

# Lamp Efficacy: a Performance Requirement

FORTALECIMIENTO DE ESTÁNDARES DE EFICIENCIA ENERGÉTICA EN ILUMINACIÓN  
Primera Reunión y Taller Presencial del Grupo Técnico de Eficiencia Energética (GTEE)

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6 November 2019



**1**

**General Trends in the Market**

**2**

**MEPS Levels in EU, China, RSA**

**3**

**Discussion**

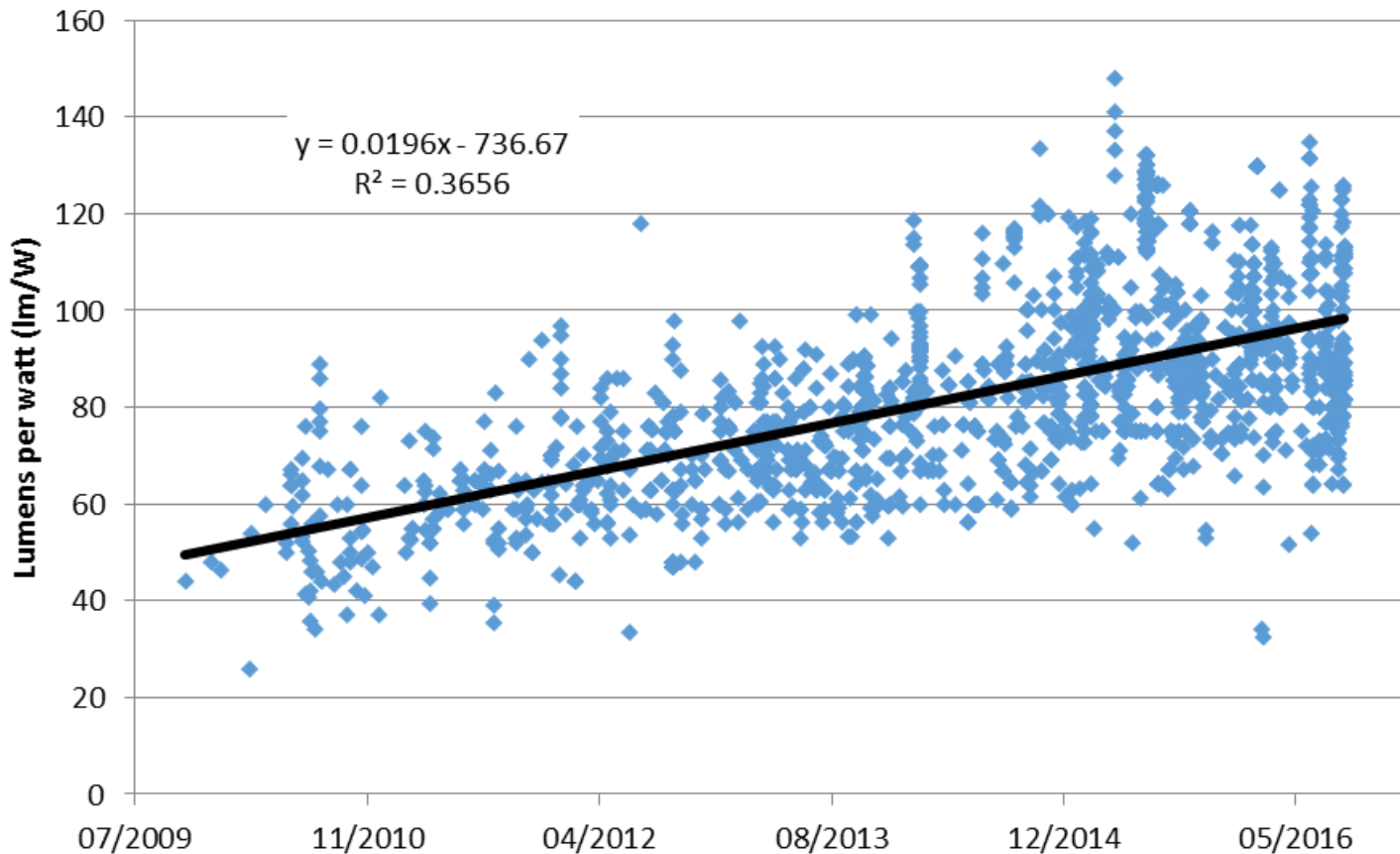
# Accelerating the market shift to LED

- LED lighting is the majority of new installations around the world
- Offers energy savings, easier to control (dim), long-life, low maintenance, durability, optical control, mercury-free, etc.
- Markets will gradually shift on their own to LED, but the business as usual case is slow
- Adopting cost-effective policy measures can manage and accelerate the transition to LED lighting
- Economic and environmental benefits will be enhanced



