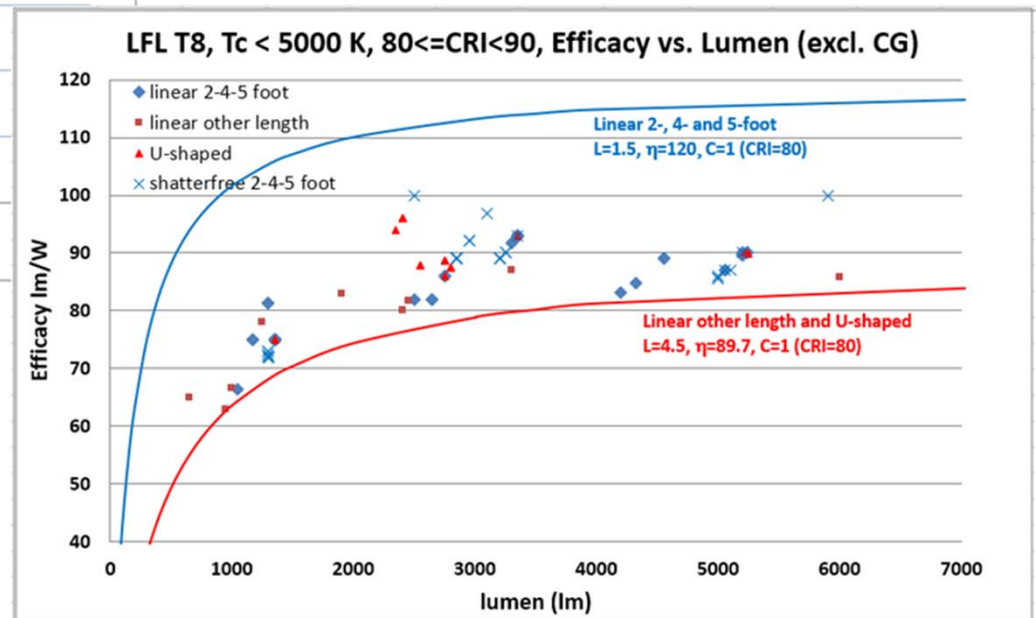


Existing vs. new requirement [3]

- For all other ('non-protected') light sources (LFL T8 2/4/5-feet, HL except R7s < 2700 lm, CFLi, LED) single requirement applies, more severe than existing requirement ($L=1.5$, $\eta=120$)
- Example FL T8:

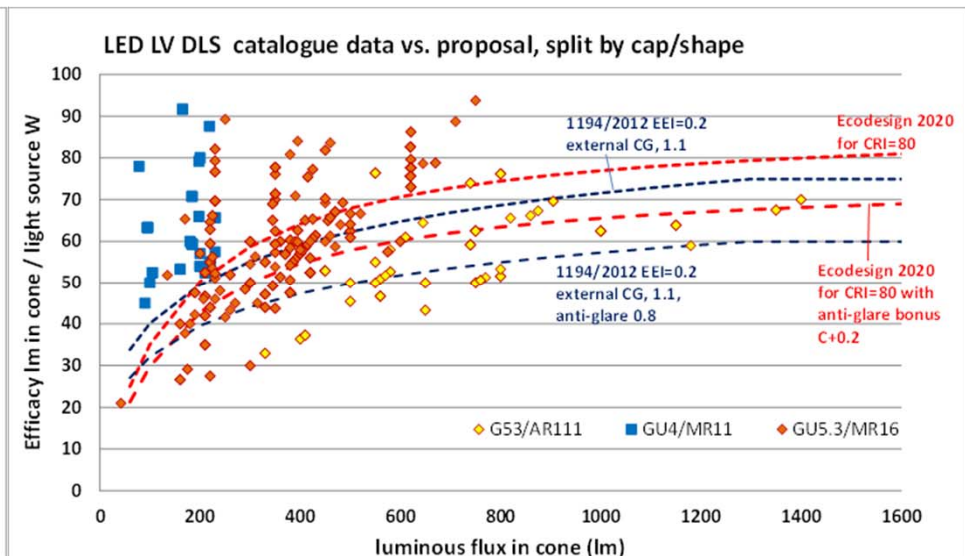
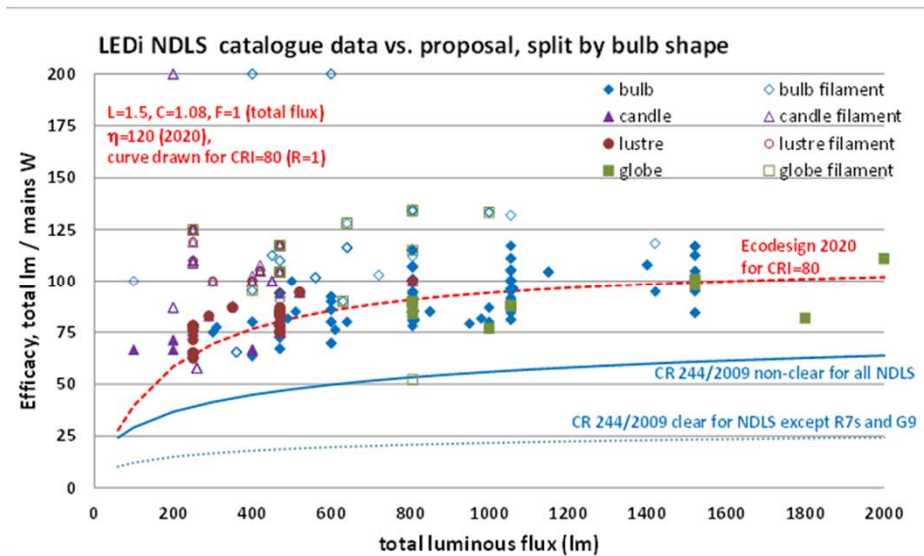


