

# The Proposed EU 2020 Lighting Regulations and their Potential Impact on Performance Lighting

*A Briefing Document prepared by the Association of Lighting Designers  
www.ald.org.uk  
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## THE THREE LINE VERSION:

- The EU is threatening to bring show lighting under the same rules as office and industrial lighting.
- The tools used to create the magic of light on stage will be outlawed.
- Shows will never look the same again.



*Now*

*2020?*

## WHICH CONTRADICTS OTHER EU GUIDANCE:

- One of the statements included in Article 2 of the Lisbon Treaty, a key EU document, states that the EU '**shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced.**'
- Disrupting a key element of performance culture - visual quality - seems to run counter to this.
- And on a practical level the EU guides that products covered by these new regulations '**shall present significant potential for improvement in terms of its environmental impact without entailing excessive costs...**'
- Upgrading entertainment lighting to meet these regulations will be very expensive, if it is actually possible at all, and the overall improvement in environmental impact is likely to be much lower than supposed.

## 1. SUMMARY - KEY POINTS

- The current EU lighting regulations (EU1194/2012 and related regulations such as 2015/1428) include an exemption for 'studio lighting, show effect lighting, theatre lighting'.
- The new regulations proposed for September 2020 under the Ecodesign Working Plan 2016-2017 do not contain this exemption.
- Current entertainment lighting fixtures (including traditional tungsten fixtures, traditional tungsten light bulbs, more recent arc fixtures, but also even brand new, much more efficient LED fixtures) do not meet the minimum prescribed efficiency of 85 lumens per Watt.
- In addition, non-tungsten entertainment lighting fixtures (arc, LED) do not meet the minimum standby power of 0.5W prescribed.

This means that if the regulations were to be implemented as currently written, from September 2020:

- No tungsten entertainment light bulbs could be placed on the market. As the stocks in the supply chain were exhausted, all of the tungsten fixtures currently in use in entertainment lighting could no longer be used.
- None of the LED fixtures currently available as more efficient replacements for these tungsten fixtures could be sold.
- Manufacturers are suggesting that because of the optical and performance design requirements of entertainment lighting fixtures, they would not be able to offer equivalent fixtures which did meet the requirements by September 2020, or possibly thereafter.
- Switching to LED sources, even if available, is expensive in itself, and requires a new supporting infrastructure, since dimmers are no longer required and, if used, may damage new LED fixtures. The cost of this may be unaffordable, particularly to smaller venues.
- The overall effect on entertainment lighting, a key part of the design of shows for theatre, television, film and live concerts, in the UK and across Europe, would be devastating.

## 2. CONTEXT

The 'Cultural Sector' (film, tv, music, theatre) was worth £26.8bn to the UK in 2016 - 1.5% of UK gross value added (GVA).

Creative industries outgrew the overall UK economy, generating £87.4bn in 2015 ('creative industries' is the cultural sector as above plus advertising/marketing, architecture, crafts, product design and fashion, software and gaming, publishing, museums and galleries).

In theatre across the UK alone, revenue from ticket sales is now more than £1billion annually.

More people go to shows than go to all league football games in the UK - 76% of the UK population have seen at least one theatre performance in the last four years.

The total concert attendance in the UK during 2016 was 27 million people, with a £4billion direct and indirect spend on live music.

The contribution of the Cultural Sector has been growing steadily and reliably (4.4% growth in 2015-2016 vs 3.5% in the wider economy, 27.1% in 2010-2016 vs 22.7% in the wider economy).

The arts and culture industry employs an estimated 131,200 people in the UK.

For every £1 of public funding of the arts and culture, £5 of tax is contributed by the arts and culture industry.

In 2011, ten million visits to the UK involved engagement with the arts and culture, representing 32% of all visits to the UK and 42% of all tourism-related expenditure.

There are more than 241 professional theatres in London; hundreds more across the UK, thousands more venues of all types from stadia to school halls.

Almost £5.2 billion of arts and culture-based goods and services were exported from the UK in 2013.

The House of Lords Select Committee on Communications noted in May 2017 that "the theatre industry is rightly hailed as one of the UK's cultural and economic success stories."

Performance lighting is a key part of every type of live show and event.

### 3. PERFORMANCE LIGHTING

Performance lighting is used across every part of the Creative Industries: theatre, film, television/broadcast, live events including rock concerts, festivals, bring cityscapes to life, and more.

It is used at every level, from the biggest concerts and musicals to the smallest school plays and gigs in tiny pubs and clubs.

It is also found far beyond these areas, in themed attractions, museums, corporate presentations & events, and houses of worship.

Performance lighting provides far more than illumination.

In theatre, it has been described as the 'glue' that holds every other element of a production (set design, costume, props, and, of course, performance) together. It transforms spaces:



*The play Red - worklight vs stage lighting*

and, by controlling and directing what audience members see, focuses attention, and enables magic.



*Same set, transformed just by lighting - the play Equus*

In television, film and broadcast, it is the enabler: on a purely technical level, without light, none of these media would be possible. But beyond merely enabling, light allows the creation of mood and atmosphere in thrillers, the dynamic excitement of *Strictly* or *X-Factor*.

