Stakeholder comments form

DG ENER Lot 8: Ecodesign Preparatory Study on Light Sources

Organization:	Name:	Date:
IALD	**Nicolas Fuentes Colomer**	**14 July 2015**

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
4	Exec Sum mary	1 2	Table 1	We consider that the approach taken here is too one-dimensional. Variation in efficiency must be compared to colour appearance, quality of light, projected life and price to be a more reliable point of comparison	Add detail on colour appearance quality and life to tables	
		1 3	Figure 1	Projected efficiency improvements are more based on speculation than research. CLASP /VHK projection would seem more reasonable	Reconsider this graph or delete as considered not entirely reliable.	
		1 3	Figure 2	Projected cost decreases may reflect technology change bur=t not market change. Ex works China price for LED filament lamps in 6W is currently $3 to $4 on 1000 off quantity. Lamps costs are now more to do with the cost of bringing to market and retail mark ups.	Reconsider this graph	
		1 2 - 1 4	General	The argument here reflects only the replacement lamp market. In the tertiary sector, and increasingly in new and refurbished residential,	Add considerable further information pertaining to LED integrated fittings.	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
				dedicated LED fittings are used. The efficiency and price trajectory on these are totally different as they go through different routes to market, predominantly non retail. Also new direct sales channels are impacting on mark up and profitability for traditional wholesale routes.		
		14	OLED	No mention here of OLED effective life or light quality. OLEDS are generally poorer quality and show shorter lives than inorganic LED	Add: *Current OLED technology does not match inorganic LED projected life or meet the light qualities necessary for adoption as a general light source at present.*	
		16	LFL	LED retrofit: It is not clear from the text that high efficiency options such as the 148 lm/W example do not provide the same light output as the fluorescent lamps they replace. With regard to the claim for a 200 lm/w product, as has been experience with the stage 6 halogen issue, basing any considerations of a product not fully realised in the market may entail some risks.	Delete: *"(slightly above the LFLs they aim to replace), but models with (tested) efficacies up to 148 lm/W are already on the market, while models with 200 lm/W have been realized on laboratory scale and should enter the market soon."* Replace with *:"(slightly above some LFLs they aim to replace but below others) Higher efficiencies are on the market but these do not necessarily meet the same total light output of the lamps they are intended to replace.*	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
		1 6	LFL	"However, the directionality of the LED tubes potentially has advantages, i.e. less lumen could be installed to have the same light level in the task area. In existing luminaires it might be an option to remove the optics, avoiding their losses." The IALD is not in line with this statement.	The directionality of LED tubes will generally degrade lighting based on the photometric performance of the fitting. While increasing light level on the horizontal below the lamp, loss of uniformity and lighting of the vertical and ceiling surfaces potentially compromises compliance with the requirements of EN12464/1 2011, Lighting of interior workplaces	
		1 8	HID	Street lighting tends to have a very long in service life 30 to 40 years is typical. Replacement cycles are based on this and the economic argument to replace a recent MH or HPS installation has to be very strong.	Add: *The long service life of street lighting (typically 30 to 40 years) requires a very strong case for the replacement of recently installed equipment (<10 years). HID replacement lamps will be required for another 20 to 30 years to service these installations where they may be unsuitable for LED or other lamp replacements.*	
	1.3	2 3	Remarks about Technical product descriptions	There is no mention of luminaire retrofit kits. These tend to include a baseplate with LEDs and gear designed to replace, typically, a CFL, reflector and gear. These are widely offered for the tertiary sector.	Add: *Retrofit kits with specific LED and gear mounted on plates to replace typical CFLni lamp, reflector and gear in existing fittings are extensively available and used in the tertiary sector These may or may not, depending on the case, provide adequate solutions.*	
	2.5.6	4 4	Figure 11	The DoE data has been significantly overoptimistic, (please see Overlay of 2010 prediction and 2014 prediction normalised below). Laying down regulations based on data	It would be good to subject to revision data that is based on overoptimistic predictions.	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
				that may be overoptimistic entails some risks. If the market cannot achieve the predictions stated in regulation, this would need to be revised putting the achievement of the efficiency targets at risk. Based on general trends in the industry, it seems that manufacturing has been and continues to focus on reducing costs of LED devices rather than increasing efficiency. Solid-state lighting (LED) and other new technologies offer the promise of improved efficiency and in some instances additional advantages. Maintenance on solid-state lighting devices can be difficult, and initial expense is often greater than legacy technologies. Therefore, the IALD recommends the consideration of significant warranty protection for such devices, in order to provide owners and operators assurance that their investment is somewhat protected.		

