HOUSE OF LORDS

Science and Technology Committee

Corrected oral evidence: The effects of artificial light and noise on human health

Tuesday 28 March 2023

11.15 am

Watch the meeting

Members present: Baroness Brown of Cambridge (The Chair); Lord Borwick; Lord Holmes of Richmond; Lord Krebs; Lord Mitchell; Baroness Neville-Jones; Baroness Northover; Lord Rees of Ludlow; Lord Sharkey; Baroness Warwick of Undercliffe; Lord Wei; Lord Winston.

Evidence Session No. 6 | Heard in Public | Questions 67 - 77

Witnesses

Guy Harding, Technical Manager, Institution of Lighting Professionals; Allan Howard, Past-President, Institution of Lighting Professionals; Stuart Morton, Professional Head, Highways and Aviation Electrical Design, Jacobs; Andrew Bissell, President, Society of Light and Lighting.

Examination of witnesses

Guy Harding, Allan Howard, Stuart Morton and Andrew Bissell.

Q67 **The Chair:** I welcome the witnesses to the committee's sixth evidence session of its inquiry into the effects of artificial light and noise on human health, focusing in this panel on the effects of light pollution. Our witnesses are Guy Harding, technical manager at the Institution of Lighting Professionals, Allan Howard, past president of the Institution of Lighting Professionals, Stuart Morton, head of highways and aviation electrical design at Jacobs, and Andrew Bissell, president of the Society of Light and Lighting. The session is being broadcast on parliamentlive.tv and a full transcript will be made available to you shortly after the session for you to make minor corrections. If you think of any evidence that we would find useful or anything you do not get a chance to say that you would like us to have, we would be very pleased to receive that as additional written evidence after the session.

With that, I shall kick off with the first question. I ask everyone to give me two bullet points, one to quickly outline your area of expertise and the other to say what factors you would consider in setting guidelines for light installations to minimise health impacts.

Andrew Bissell: I am president of the Society of Light and Lighting. During my presidential year, protecting dark skies, pristine skies, and updating our guidance are priorities for us. We have around 17 documents covering all areas—schools, outdoor premises, healthcare and so on—and we will be updating all those in relation to doing more to protect dark skies and reduce light pollution.

In my work I am a partner with Ridge and Partners. I head up the lighting design team. As well as working on what you would consider traditional light pollution assessments for a typical planning application, we also do a lot of work on dark sky projects. That has included areas in Northumberland and Cumbria, and we are doing a lot of work in Wales. Probably the most onerous and challenging work we are doing is on large projects in Saudi Arabia, where they have made it a real priority and they will be protecting and regenerating the night sky for the benefit of visitors.

In relation to areas where the guidance needs to focus, as was mentioned in the 2009 royal commission report, we have a lot of people who are willing to look after national parks and areas of outstanding natural beauty, and rightly so, but we are perhaps lagging behind in what we do in cities, and of course more people live in towns, cities and villages where we have extreme light pollution. I would like to see us focus more on cities—both the direct light that people receive through their windows and to themselves and the overall sky glow that you get in cities. There is no rest from light pollution. Wherever you go, there is light pollution; there is an ambience. We have to not just hold ourselves at a steady level but start reducing that ambience in cities.

I do not think it is street lights as such that are the issue; it is our glass buildings and tall buildings. Again, the royal commission report picked up on that in 2009, so we ought to be doing something about it. Media facades are also a problem. Anyone who has been anywhere knows that these things light up entire buildings, but they are not intended to. I would say it is the ambient light in cities that needs to be focused on.

The Chair: We may want to come back to you on hospitals later.

Stuart Morton: My main focus has been energy and carbon reduction, focusing on net zero. Recently I have spent a lot of time working with conservation and ecologists on the impact of artificial light on conservation, biodiversity and the sensitive ecosystems that we as humans rely on.

Regarding policy, we need to look more at how we protect the sensitive environments that are left in the UK: we need to protect dark skies, similar to what Andrew mentioned, and reduce the impacts where we have already made problems.

Allan Howard: I am a past president of the ILP. A lot of my work over the last few years has been to develop the Institution of Lighting Professionals guidance documents, specifically GN-01, which looks at the management of obtrusive light and is one of the core documents that planners refer to. More recently, I have just completed PLG05, which looks at the brightness of illuminated signs and picks up in particular on digital media displays, the big screens that we now see. We are pleased that we had the industry that develops these involved in that. They realised the problems that they generate, and we have come up with approaches on how to deal with those in future.

In my day-to-day work, I am involved in a lot of assessments of intrusive light, light nuisance and other issues that go on, and we look to mitigate those in designs. It is key that artificial light is taken seriously through the planning process. It is not really, at the moment. I have seen that there are questions later that will expand on that area. We need to see it taken up and dealt with then, as opposed to conditions being left in that will then be taken up only if a complaint is raised because the planners do not have time to make sure that the conditions have been discharged.

