

# ***Task 3 update: Life Cycle Assessment of Linear LED Retrofit Lamps***



Mohamed Ridha KOUKI (LAPLACE)  
Georges ZISSIS (LAPLACE)

	T5 Comparison	T8 Comparison*
Fluorescent Baseline Lamp	Philips TL5 HE 35W 840 (MASTER), 145cm - Cool White	Sylvania T8 Luxline Plus F18W 840, 60cm - Cool White
LED Option #1	Philips LEDtube T5 HF HE 20W 840 150cm (MASTER), Cool White	Philips LEDtube HF HO 8W 840 60cm (MASTER), Cool White
LED Option #2	Osram SubstiTUBE T5 HE AC 18W 840 145cm, Cool White	Philips LEDtube EM HO 8W 840 60cm (MASTER), Cool White - incl. LED Starter

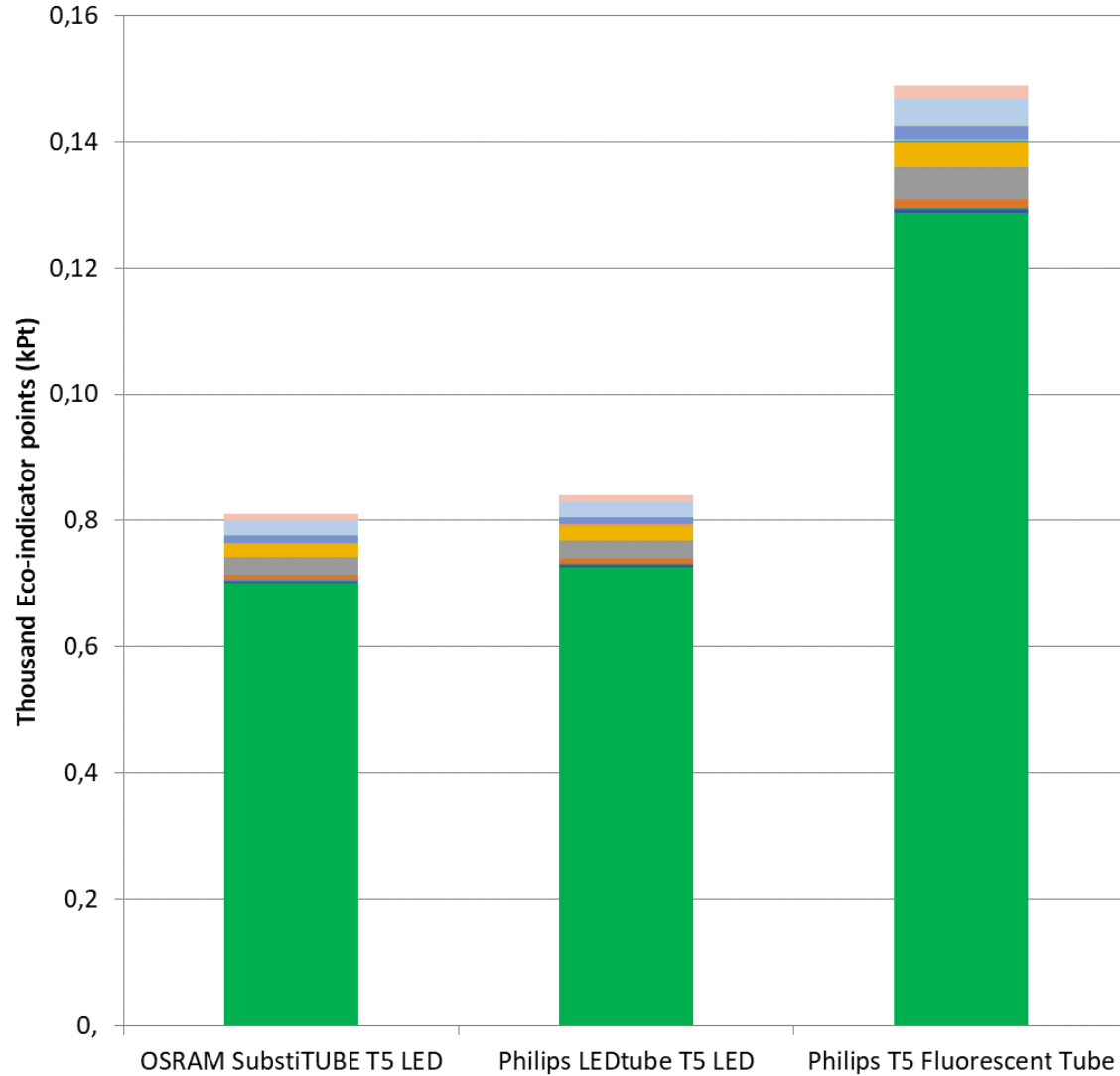
\*Note: the T8 comparison includes one LED alternative for HF and one for EM fluorescent ballasts.