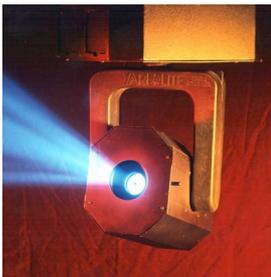
In the other areas it allows the focus of attention, the shaping of mood, the creation of atmosphere.

All of this is made possible by specialist entertainment lighting tools: lighting fixtures which give absolute control of directional light, with the beam able to be precisely adjusted in terms of shape, edge, colour and brightness.



*Progress in lighting: candle, gas, electricity, directional spotlights*

Lighting fixtures of this type have evolved from candlelight to gas-light to electric light: entertainment lighting has never been afraid to adopt new technology if it allows the creation of better lighting tools, and so the creation of better lighting for performance, and so ultimately better performances.



*Vari-Lite VL2 moving light*

Improvement in this equipment has continued in the electric age. From the early 1980s, computerised, remotely controllable lighting fixtures became readily available. First seen in rock concerts and now found in every area of entertainment lighting, these allowed the creation of greater spectacle in live events; for theatre their advantages included greater flexibility within a rig of lights and reduced set-up time, since there was no longer a need to climb a ladder to adjust a light. The arc discharge sources these fixtures used were more efficient and more rugged than traditional tungsten sources.



*ETC Source Four high-efficiency tungsten spotlight*

These moving fixtures were expensive, though, and so they continued to exist alongside more traditional, manually operated spotlights. In 1992, the

ETC Source Four spotlight brought a huge improvement to this type of equipment, using a dramatically improved optical design to improve the performance from a traditional tungsten-halogen light source: its new 575W lamp gave a light output that exceeded the 1000W fixtures that were the standard at that time, improving the efficiency from roughly 5 lumens per Watt of existing fixtures of the time to 13 lumens per Watt - more than double the efficiency, a remarkable step-change.

Progress continues, and entertainment lighting professionals are now adopting new LED lighting fixtures as they finally reach a level of quality (in terms of light output, light quality, fade quality plus other important factors such as running noise and reliability) that matches or, in some areas, exceeds traditional lighting fixtures. Improved efficiency and reduced power consumption are bonuses in many cases.

Today, the entertainment lighting industry as a whole uses an enormous range of fixtures and fixture types:



*Looking into the lens of an LED spotlight, diffuser removed*

- the very latest LED static and moving lights
- a previous generation of moving lights, mostly using arc-source discharge lamps, which offer high brightness and relatively high efficiency, particularly in applications such as concerts and festivals where the lights are used primarily at high output levels.
- in some cases, arc-source discharge static lighting fixtures, these more usually found in specialist sources (such as follow-spots) or in higher output fixtures used in film and television lighting.
- tungsten-halogen lighting static lighting fixtures. These are by far the most common light sources, particularly in theatre. Their light quality is adored by lighting practitioners for its full, even colour spectrum. They fade well and are quiet (no cooling fans required). The support infrastructure in every theatre is designed around them (with installed or temporary dimming systems). They are well understood by all who use them. They are rugged, reliable, easy to maintain and long lasting.

The active base of these tungsten fixtures across all performance venues contains a wide spread of fixture types and ages: in some cases even theatres that have undergone quite dramatic recent refurbishments/ upgrades (such as the Chichester Festival Theatre) have chosen to refurbish and continue to use fixtures up to 40 years old.

New venues have chosen - still often choose - to purchase tungsten fixtures. The television studios opening as part of the re-creation of the BBC Television Centre in London are primarily equipped with tungsten lighting fixtures.

Sometimes the deciding factor is money: sometimes a venue just needs a certain amount of equipment, and that amount is unobtainable if specified entirely as LED, since LED fixtures are more expensive than tungsten fixtures (-the same is true of lighting rigs rented for productions). The end result is usually a mixture of fixture types. Sometimes the issue is that the extra cost of LED fixtures can't be justified against the costs saved by their lower running costs (lower power requirement, no lamp replacement costs) - this is often the case with replacing existing equipment. For new buildings, the problem is often that the equipment purchase is from a capital programme, the running costs are from a running budget, and there is no way to offset one against the other. Sometimes, as in the case of Television Centre, it is a choice made by the end users on very particular artistic or aesthetic grounds.

What is clear is that because of the way entertainment lighting equipment is used (see section 4 below), the running costs saved by an LED fixture's lower energy savings would in some cases not prove sufficient relative to the cost of a recent, efficient tungsten fixture or even an old, long-serving tungsten fixture, leaving other factors aside.

Critically, replacing an existing fixture because that fixture can no longer be used also creates waste material (scrapping the old light) and consumes extra energy and materials (creating and shipping the replacement light). It is arguable that the relatively small amounts of energy saved by the new fixture may not fully compensate for this.

## 4. PERFORMANCE LIGHTING AND ENERGY USAGE

In many cases, lighting rigs for productions rely on large quantities of these specialist entertainment lighting fixtures.

Looking at the size of these rigs, it is easy to assume that these shows consume large amounts of power.

This is not the case.