LFL T8, 2-,4-,5-feet
phased-out from 2020



Existing vs. new requirement [4]

- Examples LED:



LED light source type	Share of existing LED already meeting proposed 2020 efficiency requirements
MV NDLS, bulbs	70%
MV NDLS, linear R7s	61%
MV NDLS, capsules G9	79%
LV NDLS, capsules G4 / GY6.35	84% / 94%
MV DLS	70%
LV DLS	41% (not considering anti-glare bonus)
LED Tubes	67%

Scenario Analysis

(savings)

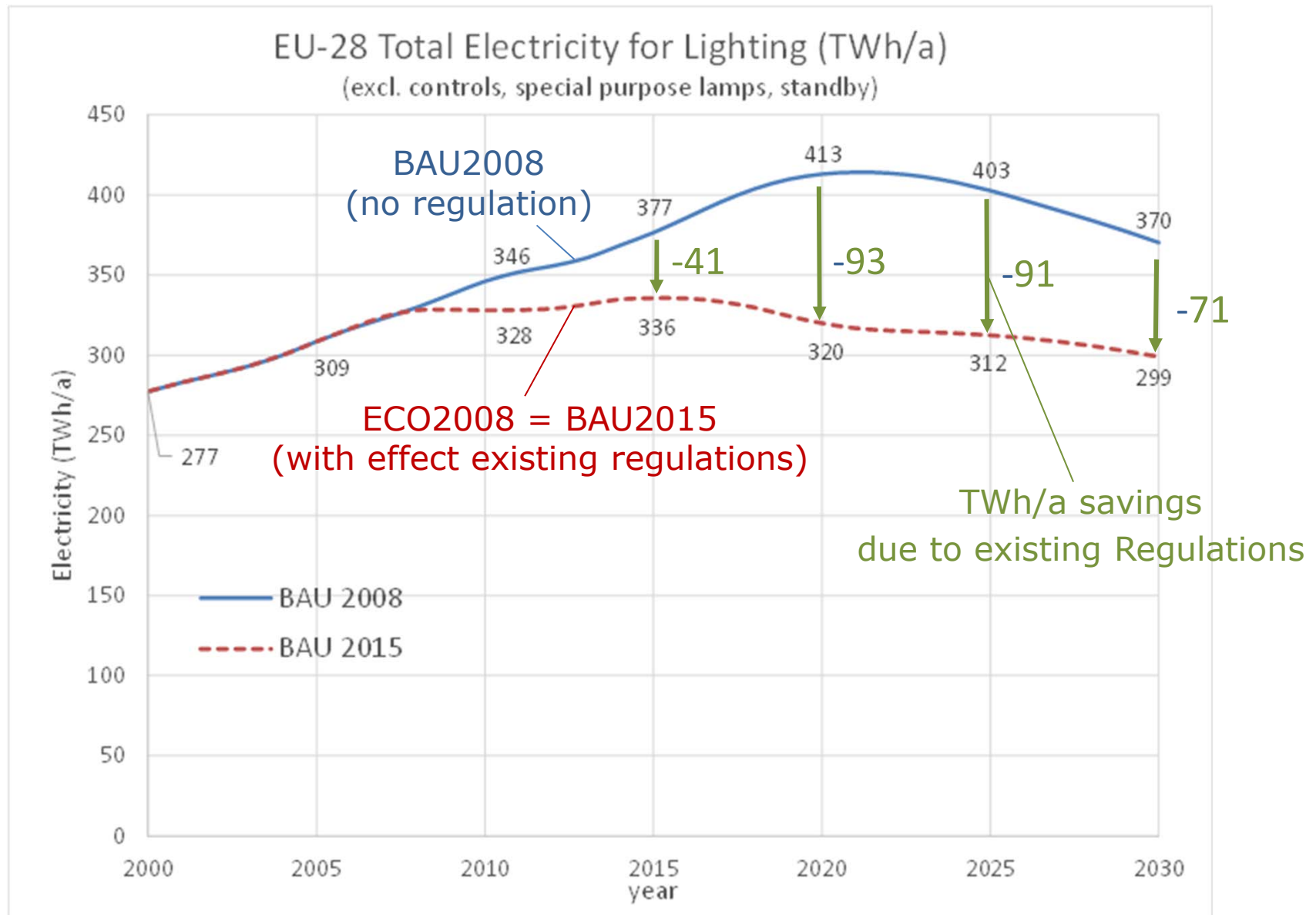
MELISA model for scenario analyses

- **M**odel for **E**uropean **L**ight **S**ources **A**alysis
- Updated since Lot 8/9/19 study
- Update in cooperation with LightingEurope (LFL, HID)
- Update for LED efficacy and price projections
- Update of scenarios for proposed Ecodesign measures
- Update for recent Eurostat electricity prices
- New BAU2008 scenario (without effects current regulations)
- Also used for Lot 37 Lighting Systems study