	<b>Fluorescent Philips TL5 HE 35W 840</b>	<b>LED1: Philips LEDtube T5 HF HE 20W 840</b>	<b>LED 2: Osram SubstiTUBE T5 HE AC 18W 840</b>
<b>Power (W)</b>	<b>35</b>	20	18
<b>Lumen output (lm)</b>	<b>3315</b>	3000	2800
<b>Luminous efficacy (lm/W)</b>	<b>95</b>	150	156
<b>Lifetime (h)</b>	<b>24 000</b>	60 000	50 000
<b>LOR (%)</b>	<b>85</b>	95	95
<b>Total life consumption (kWh)</b>	<b>840</b>	1200	900
<b>Light Quantity (Megalumen-hour)</b>	<b>68</b>	180	133
<b>Number of Lamps for Equivalent Light Output</b>	<b>2,53</b>	1,00	1,29



# Comparison of T5 Linear Lamps

(Preliminary findings, not reviewed)



- Water consumption, Human health
- Fossil resource scarcity
- Mineral resource scarcity
- Land use
- Human non-carcinogenic toxicity
- Human carcinogenic toxicity
- Marine ecotoxicity
- Freshwater ecotoxicity
- Terrestrial ecotoxicity
- Marine eutrophication
- Freshwater eutrophication
- Terrestrial acidification
- Ozone formation, Terrestrial ecosystems
- Fine particulate matter formation
- Ozone formation, Human health
- Ionizing radiation
- Stratospheric ozone depletion
- Global warming (combined)