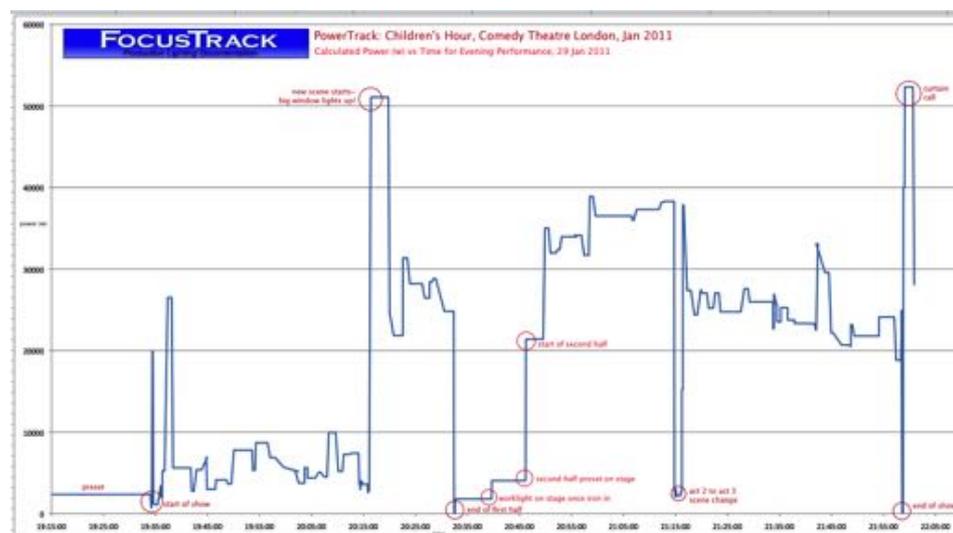
In a typical theatre lighting rig, each lighting fixture has a specific purpose, whether that be providing a broad brush-stroke of light to a particular area of the stage in a particular colour, providing a very tight special pin-point of light to a particular moment or effect in the show, or providing some other particular effect such as light through a door or window.

It will rarely, probably never, be the case that all of these lights are on at the same time.

Because each lighting fixture has the ability to be dimmed (through a built-in dimmer for LED and moving lights, through an external dimmer for tungsten fixtures), and controlling the level of different fixtures to create a balanced visual picture on stage is a key part of the job of lighting a performance, it will rarely, probably never, be the case that any of the lights on at a given moment will be running at full power.

Plus, performance lighting rigs are for the most part used only during performances (with occasional extra use during rehearsals, usually when a show is first being created). For a typical theatre show, the lighting rig may only actually be in use for 2-3 hours a day.

Taken together, several studies (including a comprehensive one carried out for the Seattle Rep in America and a broader one carried out for the Mayor of London's Office) have shown that performance lighting typically accounts for just 3-5% of a theatre's total power consumption.



Power use by performance lighting during one performance of *The Children's Hour*

For one example show (*The Children's Hour*, which ran at the Comedy Theatre in London during 2011), the key figures were:

Total connected load (all tungsten): 170kW  
Actual peak load during show: 52.3kW  
*so 31% of connected load -  
and this just for the curtain calls,  
often a show's brightest state!*

Show running time: 2hr45min

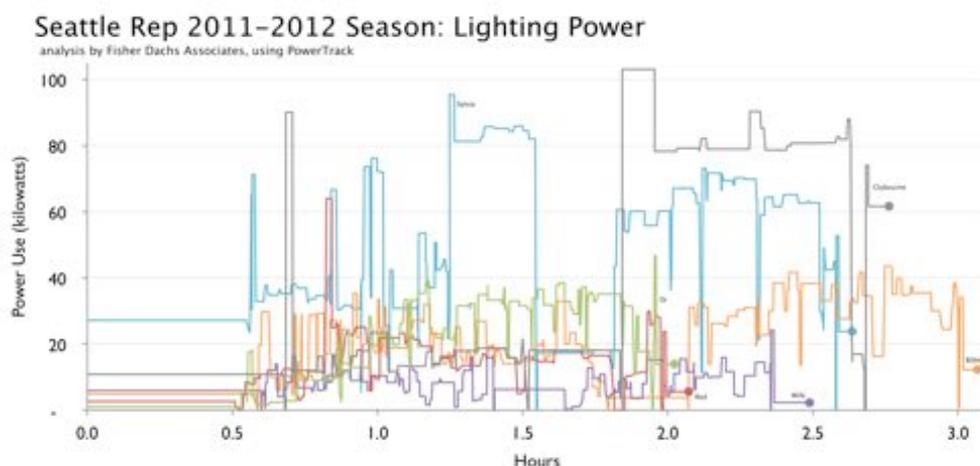
Hypothetical power consumption, all lights on at full power for entire show:  
467.5kWh (170\*2.75)

Actual power consumption: 75.5kWh  
so 16% of the possible power use

That actual power use of just 16% of the total possible consumption is dramatically lower than a casual observer might have expected. Outside of performance time, with the rig off, there would have been no power consumed by the show's lighting rig.

The figures will of course differ for different productions using different combinations of lights in different venues. However, the Seattle Rep study monitored six different productions across the Rep's season. Across these quite widely differing shows, the peak demand ranged between 15% and 44% of total connected load. The actual power usage ranged between just 7% and 36.5% of the possible maximum power consumption.