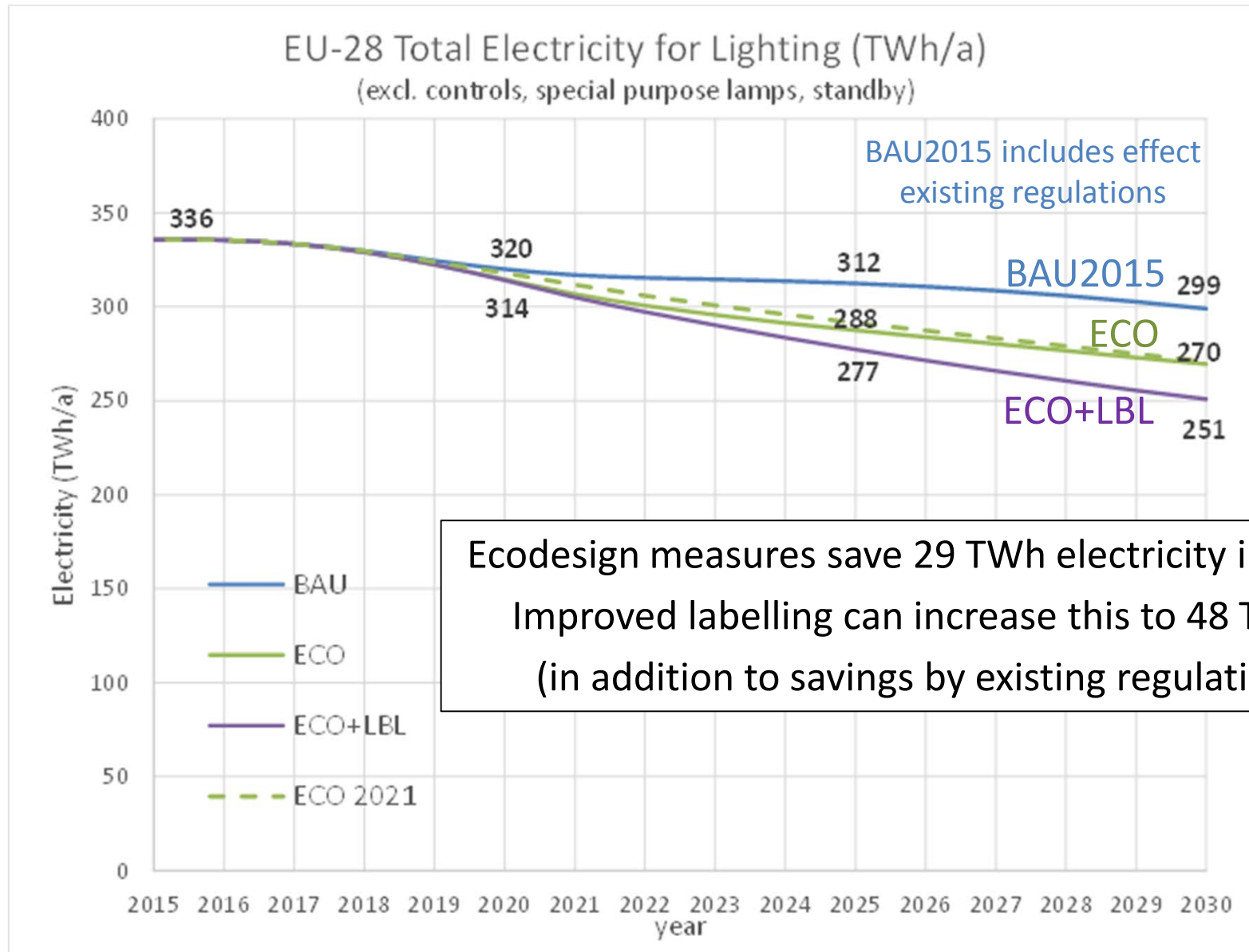
Analyzed scenarios

- **BAU2008:** without any regulation
- **BAU:** with effects of existing regulations, slow shift from conventional to LED, 'normal' LED projection curves (not a freeze scenario)
- **ECO:** as BAU but accelerated shift from conventional to LED due to Ecodesign measures (phase-out of LFL T8, CFLi, all Halogen except R7s < 2700 lm)
- **ECO+LBL:** as ECO but LED projection curves with label effect (higher average LED efficacy but also higher LED prices)

Electricity Savings without new Regulation



Additional Savings with new Regulation



Scenario Comparison

Electricity (TWh)		2015	2020	2025	2030	Cumul
BAU	Electricity	336	320	312	299	5079
ECO	saving		-5.3	-24.9	-29.5	-243
ECO+LBL	saving		-5.9	-35.2	-48.2	-303
Emission (MtCO ₂ eq)		2015	2020	2025	2030	Cumul
BAU	Emission	133	122	112	102	1878
ECO	saving		-2.0	-9.0	-10.0	-86
ECO+LBL	saving		-2.2	-12.7	-16.4	-125
Expense (bn euros)		2015	2020	2025	2030	Cumul
BAU	Expense	70	70	73	83	1171
ECO	saving		+2.3	-3.7	-6.9	-30
ECO+LBL	saving		+4.3	-2.8	-9.5	-24

Additional Acquisition Costs
(investment in LEDs)

Lower Energy Cost

Ecodesign measures save 29.5 TWh electricity, 10 MtCO₂eq. GHG-emissions and 6.9 bn euros in 2030.

Effective labelling can increase this to 48.2 TWh, 16 MtCO₂eq. and 9.5 bn euros.

Breakdown of ECO-savings

ECO-scenario electricity savings vs. BAU	2020	2025	2030	cumulative 2015-2030
Total EU-28, all sectors	5.3	24.9	29.5	243
LFL-applications	3.2	19.3	27.1	195
HID-applications	0	0	0	0
CFLni-applications	0	0	0	0
DLS-applications	1.1	3.8	1.3	29
NDLS-applications	1.0	1.8	1.1	18

92% of savings in 2030 derives from phase-out of LFL T8.

Phase-out of CFLi and Halogens has a peak of savings around
2025: $3.8 + 1.8 = 5.6$ TWh.