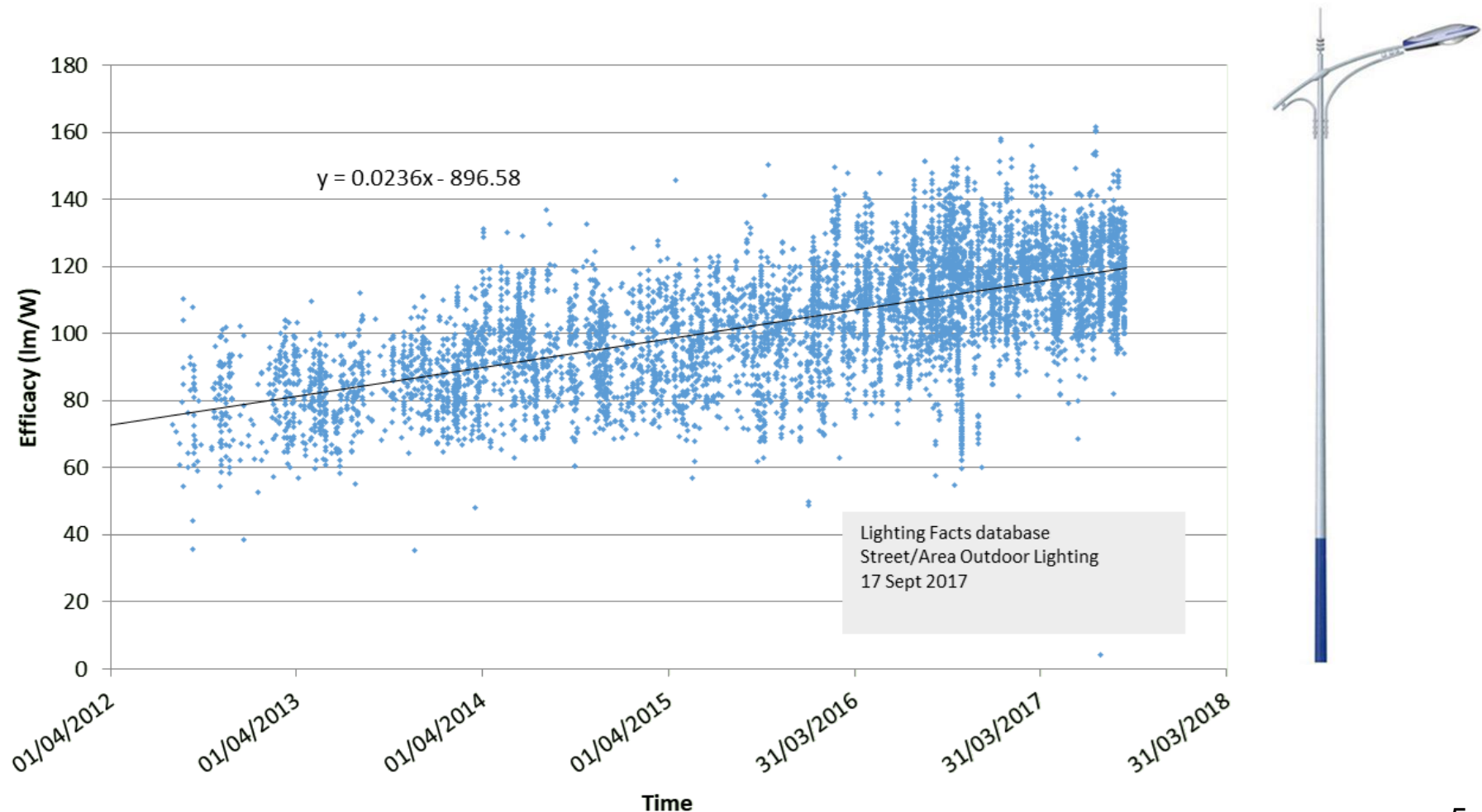
# A-type Lamp Performance 2010 - 2016

- LED performance improvement over time.....non-directional LED lamps (n=1551 models); efficacy gain: **7.2 lm/W per year**



# LED Street Lights Performance 2012 - 2018