At the time of the study (2013-2014) and taking into account the low cost of electricity in the region at the time, it was not cost-effective to switch the entire rig to LED lighting - in general the cost of the power saved would not counterbalance the higher cost of purchasing the LED fixtures.



Power consumption during the performances of six plays at Seattle Rep

However Seattle and other venues have identified that for light sources run at high levels for long periods of time (such as houselighting which is on at full outside of performance times) it is cost-effective to switch to LED

sources, for both the reduced power consumption and reduced running and maintenance costs. Many venues have already made exactly this change, particularly in areas where electricity is more expensive than in Seattle, or in new venues purchasing equipment for the first time and so able to justify the higher equipment costs against lower running costs and on general ecological grounds. Entertainment lighting is working to reduce its energy consumption wherever it can, as common sense and economics both dictate.

In addition, the availability of good quality LED-based moving lights means that these fixtures are now rapidly replacing arc-based moving light sources in entertainment lighting, leading to a further dramatic reduction in power consumption during performances.

And across the industry, now that high quality professional entertainment lighting fixtures are available, lighting designers are starting to specify and use LED fixtures for the advantages they bring - where budgets (either for purchasing equipment, or renting it which is the more usual model for commercial theatre productions) are sufficient to do so. The advantage to the designer is increased creative opportunities. The advantage to the show is dramatically reduced running and maintenance costs. One lighting rental company has noted that it now stocks more LED spotlights than it ever did colour scrollers, the accessory previously used to add colour-changing capabilities to tungsten spotlights. This quite a sea change. But these LED spotlights will not meet the 2020 standards.

## 5. PERFORMANCE LIGHTING AND THE PROPOSED 2020 EU LIGHTING REGULATIONS

As far as the Association of Lighting Designers can establish, under the proposed 2020 EU Lighting Regulation being formed under the Ecodesign Working Plan 2016-2019 to replace EU1194/2012 and associated regulations such as 244/2009 , 245/2009 and 2015/1428), ***all lighting fixtures used for entertainment lighting within the lumen output range defined by the regulations (the majority of fixtures used) would no longer be permitted, and so would no longer be available for sale in the EU.***

This would include all tungsten lighting fixtures, and a vast majority, probably all, specialist arc and LED lighting fixtures (certainly those of the performance quality required for entertainment lighting).

To be clear: ***this issue is about all entertainment lighting fixtures***, not just existing tungsten lighting fixtures as some continue to assume.

These fixtures all fail because they DO sit within the 60-82000 lumen output range that the regulations cover, but DO NOT meet the 85 lumen per watt minimum efficiency standard. In addition, LED and moving light fixtures would not meet the 0.5W standby power requirement, required when no light is being emitted.

In the current regulations, there is a clearly stated exemption for “studio lighting, show effect lighting, theatre lighting.” There is no such exemption included in the proposed regulations.

Of some current commonly used products:

Source Four fixture: tungsten, 575W, 7489 lumens, **13 lm/W**

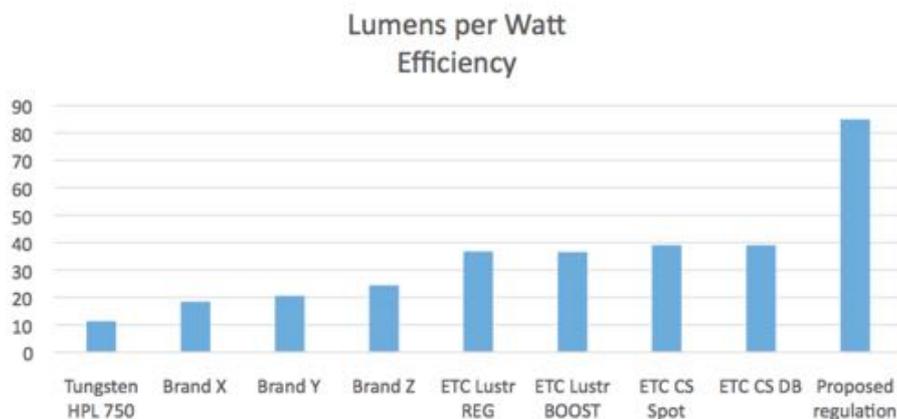
Source Four fixture: tungsten, 750W, 8500 lumens, **11.3 lm/W**

ETC Source Four Lustr2 Spotlight: LED, 160W, 5882 lumens, **36.7 lm/W**

Martin Viper Performance moving light: arc, 1000W, 26000 lumens, **26 lm/W**

Martin Encore CLD moving light: LED, 580W, 11600 lumens, **20 lm/W**.