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
		4 4	Remarks	On the basis of comments above reconsider remarks. Price reductions will not be linear neither will efficiencies increase on the proposed S curve development is beyond the shoulder of the curve and improvements will be slow	• By 2020 prices of LED packages are expected to be below 3€ / kLm with efficiencies around 160Lm/W	
				Package efficiencies are more relevant for this case than replacement lamps. As the move to LED increases, replacement lamps are expected to become decreasingly important as fittings with fully integrated LEDs take over the domestic market in the same way as has happened in the tertiary market	• The data regard package efficiencies. Efficiencies for LED replacement lamp are significantly lower, see par 2.10.2. The transfer between replacement lamps and dedicated LED luminaires will be beneficial and should be encouraged	
	2.6	4 5	White LED Package configurations	Notwithstanding IEC 62504, LED packages that are suitable for direct connection to mains voltage are available in the market i.e. Seol Semiconductor Acriche range. These offer significantly better efficiency, as they do not require gear. The reduced complexity also offers economies in the manufacture of light fittings specifically for the domestic market where there is very significant price pressure on purchase decisions	Note and include mains voltage LED packages	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
		4 6	CSP	CSP are also a component in high quality remote phosphor LED packages	Add: *CSP are also used as a blue pumping device in some high quality remote phosphor LED packages.*	
		4 7	Constant Voltage Drivers	LED control gears are DC while a very significant number of LVTH gears are AC. Comparing these two systems does not offer a reliable point of reference.	Delete: *These LED control gears are similar or identical to the low voltage power supplies of halogen lights.*	
	2.7.3	5 0	Switch mode power supplies	These are not flicker free. Typically the flicker frequency is increased well above the 100Hz from the simpler examples however the flicker depth is greater potentially increasing apparent strobing and flicker rather than reducing it. As we have stated before in our submissions, flicker is an important issue that requires consideration in regulations	Delete: *They offer flicker free operation, power factor correction and high efficiency* Replace with: *High quality, well designed switch mode LED gear can offer reduced flicker, higher power factor, and relatively high efficiency.*	
		5 1	LED control gear and dimming	Include combined PWM and CCR systems as per IALD comments on Task 3		
	2.7.4	5 2	LED control gear and dimming	This only deals with domestic triac or MOSFET 2 wire dimming. Other digital and analogue systems will dim suitable products using dedicated control gear. Too much emphasis on domestic market not enough		

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
				consideration of the tertiary market		
	2.9			MOSFET does not overcome flicker issues and has similar problems with inconsistent behaviour with different manufacturers' lamp products.		
	2.10.1	61	Table 11	DoE efficacy projections have tended to be significantly overoptimistic as demonstrated by the attached graphs. As we are at appoint in LED development where we are close to the highest possible theoretical efficacies for the materials and technology efficiency gains can only be significant if wholesale new technologies are introduced. Downward pressure on prices limits the capital available for research and development thereby slowing efficacy developments compared to reduction in production costs	We would suggest here to apply a 20% cumulative reduction to DoE efficacy projections year on year based on failure margin on previous projections.	
	.10.3	62	Table 12	The linear projection of price beyond 2020 is unsafe. It does not take account of the proportion of price that is transport, marketing, retailer cost and mark up. This will not fall linearly with the materials	Based on current retail of circa €15 for an 8w filament LED versus circa € 2.75 Ex Works in China a reduction to €1.5 Ex Works is likely to translate into Circa € 11 retail in the EU. Suggest re calculating curve proportionate to expected change in Ex Works costs,	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
				price of the LED. Die cost will be a reducing proportion of the lamp price. The BoM of LED lamps is far greater than that of CFLi which have bottomed out at between €1.6 and €3.2 depending on the retail channel not significantly on the cost of the products (the same product can be purchased at the two different prices depending on retailer's margins, i.e. LIDL and Tesco)	bearing in mind higher mark-ups required to compensate for lower sales volume over time due to expected long product life	
	2,10. 4	6 3	Proposed timeline for LED lamp efficacy	For reasons stated above the preferred projection figures in figure 20 appear unsafe.	We propose using the CLASP / VHK predictions as these seem potentially more realistic	
		6 4	Proposed timeline for LED lamp price	For reasons stated above the projection in figure 21 appears unsafe. Given the range of price in the market is unlikely to change and given the required mark-ups between factory and consumer the projection should be amended to account for these based on current evidence		
		6 5	comment	We consider that we are either at or very close to the point of no substantial improvement on efficacy or price. At 2018 the removal of the MVTH lamps from the domestic market are expected to take away a low price comparison product		

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
				therefore the likelihood is that all other lamp prices will generally rise at least in line with inflation or remain at the existing price points. Major companies withdrawing from the domestic lamp business indicate that current price points are below economic in the short to medium term therefore prices are more likely to stabilise at or rise from the current levels.		
	3.3	7 2	Graphene Light bulbs	Propose this section is contrasted and complemented with our proposed addition.	Currently there are two streams of development for Graphene as a material for use in lighting 1. Graphene Lighting PLC, a spin off from Manchester University's National Graphene Institute have proposed an LED lamp product using Graphene as an interface material for the LED die claiming efficiency improvements of 10% over a standard LED replacement bulb.[1] This product has yet to be placed on the market however is proposed for launch in 2015. 2. Young Duck Kim of Colombia University announced the development of light emission	