- LED performance improvement over time.....street lighting database (n=7728 models); efficacy gain: **8.6 lm/W per year**



# Prices are decreasing, shipments are growing

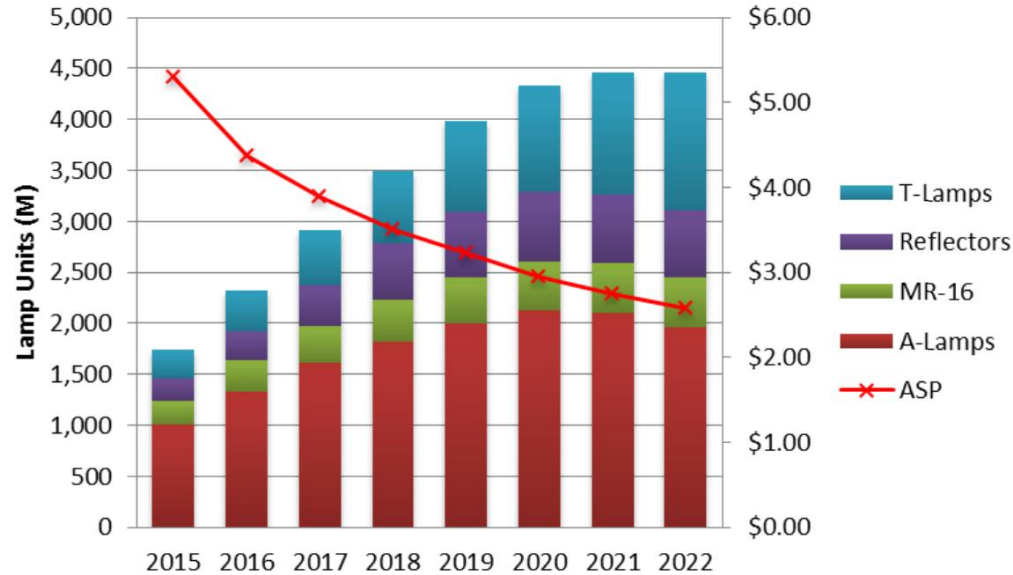
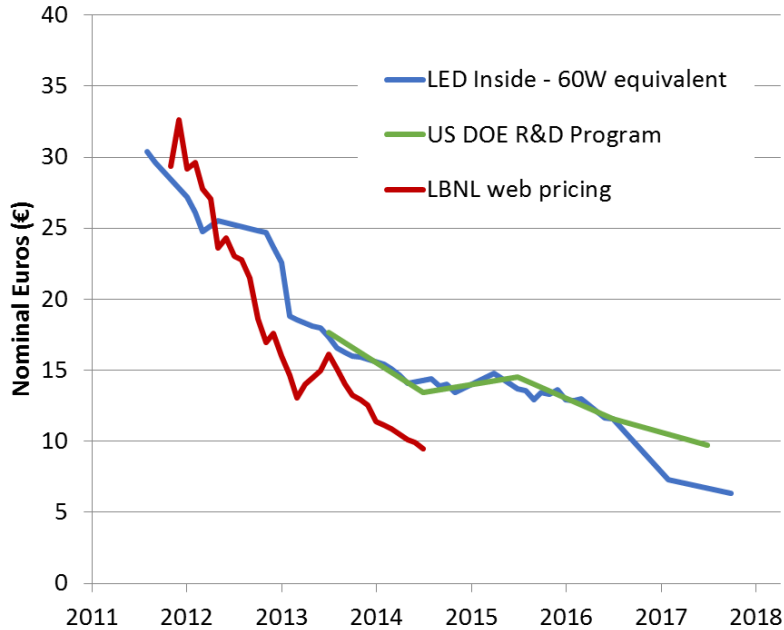