*(all fail to meet the 85 lm/W requirement. The Lustr2, Viper and Encore - and all other fixtures of these types from other manufacturers - would also fail to meet the standby power requirements).*



*Existing tungsten and LED lighting fixtures vs the proposed regulation to the right (graph produced by entertainment lighting manufacturer ETC)*

A reading of the regulations suggest that the EU expects drop-in replacement LED sources to be available for existing lighting fixtures. While perhaps true for general service domestic and industrial lighting fixtures, this is unlikely to be the case with entertainment lighting fixtures, partly because of the complexities of designing such sources to work with the optical systems of these lighting fixtures, partly because of lack of demand in a relatively small market, particularly for older fixtures. There could be a demand for such a source for the highly successful Source Four fixture, which has sold approaching 4million units worldwide across its 25 year history, but while its manufacturer, ETC, has created a drop-in replacement white light source for its Source Four fixture in the US, it has abandoned development of a UK/EU 230V version on technical grounds.

It also feels like the regulations are intended as a 'stick and carrot' approach to encourage manufacturers to improve their products. However, in the case of these specialist entertainment lighting products, the manufacturers are suggesting it will impossible to do this in time for the September 2020 introduction of these regulations, or possibly at all.

This is because of the particular design requirements of the optical systems for these fixtures, particularly for the need to start with a very small, ideally 'point', source to design an efficient optical system around. Tungsten and arc sources allow the creation of very small sources of high power. LED sources cannot be packed together tightly enough to achieve this, an effect known as étendue. The only workaround is to use larger arrays of LEDs and effectively waste some of the light, which would provide the brightness level required but would again mean being unable to achieve the required efficiency standard.

In addition, obtaining the required standby power will be very difficult for entertainment lighting fixtures which need to respond immediately to requests to change level, or may still be active (ie. a moving light may be moving to its next position) even when no light is being emitted and so the fixture is counted as being in standby by the regulations.

One already noticeable result of LED component manufacturers anticipating these regulations is that while light LED sources are being improved in efficiency far more rapidly than coloured sources, as huge investments are made in an attempt to meet the standards for general purpose lighting. Many entertainment fixtures rely on multiple coloured LEDs for their colour-changing abilities. An irony of the proposed regulations is that while a white light LED that met the regulations could be used then filtered to give the colours required on stage, additive colour mixing fixtures would not be permitted - despite the fact that for any colour other than white, the additive-mixing fixture would be more efficient than the filtered-white fixture since only just the right amount of just the right colours is in use and drawing power.

Taking all of these points together, it is possible that ***no specialist entertainment lighting fixtures will be able to meet the requirements of these new regulations at the time the regulations are introduced - and possibly beyond.***

## 6. THE IMPACT OF THE REGULATIONS IF IMPOSED AS CURRENTLY WRITTEN - PRACTICAL

If imposed as currently written, the effect of the new regulations on entertainment lighting across the EU would be dramatic:

- all of the tungsten lighting equipment currently in use would effectively become obsolete. While there is nothing in the regulations preventing it from being used, no new supplies of the light-bulbs on which this equipment relies would be available. It is unknown at this time how long supplies already placed on the market by September 2020 would last, but this is not a big market in global terms and it is expected that supplies would be exhausted quite quickly.

- as an indicator of how widespread these fixtures are, one entertainment lighting supplier notes that it sold 24,400 individual tungsten lamps suitable for entertainment fixtures in the period Jan-Dec 2017; that supplier estimates that its market share for these products is probably less than 10%.

- venues and productions would therefore be forced to adopt LED equipment. Suitable replacement LED fixtures are available now (ie. pre-2020) but as noted above may not be available post 2020. Even if purchasing in the next two years they are expensive (roughly 2.5-10 times the price of a comparable tungsten fixture, depending on fixture type), and much more expensive than continuing to support existing tungsten fixtures (where your investment would be £15 for a new light bulb every few years, not £1300-£2500 for a new fixture):

Source Four Tungsten Profile Spot: £490  
Cheapest Single Colour Profile Spot: £1235  
Professional LED Profile Spot, Colour Mixing: £1300  
Professional LED Profile Spot, Advanced Colour Mixing: £2250

Par64 Fixture and lamp: £60  
Budget LED Par: £300  
Decent LED Par: £625  
High-End Professional LED Par with Advanced Colour Mixing: £1900

- even the most advanced professional LED lighting fixtures still do not match the absolute light quality of traditional tungsten fixtures by some measures, notably colour quality and 'richness'; this is an issue for the most demanding professional users.

- all venues would be forced to make this change, since without a supply of light bulbs or available retrofit LED sources, the traditional second hand or hand me down distribution routes would be broken.

- in addition, the infrastructure of every entertainment venue for the last fifty years has been structured around tungsten lighting, with installations of professional dimming equipment to control those fixtures. These dimmers not only cannot be used to control LED fixtures, but in many cases would damage LED fixtures. Older control consoles often do not have the ability to deal with LED light fittings. The cost and disruption of replacing all of this

equipment therefore also has to be included, and would very quickly run to tens of thousands of Pounds, even for very small installations.

- For larger venues and other suppliers (rental companies, for example), while these changes may be affordable, they may not be achievable for planning/capital expenditure reasons within the next two and a half years. Again, we have not yet established a formal number of venues involved, but there are at least 240 professional theatres in London plus large theatres in all major UK cities and towns.

- For smaller venues - thousands, once you include schools, clubs, pubs, village halls and the like, these changes may be unaffordable or unachievable for other reasons. These venues may be forced, quite literally, to go dark.