Guy Harding: I am the technical manager at the ILP. I have been in post for six months now. Previous to that, I have had a career in manufacturing and consultancy in lighting for the last 30-odd years. In my role at the ILP, I am very much involved with volunteers like Alan who get involved with the guidance notes, technical documents and guidance. My role is to bring that together through the technical committee. I also deal with probably one or two calls a week from the general public complaining about artificial lighting—that could be light through their windows, light from a tennis court or light from a roadway—so we see this issue at the sharp end. We at the ILP do not get involved directly but refer them to our specialist members.

Q68 **Lord Mitchell:** Good morning and thank you for coming. Considering the UK's policy response to the problems of artificial light in the round, how

well do you think we are tackling the problem of light pollution? Perhaps you could rate it on a scale from one to 10, where 10 is brilliant and one is rubbish. Is it being given appropriate priority by decision-makers?

I have two further points. Are there any common misconceptions about light pollution you want to correct? Do you feel that the government response to the 2009 Royal Commission on Environmental Pollution report on artificial light at night was adequate?

Guy Harding: On that scale I would say only two or three. It is not being tackled properly or taken seriously. On street lighting, we are getting our act together. There has been a lot of work to control street lighting and on getting that right, but having flown into the UK at night to Birmingham Airport I would say that you only have to look down to see the amount of stray light coming up. We are not controlling it properly.

Lord Mitchell: Is that not true of everywhere?

Guy Harding: Yes, to a certain extent. I think Belgium is the worst. If you look at a lighting map of Europe, Belgium is the worst on the amount of light. The bad installations are so obvious. When you start looking for them and focus on the installations, you realise how much poor lighting there is.

Allan Howard: I think I would put it somewhere around a four, maybe pushing towards a five. A lot of good work is going on. In recent years there has certainly been more awareness through the dark skies campaign and so on.

However, along the lines of Guy's point, I drive up to Derbyshire quite a lot. You only have to look at the sides of the motorway, which have huge lit advertising signs. There is a lot of industry, and commercial properties where the light is going everywhere because it has not been considered or designed properly. This is coming to the fore because BEIS is doing a consultation to move forward energy efficiency. It wants more efficient light sources to reduce energy use. That is coming at the cost of lighting performance. Therefore, we are seeing that LEDs are the only choice. We are seeing a lot of very bad installations, because there are a lot of things that LEDs cannot do but lamp-based technology with a reflector could do perfectly. We also have different trends. Lots of people seem to be putting up-down lights all around their houses, causing lots of issues.

Stuart Morton: Like Allan, I would go with a four. There is some good practice in the United Kingdom, but I think we can do better.

On misconceptions, a lot of people default to light due to perceptions of crime and safety. Those are the misconceptions that we need to look at as an industry. There are some unfortunate side effects of lighting. We are now fully aware of the impacts on protected species such as bats. We know that it impacts their food chain and the ecosystems that will be vital to future human health.

Andrew Bissell: Thinking back to when I started in the lighting industry around 25 years ago, on probably one in 25 or 30 projects you would be

asked to consider light pollution or obtrusive light. It was very rare that you would be asked by a local authority or planner to do something about it. Now, on almost every project, you are asked to look at obtrusive light and light pollution. We have clearly made huge strides. We have been asked to look at light pollution on every project for the past 10 years.

I would not give it a 10 but maybe head back towards a five, because the guidance has not kept up with technology, our knowledge or the research that is out there. If you are in a national park, the criteria on the amount of uplight and spill light you can have are quite strict. However, as soon as you move into a city, you could have 10 or 15 times more light spill on to a building façade, and that is considered acceptable. It becomes very easy to satisfy light pollution criteria in a city or town. It is quite difficult to do it in a national park; it is not impossible, but it certainly takes a bit more thought. In a city or a town, it is quite easy to meet the current guidance. Now is a good time to step up that guidance, make it more onerous and challenge the industry more.

As to whether local authorities are taking it seriously enough, it is very mixed. Everyone does the minimum of asking for a light pollution assessment or statement, but some take it far more seriously than others. We are doing some great work with Denbighshire County Council, Anglesey and the Brecon Beacons. They take it immensely seriously and are passionate. The work they are doing—how they are helping and educating the communities—would be worth looking into. They are not just looking at the Brecon Beacons or Snowdonia dark sky areas; they are looking at everywhere—for example, factories and caravan parks. They are really taking a holistic view. However, in other areas, for example in Manchester, we meet the guide, tick the box and move on. Perhaps we should not be doing that.

On the point about preconceptions, when you talk to people about light pollution and dark skies, the immediate connotation they draw is that you are going to create an area that is less interesting and not as exciting. If you told a developer that you wanted to make their public realm scheme a dark sky-friendly area, they would immediately think that no one would come there or want to be there because it will not look vibrant and exciting.

The reality is that you can do both. An education piece is needed. We need to educate people. You can have great lighting design, vibrancy and all the things you want for entertainment, but protect the night sky as well. I would like to see us stop talking about dark skies and start talking about health, well-being and pristine skies. I think people will then come along on the journey with us.

Lord Mitchell: I could not help but smile about the ability these last few days to see five planets in the western sky. Even if we did not have cloud cover, I wonder how many of them we could see, given the light pollution.