Energy Labelling

(sales distribution over classes)

Energy Labelling

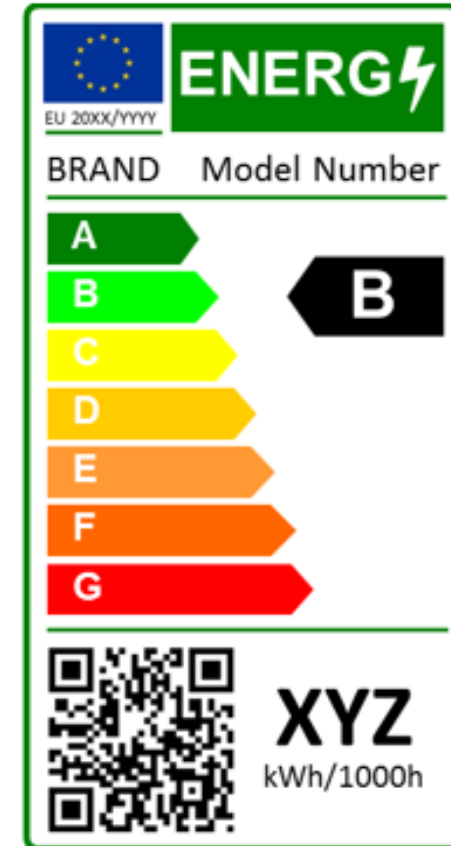
New Framework Regulation:

- Use A-G scale (instead of A⁺⁺-E)
- Class A empty at moment of introduction (or A and B if rapid development)
- Time within which majority of models falls into class A at least 10 years later

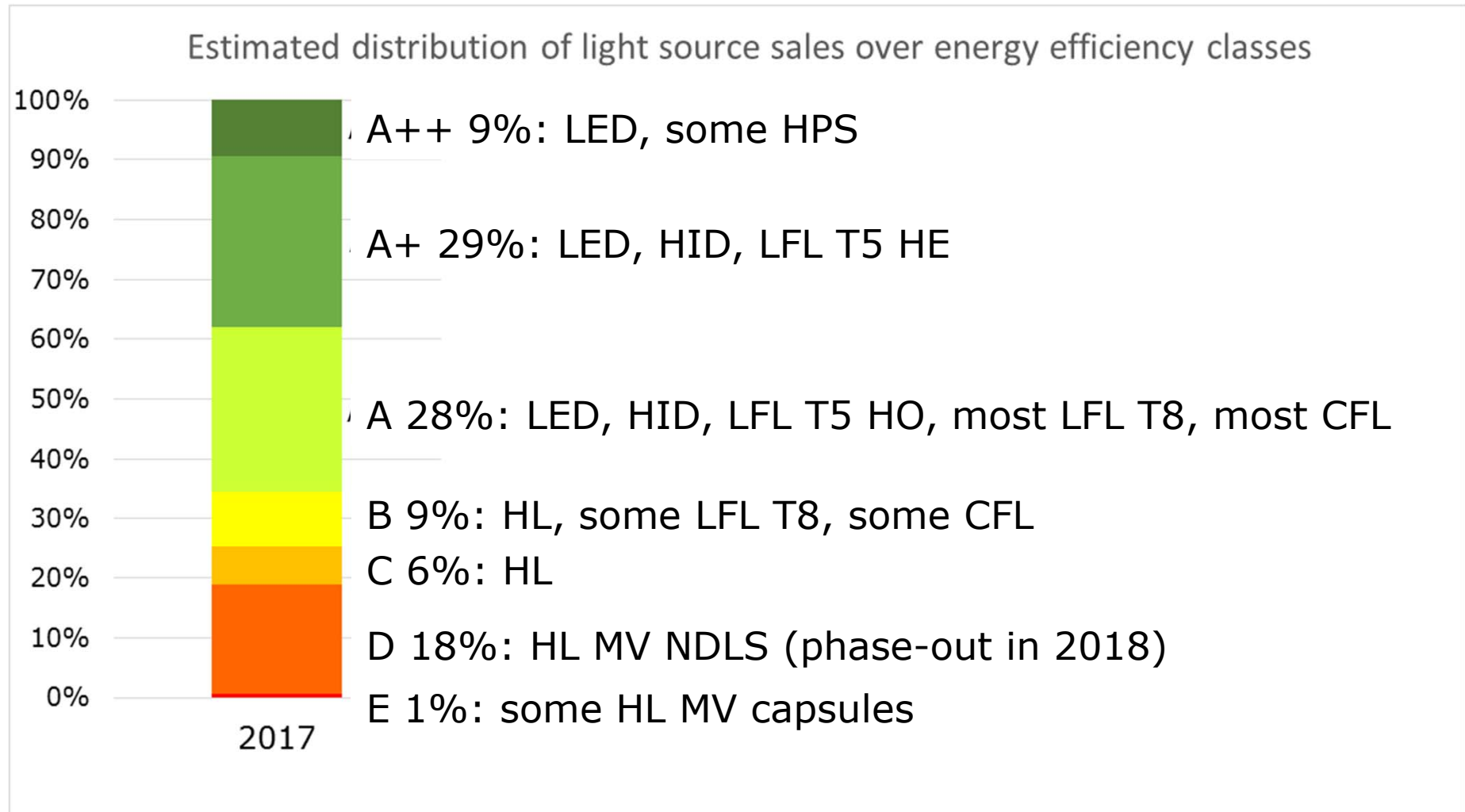
In addition:

- New scale to distinguish between future LEDs (rather than between LED and conventional)

→ scale 85 - 210 lm/W, equal steps of 25 lm/W

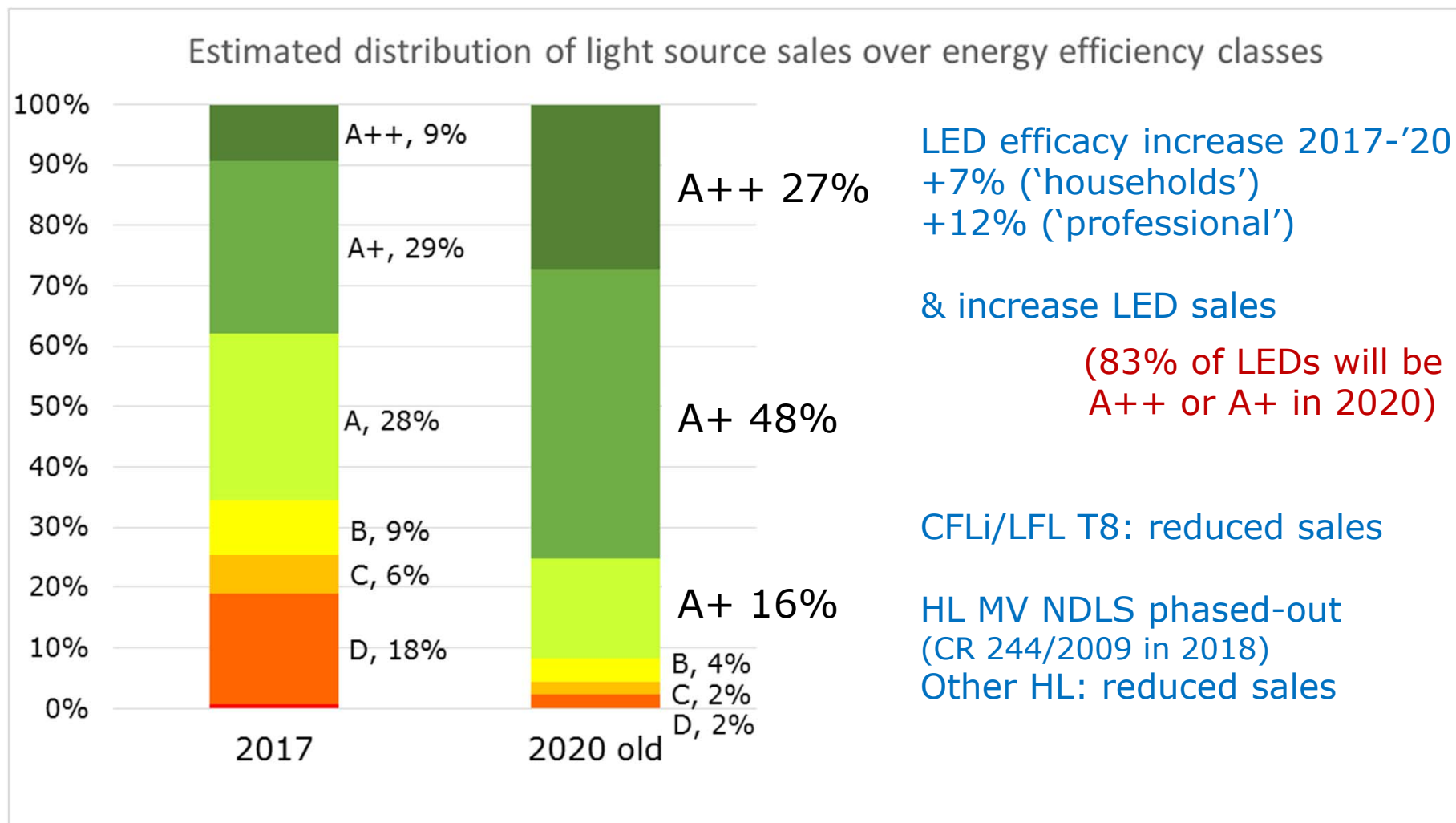


Energy Label Class Distribution [2017]