- After September 2020, it is unknown whether suitable, compliant sources would actually be available at all, because of the extreme difficulty of designing fixtures of this type while meeting the lm/W and standby power requirements.

In addition:

- It is unclear just how great the power savings from switching to LED fixtures would be, since though lower power than equivalent tungsten fixtures they also usually have a lower output, and so would have to be run at a higher level to achieve the same result on stage. To the ALD's knowledge, no direct comparisons (the same show lit with a traditional rig then with an LED rig) have been made anywhere.

- LED fixtures have a standby power consumption, which tungsten fixtures do not. In other words, even during the 2-3 hours of a performance, the power consumption of inactive lighting fixtures would be greater than that of a traditional tungsten rig. It is not yet clearly established whether the lower power consumption of these fixtures when active would compensate for this.

- Current lighting fixtures, which have given faithful and reliable service for years, sometimes decades, would all become scrap. Taken together with the materials and power required to create and distribute replacement lighting fixtures, this is surely the opposite of sustainability.

- Replacement fixtures would place much greater demands on end users: if a traditional tungsten fixture fails, the cure is usually to replace the light bulb. If an LED fixture fails it will require specialist electronic skills to diagnose and, if possible, repair the fault. It is being widely reported that the failures within all types of LED fixtures are not with the LEDs themselves, but with the control electronics. Since these are often an integral part of the fixture, failure can often mean the need to replace the entire fixture - again, more cost, and more waste created.

## 7. THE IMPACT OF THE REGULATIONS IF IMPOSED AS CURRENTLY WRITTEN - FINANCIAL

As an example, take a hypothetical venue with 50 tungsten spotlights, 50 Par fixture and 96 dimmers - a sort of notional mid point between very large and very small venues. The cost to move to equipment available now which would not become obsolete post 2020 (ie. currently available LED equipment, which would not meet the new regulations, but which would not rely on a supply of light bulbs and so which could continue to be used) would be of the order of:

£96000 for new lighting fixtures (*while such fixtures are still available*)

£40000 for new power control systems (equipment and installation)

£10000 for a new lighting console

Total: approximately £146,000.

*(costs based on sample quotations from multiple suppliers)*

This is quite an investment for a venue that might have been used to spending £100-200 per year on new light bulbs, and in many cases receiving hand-down equipment or purchasing equipment second hand. Plus obtaining matching replacements post-2020 will not be possible.

Repeated across the 241 professional theatres in London, the figure involved reaches to just £35million.

Repeated across thousands of venues across the country (all types of venues - theatres big and small, colleges, schools, village halls, pubs, clubs), it quickly reaches hundreds of millions of pounds, even before including the much larger scale of some venues (the European association PEARLE - Live Performance Europe - is estimating the cost at 3-4million Euro for an opera house). This work would be required even in some very recently built venues. And all this is even before counting the massive levels of disruption it would force on those venues, including loss of income during closed periods while this work was carried out.

Many of these venues will be direct or indirect recipients of Arts Council or Local Authority funding. So these changes would have to take place in an environment when both of these funding sources are already decreasing: there was a 4% cash decrease in Arts Council England funding for theatres between 2010/11 and 2014/15. Local authority investment fell by 18%, or £31million, over the same period.

Julian Bird, the president of SOLT (the Society of London Theatre) has already noted that "certain parts of the country becoming a little like deserts with no arts provision" because of venues closing or on the verge of closing. These onerous new lighting regulations would likely only increase the speed and severity of this.

Beyond the cost of re-equipping venues, for venues where long-running shows are performed (such as opera and ballet theatres where productions from a wide repertoire of productions intermittently return to the stage, or for long-running commercial shows) there would be the need to adapt the

lighting back to the original design intent using new equipment, which again carries time and therefore cost penalties.



*The Olivier Theatre.*

As a real world example, the National Theatre in London has approximately 2900 lighting fixtures across its three auditoria. To upgrade just the infrastructure (dimming/power control) in the largest theatre, the Olivier, to be ready for LED lighting fixtures, the National is currently budgeting £1.5million. The National notes that the installation costs involved are higher than might be expected because of trying to achieve upgrades with overnight working, so as not to lose performance revenue in the theatre as work is carried out.

And this is of course only with equipment available now, if it can be purchased before September 2020. The position after 2020 is unknown.

In every case where massive equipment purchases are required, the ultimate effect will be that higher costs will move through the industry, ultimately ending up with higher ticket prices for audience members.

Or if we say some of the money - say £150million - somehow came through arts funding bodies, that's money that would have to come somewhere else in the arts, or if pulled in from wider government, is money which could not go to schools or hospitals - despite the fact it is money being spent effectively to keep lighting as it is now. Not necessarily better. And certainly not then saving £150million-worth of power.

It should be noted that Article 15.2(c) of Directive 2009/125/EC, which establishes a framework for the setting of Ecodesign requirements for energy related products, says: ***“the product shall present significant potential for improvement in terms of its environmental impact without entailing excessive costs...”***

And that Article 15.5(c) of the same Directive says ***“There shall be no significant negative impact on consumers in particular as regards the affordability and the lifecycle cost of the product.”***

It feels like in the context of entertainment lighting, the new regulations would contradict these directives.