Figure 2.3 Global LED Lamp Shipments by Lamp Type

## Historic...

LED Inside average selling price (ASP) of 60W-eq. LED lamp

## Forecast...

Philip Smallwood,  
Strategies Unlimited,  
March 2017

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General Trends in the Market

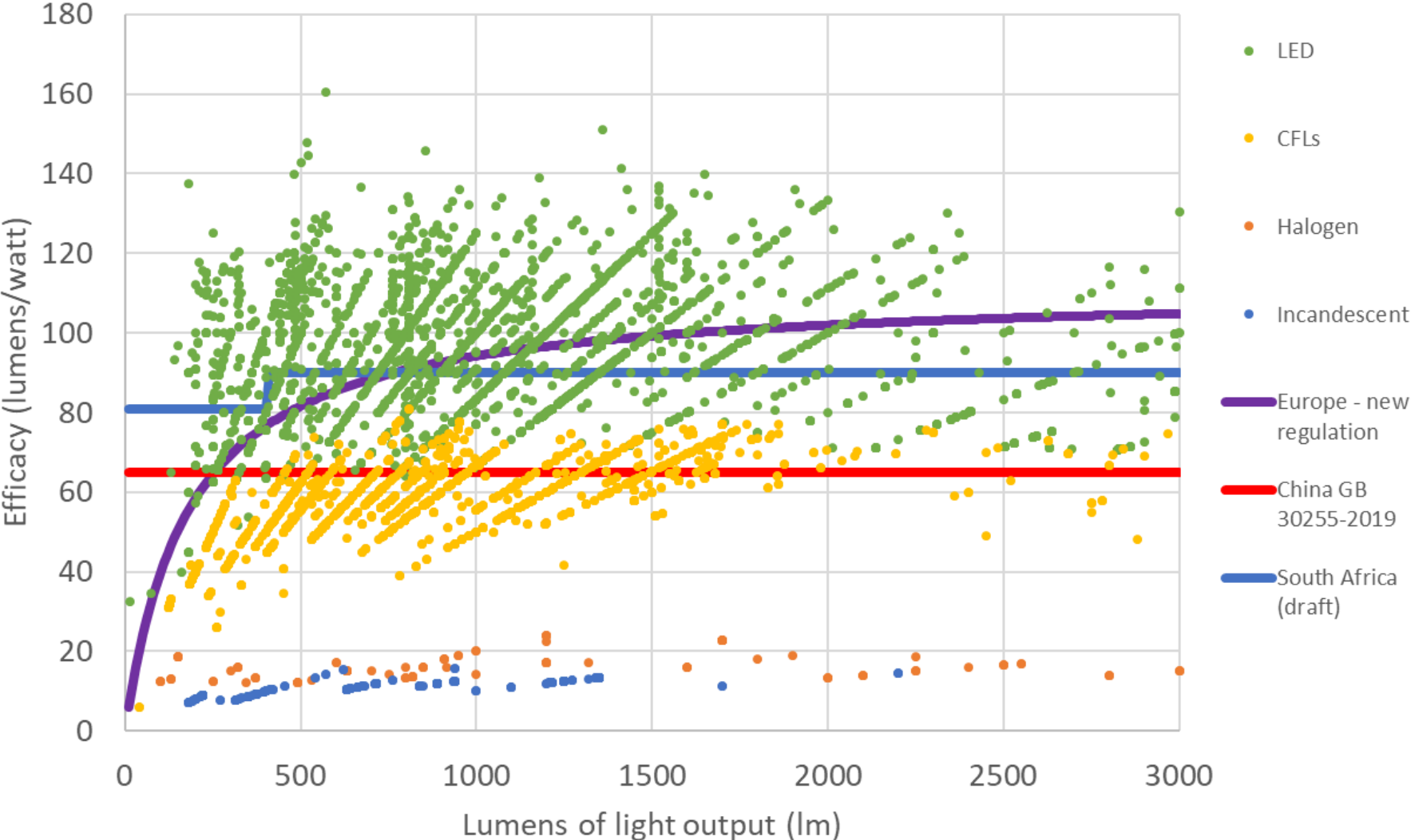
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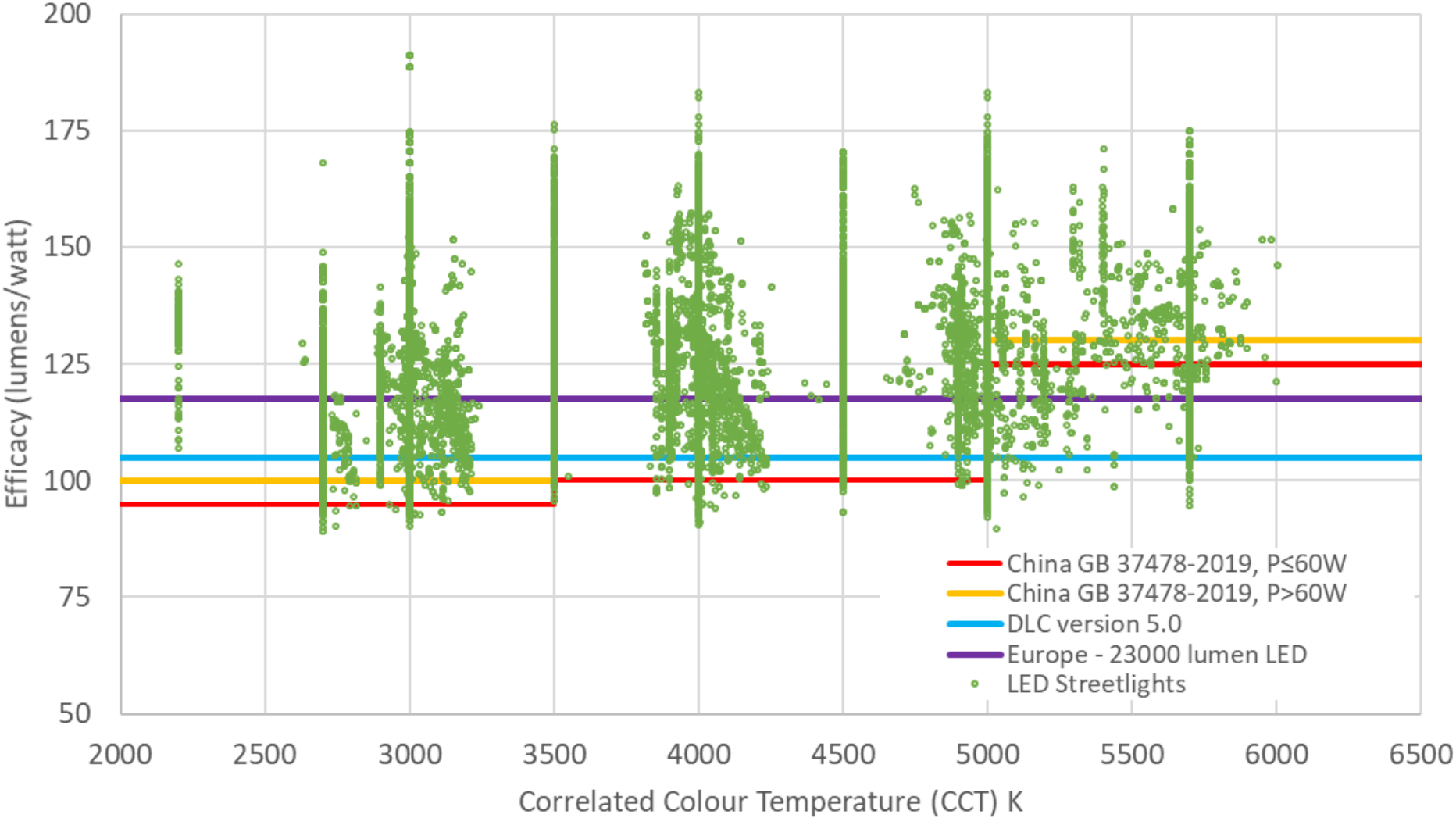
Discussion