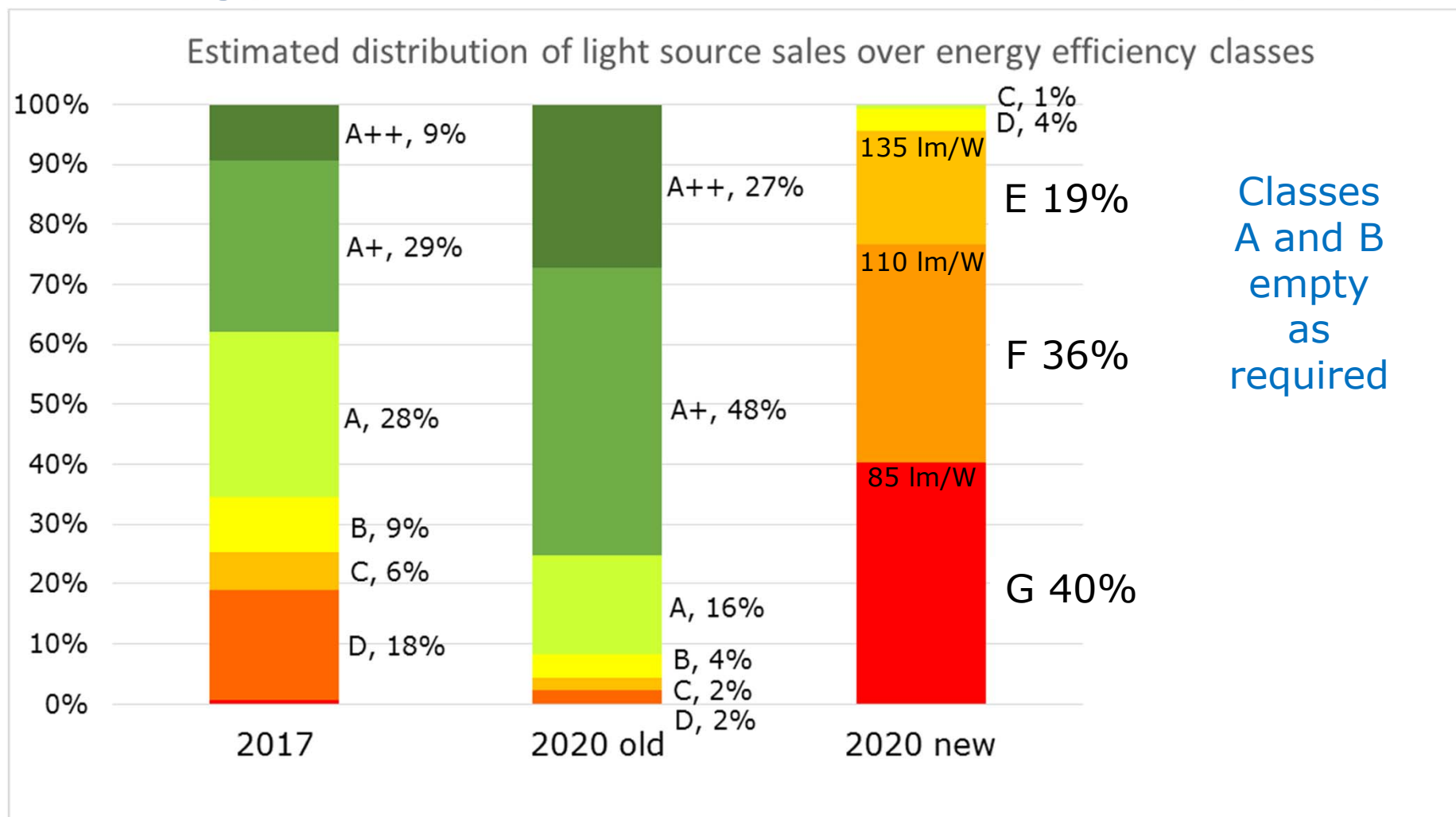
Based on VHK light source database 2015-2017 (4000 models)
Sales-weighted (from MELISA model for 2017)

Energy Label Class Distribution [2020 (old)]