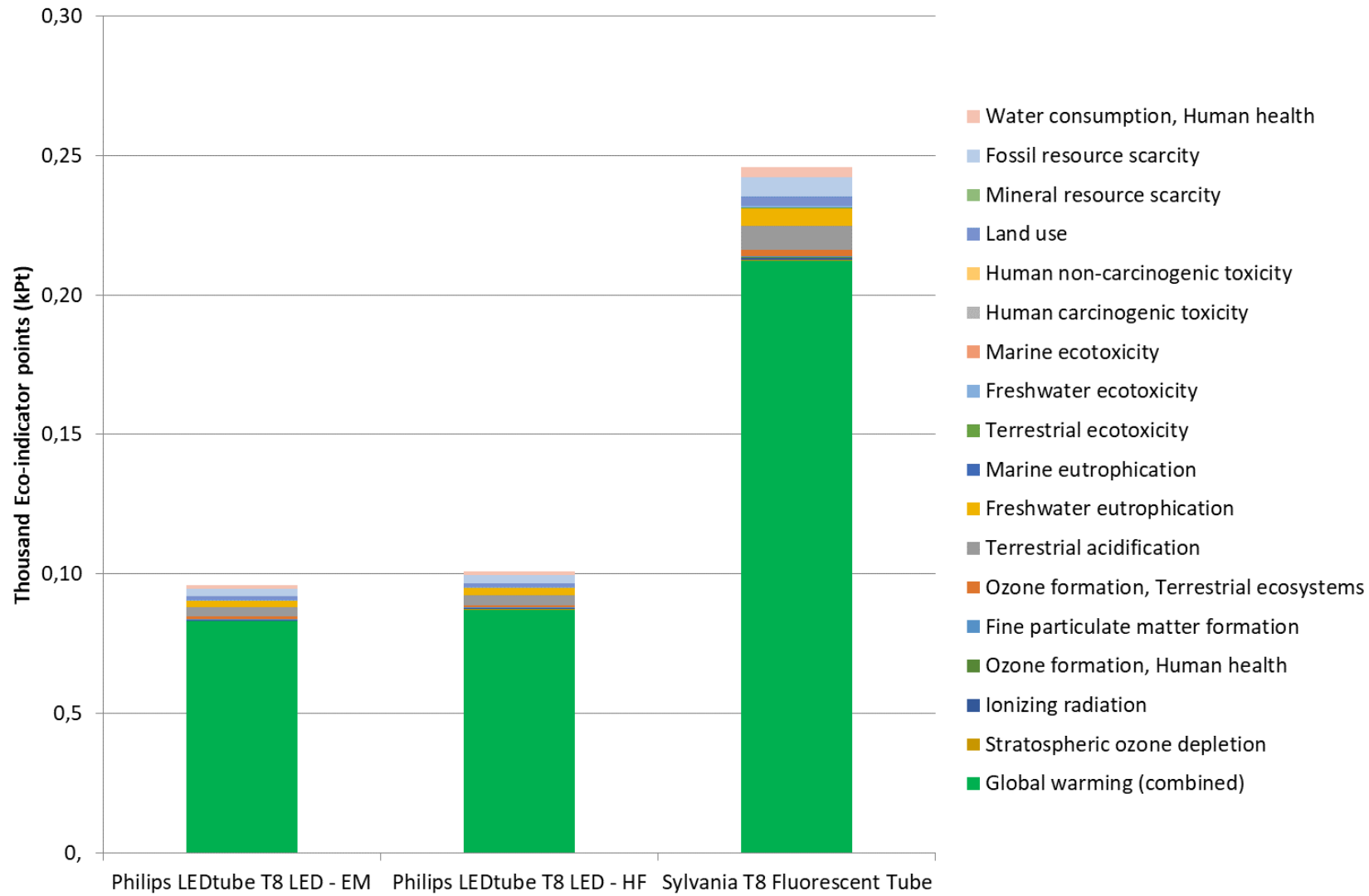


	<b>Fluorescent: Sylvania T8 Luxline Plus F18W 840</b>	<b>LED 1: Philips LEDtube HF HO 8W 840 60cm</b>	<b>LED 2: Philips LEDtube EM HO 8W 840 60cm</b>
<b>Power (W)</b>	<b>18</b>	8	8
<b>Lumen output (lm)</b>	<b>1350</b>	1000	1050
<b>Luminous efficacy (lm/W)</b>	<b>75</b>	125	131
<b>Lifetime (h)</b>	<b>20 000</b>	60 000	60 000
<b>LOR (%)</b>	<b>65</b>	95	95
<b>Total life consumption (kWh)</b>	<b>360</b>	480	480
<b>Light Quantity (Megalumen-hour)</b>	<b>18</b>	57	60
<b>Number of Lamps for Equivalent Light Output</b>	<b>9,74</b>	3,00	2,86



# Comparison of T8 Linear Lamps

(Preliminary findings, not reviewed)



- ✓ Fluorescent lamps have a greater environmental impact than retrofit LED tubes, primarily due to the energy in use (note: using average EU electricity mix)
- ✓ The substitute LED lamps (#1 and #2) in each comparison have about the same impact
- ✓ Compared to fluorescent T5, the LED lamps have approximately 44% less impact
- ✓ Compared to fluorescent T8, the LED lamps have approximately 61% less impact
- ✓ Additional work to be done in the coming months