# Scatter Plot of GLS Lamps and Policies





# Scatter Plot of LED Street Lights and Policies



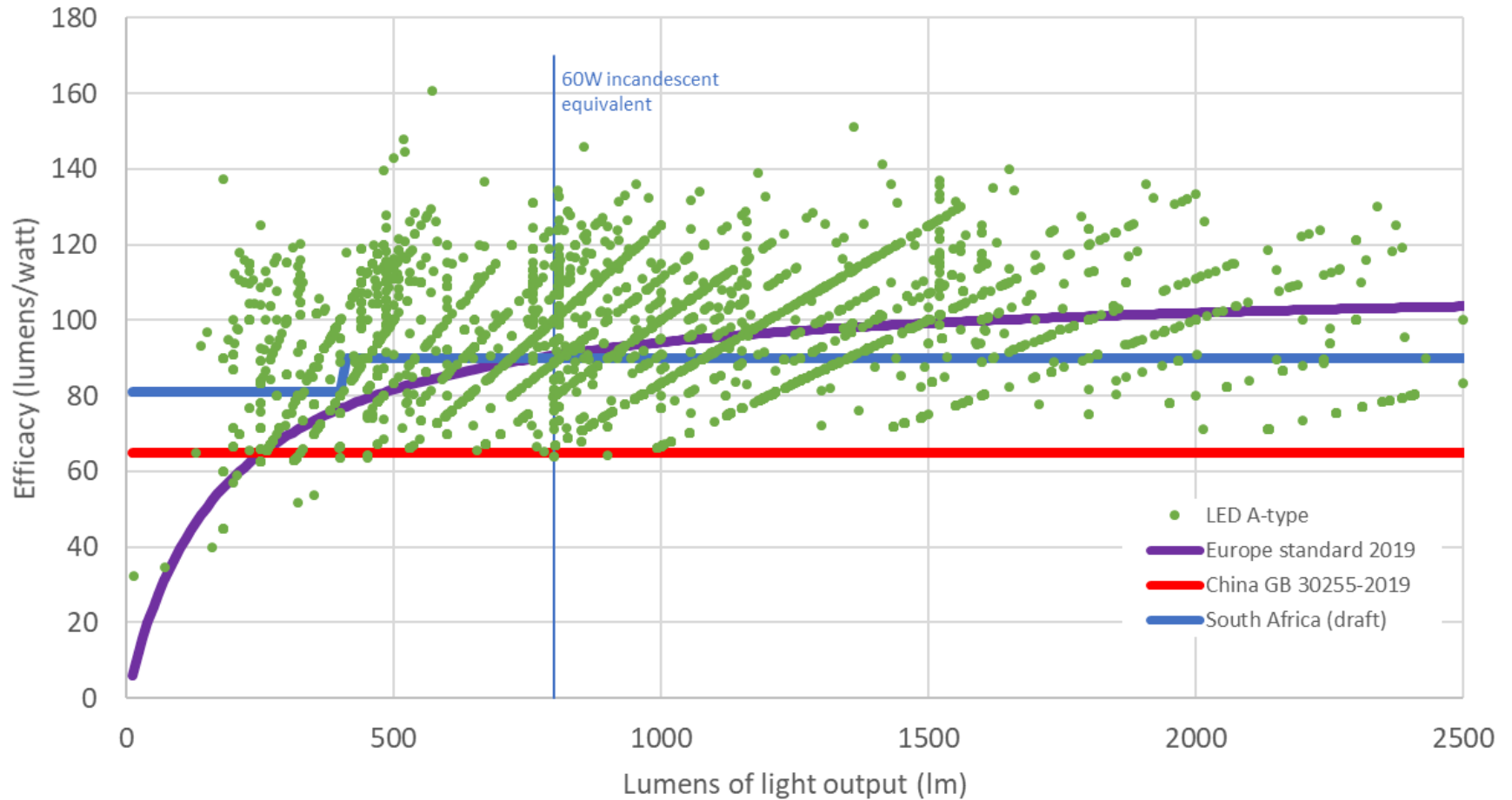
# Setting Efficacy Requirements – A Moving Target