## 8. THE IMPACT OF THE REGULATIONS IF IMPOSED AS CURRENTLY WRITTEN - ARTISTIC

As noted in the section 2, the arts are a huge success story for this country. British lighting designers create remarkable work, and are in demand worldwide for their talents and skills. Their work enriches productions of every type. Lighting has been a defining part of everything from one-off shows such as the opening of the London 2012 Olympics, to remarkable operatic and dance productions that continue to appear in the reps of performance companies around the world, to enormous commercial successes, some of which (*Cats*, *The Phantom of the Opera*, *Les Misérables*, *Miss Saigon*, *War Horse*, *Harry Potter and the Cursed Child* and others) have gone on to play - indeed, continue to play - to huge audiences around the world.



Iconic productions with iconic lighting - clockwise from top-left: *Les Misérables*, *An Inspector Calls*, *War Horse*, *The Phantom of the Opera*

Just imagine anything from *War Horse* to concerts by Take That to *Strictly Come Dancing* to the opening ceremony of the 2012 Olympics, but with the spectacular lighting they contained replaced by the kind of flat, white light you might find in an office or industrial warehouse. That is the dramatic level of change that these new regulations might enforce.

This disruption is not a disruption to lighting alone, but to production design, to the very nature of live performance as a whole. Without the possibilities brought about by lighting, whether the atmosphere of a moody drama or the excitement of a rock concert, it is easy to see the audience demand for these events reducing, and so the sector as a whole declining in popularity. This impacts not just single productions of shows, but the UK's ability to make shows that are then demanded by the rest of the world - in other words, that become valuable exports and trailblazers for Britain.

And of course the same is true across Europe.

Article 2 of the Lisbon Treaty, which is one of the core documents of the EU, states that the EU '**shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced.**' Disrupting a key component of this culture - visual quality - would seem to run counter to this.

## 9. SUSTAINIBILITY

The Association of Lighting Designers and its membership do not argue that reducing power consumption is a laudable goal. The entertainment lighting community has long been active in promoting sustainability, and has adopted new technology where it improves energy efficiency - as long as it meets the other key, specialist requirements for entertainment lighting.

These include, but are not limited to:

- precise beam control
- high colour rendering, with a full colour spectrum
- good fade performance (smooth, step free, even at the 0-1% step)
- silent or near-silent operation (particularly for fixtures used in theatre)
- consistency from fixture to fixture
- reliability / ease of maintenance
- affordability and availability

Given the way that these fixtures are used, as noted in section 4 above, the ALD believes that the proposed regulations would actually be counter-productive to the cause of sustainability, since the energy savings from switching to new fixtures (if suitable fixtures were, in fact, available) would be massively outweighed by the waste generated from scrapping existing fixtures, and the materials and energy required to manufacture and distribute new fixtures. It is also anticipated that, because of their more high-tech nature, these newer fixtures would have a shorter overall life-cycle than traditional fixtures.

The ALD notes that in earlier versions of Eco directives, the preamble has included the provision that 'the ecodesign requirements should not affect functionality from the user's perspective and should not negatively affect health, safety or the environment. In particular, ***the benefits of reducing the electricity consumption during the use phase should outweigh any potential additional impact during the production phase of products subject to this Regulation.***'

Regrettably, this principle seems to have been lost from the current proposals.

## 10. BREXIT

This issue will affect all theatres and all performances across Europe. However for the UK there is the additional complication of Brexit, which will take place on 29th March 2019, before the start date of these new regulations (20th September 2020). However, the 'Great Repeal Bill' will convert all EU-derived law into domestic UK law at the time of exit. It is anticipated that this new regulation will be enacted in autumn 2018, which means that having it come into effect would be part of the EU law taken into UK law. In addition, the UK will likely have to follow EU standards and verification procedures after Brexit in order to enable a soft border agreement with Northern Ireland and at the Channel ports.

## 11. POSSIBLE SOLUTIONS

Entertainment lighting is currently exempt from the Ecodesign Lighting regulations because EU1194/202 includes an exemption for “lighting applications where the spectral distribution of the light is adjusted to the specific needs of particular technical equipment in addition to making the scene or object visible for humans (such as studio lighting, show effect lighting, theatre lighting).” (article 2, section 4(b)ii). The same exemption is included in EU2015/1428.

There is no such exemption in the regulations currently proposed for September 2020.

The EU’s Explanatory Memorandum suggests that there has been an intent to continue an exemption for these kinds of specialist fixtures because of the nature of their optical design and the way they are used (in explaining the 82000 lumen upper limit it notes that this is to “exclude very powerful lamps, eg. sports lighting, theatre-, stage-and studio-lighting”). However the 82000 lumen upper limit is far above the light output of typical entertainment lighting fixtures, which is more commonly in the 4000-40000 lumen range.

The EU’s documents also provides an exemption (in Annex 1) for “projection and image capture... including video projection”, and in Annex 6 notes that “features required in certain applications, eg. a high colour rendering, might prevent products offering those features from achieving these benchmarks.” Both are pertinent to entertainment lighting, but the first does not specifically include entertainment lighting, and the second is merely a comment rather than providing an exemption for such equipment.