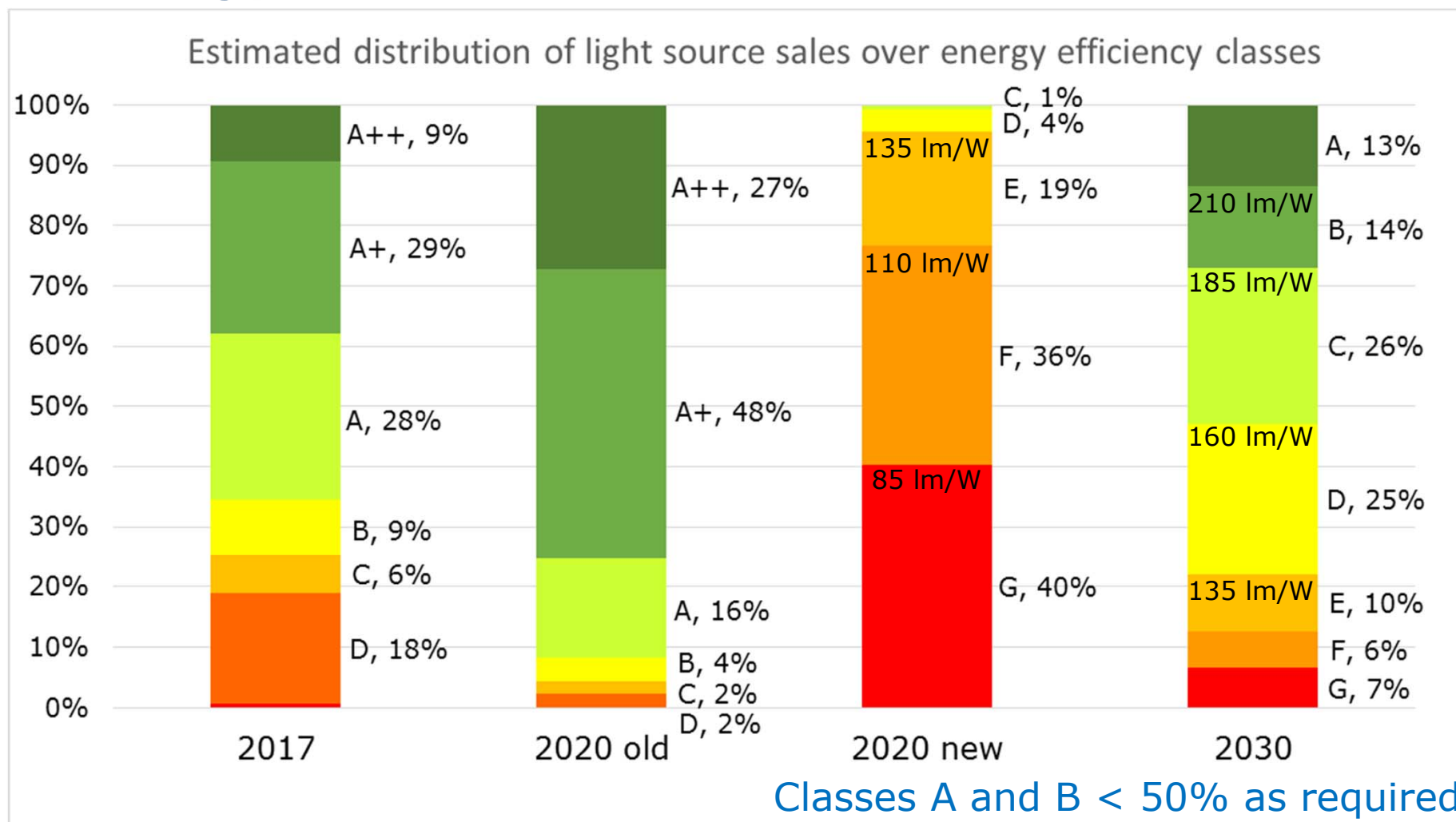
Based on VHK light source database 2015-2017 (4000 models)
Sales-weighted (from MELISA model for 2017 and 2020, ECO scenario)

Energy Label Class Distribution [2020 (new)]



Based on VHK light source database 2015-2017 (4000 models)
Sales-weighted (from MELISA model for 2017 and 2020, ECO scenario)

Energy Label Class Distribution [2030]



Assumed average LED efficacy increase 2017-2030: 67-74% (also due to label)

Thanks for your attention !