- Efficacy levels have to be set in advance
  - Consider two MEPS levels, to enable the policy measure to last longer
- Efficacy of LED lamps is rapidly improving
  - On-going research and development
  - Competition in the market
- Key question: What is the best level to set for the future?
  - Consider projecting efficacy improvement





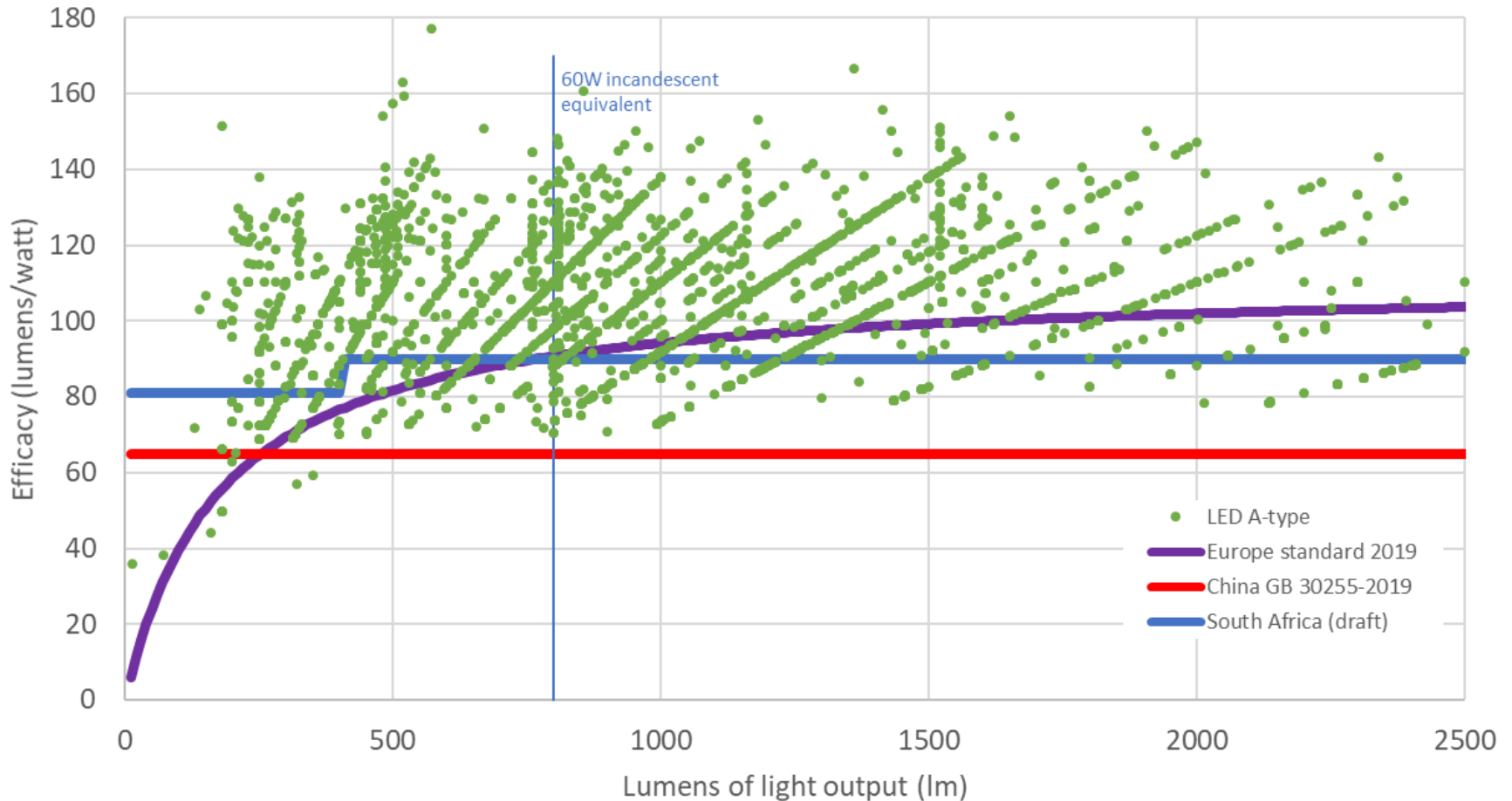
# LED GLS Lamps in 2019...