As already noted above, the EU itself states in the Directive which establishes the Ecodesign framework (2009/125EC) that “the product shall present significant potential for improvement in terms of its environmental impact without entailing excessive costs...” and “there shall be no significant negative impact on consumers in particular as regards the affordability and the lifecycle cost of the product.” Both feel highly relevant to this debate.

However, the Association of Lighting Designers’ position is that ***a clearly worded, categorical exemption for entertainment lighting equipment, recognising the specialist nature of the equipment itself and the way it used, is required.***

In its initial response to the EU on 25th January 2018, the ALD proposed several mechanisms by which equipment of this type could be recognised. However, the EU already has a definition of this equipment (EN60598-2-17 Stage and Studio Luminaires) which would surely form the clearest and simplest basis for defining such an exemption.

It should be clearly noted that the ALD is not demanding the ‘survival of tungsten’. While it recognises that lighting designers would like to have the widest possible range of tools available to them, from candle-light to LED light, just as painters have access to everything from oil to watercolours

(and also notes that it is very rare for a technology to be outlawed if that technology is not dangerous), it also recognises that tungsten light sources are already being rapidly discontinued by manufacturers in favour of LED technologies. Regardless of legislation, tungsten will, for the general market, die out. Entertainment lighting will have to continue to adopt other light sources.

However, to do that, suitable products have to be available, and end users need time to find, plan for, pay for and then learn how to use those technologies. Two and a half years before the new regulations come in, even maybe four years before the supply chain is exhausted of traditional bulbs, is not long enough to achieve this.

Plus for those moments for which only tungsten will produce the desired effect: why outlaw it? Why not rely on the market to push it out of common use, but equally, leave the opportunity available to the market for small, specialist companies who see an opportunity and have the ability to create small runs of specialist niche versions of these products, exactly as is now happening in, for example, electronic valves, vinyl LPs and camera film.

## **12. MOVING FORWARD**

This document represents the case as we see it to argue for an exemption for Stage Lighting in proposed EU Lighting Regulations, for the benefit of the entertainment lighting community, the wider show production industry that is part of, the show-going population for which these productions are mounted and, beyond that, the UK economy of which the cultural sector is a thriving, dynamic and growing part.

But stronger forces are now required to move this forward, and those forces have to be marshaled very quickly. We hope you can help with this.

If you are reading this before 7th May 2018, there is still an EU public consultation period running. Please respond to that.

The most current information about this and other ways you can help can be found on the ALD website:

<https://www.ald.org.uk/resources/savestagelighting>

## **THE ASSOCIATION OF LIGHTING DESIGNERS**

This document has been created by the Association of Lighting Designers. This Association is almost sixty years old. Founded by some of the pioneers in the field of entertainment lighting, its membership now includes people working across all areas of entertainment lighting across the world, creating lighting for live performances - plays, musicals, opera, dance, concerts and all the way up to Olympic Ceremonies. In this context the ALD is also speaking on behalf of PLASA, the Professional Lighting and Sound Association, which represents manufacturers and distributors of entertainment technology equipment.

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## **BACKGROUND INFORMATION:**

ALD Save Stage Lighting Campaign:

<https://www.ald.org.uk/resources/savestagelighting>

ALD Response to the EU, 25th January 2018:

<https://www.ald.org.uk/sites/default/files/resources/ResponsetoEUProposalfromtheALD.pdf>

Additional Comments In Response to the EU from ALD Members:

<https://www.ald.org.uk/sites/default/files/resources/ALDResponsetoEUProposalAdditionalComments.pdf>

ALD Primer on the Proposed 2020 EU Lighting Regulations:

<https://www.ald.org.uk/resources/the-proposed-2020-eu-lighting-regulations-a-primer>

PLASA Briefing Document to Members:

<http://www.plasa.org/img/ECO-Design-regulations-call-to-arms.pdf>

EU Proposed Lighting Regulations 2020:

<https://www.ald.org.uk/resources/eu-consultation-documents>

EU Current Lighting Regulations:

1194/2012:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:342:0001:0022:EN:PDF>

2015/1428:

[http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2015.224.01.0001.01.ENG](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.224.01.0001.01.ENG)

Seattle Rep Performance Lighting Energy Use Study 2011-2012:

<http://www.lightingandsoundamerica.com/reprint/EnvironmentStageLight.pdf>

Mayor of London's Green Theatre Study, September 2008:

[https://www.london.gov.uk/sites/default/files/green\\_theatre\\_summary.pdf](https://www.london.gov.uk/sites/default/files/green_theatre_summary.pdf)

## **SOURCES OF INFORMATION QUOTED:**

HM Government Industrial Strategy Creative Industries Sector Deal 2018; House of Lords Select Committee on Communications Skills for theatre: developing the pipeline of talent 2017; Offstage Workforce Review of the Theatre and Performing Arts Sector for UK Theatre and the Society of London Theatre 2017; PEARLE draft response to the EU 2018; research into The Future of the UK Entertainment Sector by NymanLibsonPaul; Wish You Were Here 2017 - annual report by UK Music; background information from the National Theatre, PLASA, other lighting industry manufacturers and suppliers.

[ENDS]