[1] < http://www.wired.co.uk/news/archive/2015-03/30/graphene-lightbulb >

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
					directly from Graphene in June 2015[2]. This is early research stage work however could lead to a practical general lighting technology in as few as 5 years. The technology is likely to be less efficient that LED however could offer considerable improvements in lighting quality as it will be emitting light on the black body curve. Care needs to be taken to allow this technology to enter the market at efficiencies well below LED	
	4	7 3	Smart Lamps	In addition to smart lamps there are a number of smart modules on the market, these include the level of complexity of the smart lamp in an element intended to be included within a complete LED Luminaire[3] It is anticipated that these will be more common in the tertiary sector than the domestic sector. This technology offers significant opportunities to add control systems that will affect significant energy savings. This subject may be further considered in LOT 37	Change title to Smart LED Devices Change "The following definition for smart or connected lamps. . . " To: "The following definition for smart or connected LED devices and lamps . . . " General change "smart lamps" for "smart LED Devices" throughout the text	

[2] .< http://www.kevan-shaw.com/blog/comments/the_newest_technology_welcome_back_the_carbon_filament_lamp>
[3] < http://www.xicato.com/lighting-20 >

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
	5.2.2 1)	8 1	Substitute LFL T12 by T8	There is no economic or logical case to replace a T12 luminaire with a T8 luminaire. If luminaire replacement was likely this would either be a T5 fluorescent or LED luminaire	Delete: *A third variant would be to substitute the entire T12 luminaire by a T8 luminaire* Replace: *In future it is expected that the majority of still installed T12 will be replaced by either LFL T8t or by LED Lighting* And add: *In future it is expected that the majority of still installed T12 will be replaced by either LFL T5 or by LED Lighting*	
		5 . 2 . 5	LFT12 special cases	The volume and use of such lamps is very limited. The exemption should remain and they will be superseded as the fittings they are used in are replaced or the volume of lamp sales falls below the volume necessary for continued production.		
	5.4.5	8 8	Directionality	The distribution difference between LED replacement LFL and the original is more likely to reduce the performance of the luminaire optics. Equating light radiated directly downwards with efficiency is not the right approach. The design of continuous rows like wall wash applications or graphical light lines the retrofit could cause visual dark spots.	Replace: *Directional emission may increase the efficiency of luminaires*. With *Directional emission will in most cases reduce the designed performance of the luminaire's optical design*	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
				The available Retrofit LED lamps for LFL would need a larger overlap of the sockets in the design. The LFL luminaires for grazing or wallwashing applications with LED Retrofit would cause dark spots and non-uniformity		
			Justifications for the lower lumen output	We would not align entirely with the justifications when considered in respect of a correctly designed luminaire and lighting installation. References are predominantly USA and are not directly comparable with EU 28 situation.		
			Plug and Play retrofit tubes	Performance is not the same as the LFL being replaced	Add: *Using Plug and Play tubes would void the warranty of the luminaire. As they provide a different load they are likely to compromise the life of the fluorescent gear in the luminaire, potentially causing failure of the gear and consequential failure of the Plug and Play tube*	
	5.9.3		HL LV R lamps	Improved accuracy.	Replace: *Most LV LED DLS lamps are dimmable; this is probably related to the simplified LV LED driver.* With: *Many LV LED DLS lamps are dimmable as the base load required by domestic dimmers is provided by the transformer. However load mismatch between transformers designed for*	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
					halogen lamps and LED replacement lamps often causes poor dimming performance and worsens flicker and strobing problems.	
		1 1 8	Figure 38	Incorrect illustration. This is likely a Metal Halide lamp however similar fittings are available for TH and do present the lock-in problem discussed here		
	6.2	1 5 2	Packaging	We see no reference to packaging and transport of LED and other components to final assembly as lamps or luminaires. Typically LED packages will be supplied on plastic reels with a backing for pick and place machines. Alternatively larger components will be packaged in PET trays. These will be further packaged in cardboard boxes and grouped into larger shipping cartons. Similarly other components such as glassware and plastic parts will be delivered to lamp manufacturers in protective packaging.		
		1 6 7 & 1 6	Table 59 & Table 60	PCA for Ceramic metal halide and HPS burners are much higher in embodied energy and much less recyclable than the metal listed in Ecoreport	Failing finding something like Sapphire in the ecoreport materials use glass for lamps	

Stakeholder comments form

Task #	Section #	Page #	Topic	Comment	Proposed change	Reply study team
		9				

Stakeholder comments form