A-type LED lamp data from 2017-2019 GLS lamps; n=4748 models



# LED GLS Lamps in 2021...efficacy is higher



Projected **2019-2021** GLS lamps  
Forecasted at 5%/year

If MEPS set at 90 lm/W....  
Pass in 2019: 60% of models  
Pass in 2021: 80% of models

# MEPS Levels in South Africa (Draft Policy)

## 3.2.1 Luminous Efficacy Requirement

GSLs shall comply with the luminous efficacy requirements in Table 1 or Table 2, as relevant:

**Table 1: minimum luminous efficacy, Phase 1 (1 January 2021)**

<b>Product Type</b>	<b>Phase 1 Minimum luminous efficacy (lm/W)</b>
Non-directional lamp	90

**Table 2: minimum luminous efficacy, Phase 2 (1 January 2023)**

<b>Product Type</b>	<b>Phase 2 Minimum luminous efficacy (lm/W)</b>
Non-directional lamp	105

# Power Allowances in South Africa (Draft Policy)

Depending on the lamp characteristics, the minimum luminous efficacy values may be decreased by the following correction factors (C):

**Table 3: correction factors**

Lamp Characteristics	C
Directional lamps	-15%
Colour-tuneable lamps (CTL)	-10%
Connected LED Lamps – rated luminous flux $\Phi$ (lm):	
$60 \text{ lm} \leq \Phi \leq 300 \text{ lm}$	-15%
$300 \text{ lm} < \Phi \leq 650 \text{ lm}$	-10%
$650 \text{ lm} < \Phi \leq 1200 \text{ lm}$	-7.5%
$1200 \text{ lm} < \Phi \leq 2000 \text{ lm}$	-5.0%
$2000 \text{ lm} < \Phi \leq 3300 \text{ lm}$	-2.5%

With respect the correction factors in Table 3, the following should be noted:

- Where applicable, the correction factors are additive.
- For colour-tuneable lamps (defined in Section 2) that are also connected lamps, the correction factors are additive.
- Lamps that allow the end-user to adapt the spectrum and/or the beam angle of the emitted light, thus changing the values for useful luminous flux, CRI-Ra and/or colour temperature ( $T_c$ ), and/or changing their directional lamp or non-directional lamp status, shall be evaluated using the reference control settings.

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# Efficacy level in draft MEPS Document

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- How should the TC determine the appropriate minimum efficacy requirement?
- What rate of improvement is appropriate for future MEPS levels?
- Which correction factors should be taken into consideration?
  - Directional lamps
  - Color tuneable lamps
  - Smart (connected) lamps
  - Other?



# Thank you, any questions?

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