Lord Winston: How many would we recognise?

Lord Mitchell: Some. The red one.

Q69 **The Chair:** Stuart, you mentioned misconceptions about lighting, crime and safety. What misconceptions would you highlight?

Stuart Morton: We have evidence from Cambridgeshire police and West Mercia Police that switching off street lights does not affect crime rates at night. In our industry, the default for safety—it is all about perception—is that for people using a remote footpath or walking along a canal in the dark, you need to light it and it will make people safe. Obviously, that is a feeling of safety rather than actually being safe.

We have been going back to the first principles in the ILP. I have not yet talked about the good work that we are doing. We are trying to guide the principles from the beginning to be: do you need light something, yes or no? Avoiding street lighting in our realm and sphere of influence is easier for us. Allan mentioned the illuminated advertising boards and things like that. In our evidence base, when we submitted it, they were much higher up the chain.

From a misconception point of view, it is about how we educate people to change their perception. If you use a path and it is lit, are you safe? It is probably quite fundamental for people. If you feel safe, you might not actually be safe. It is about giving people that opportunity. We looked at this as: if we can remove some of the wrong decisions early on, we will reduce our impact on energy consumption and carbon emissions, and obviously light pollution follows.

The Chair: Thank you. I think we might have a discussion about what you regard as an evidence base.

Lord Krebs: My question is precisely on that. Could you send us the paper or document in which this West Mercia Police study was reported? The result is a bit counterintuitive. I would really want to be convinced that it was a well-conducted trial with a sufficient sample size over a sufficient length of time to draw the conclusion that lighting does not make it safer.

Stuart Morton: Absolutely. It is in the original written format, but we could send it through.

Lord Borwick: I have a rather similar question. What period of time did that police report cover? Was it over a very long term that not lighting the canal did not cause extra crime? Was it a day or a matter of five years?

Stuart Morton: There are two clear ones from Cambridgeshire police, and obviously from West Mercia. West Mercia was a smaller sample period. I will have to send you links to give you the exact timeframe. Both of them reported, in summary, the same effects: that there were no changes in crime, but there were occasionally hotspots of crime. They both pointed to the fact that the removal or switching off of street lighting did not make any difference; the crime stayed the same in general. We will send you the links for both documents.

The Chair: Thank you. That would be very helpful.

Q70 **Lord Rees of Ludlow:** I would like to ask about the various considerations that planners have to try to reconcile in this area. Do you think the issue is high enough on the agenda generally? Do planning authorities have access to the relevant expertise that is needed?

I have two particular questions on that. First, we all know that the LEDs change the average colour of the lights, and blue lights may have different effects from others. Secondly, I wonder if you could decode one particular point from the evidence that the ILP sent us that. It said that Policy Planning Statement 23, which included guidance on light pollution, was somehow removed and has been ignored. Do you know what that guidance was and what we need to do to restore equivalent guidance? I do not know who is best qualified to answer that.

Allan Howard: On the PPS 23 issue, for many years we as the lighting industry were lobbying for planning to take artificial light seriously in all the work that they do, to do the assessments to promote good lighting practises and so on. It was agreed that PPS 23 would be expanded specifically to include a detailed lighting section, and there was a very good committee, led by a chap called Nigel Pollard, working on that, but then the Government changed the planning rules and wanted to reduce a lot of red tape. Basically they said, "We're no longer going to include that. It's just parked". We do not have access to what was picked up, but it looked at ensuring the mantra: "We have the right light in the right place at the right time controlled by the right system". Despite what people think, our first thought is not, "We're going to light", but ,"Do we need to light?", and then what the task is, how we do that efficiently and so on. Basically, that is what happened to PPS 23.

Over the years, to pick up on an earlier point about planning authorities having access to competent professionals to talk to, we have seen through the ILP and the other industry a gradual erosion of the lighting professional, the road lighting manager and anything similar in local authorities. When I started 39 years ago there was a big team, but now in a number of authorities there is no one who is necessarily a lighting expert. There are in some authorities, but in a lot there are not. They are not there for the planning teams and the environmental teams to call upon to get their own advice, which is why they then employ the likes of Stuart and me—if they have the funds to do so, and often they do not.

Andrew Bissell: I will pick up on the comment about access to information. A number of the local authorities we have worked with have said that they want access to better information and more knowledge in this area, so there is clearly a will among those people to improve the process that they are going through with the buildings and planning process that they are looking at, but they are struggling to get hold of that information. Some of that is down to the funds out there to employ the people they need to learn from and the people who might advise them on projects, but some of it is quite simply about getting hold of the relevant information.

One of my tasks is to upgrade lighting guide 21 for the SLL, which is about protecting the night-time environment, but that document is one of

around 17 that talk about obtrusive light, light pollution, wildlife, humans and so on. Are we simply adding to the noise? You cannot really blame the local authorities for struggling to get the right information. If we as lighting professionals are struggling to decide which of the 17 documents we should be looking at, it will be even more difficult for them. As we said earlier, we need to see more collaboration on the documents that we produce. We should have fewer but better-quality documents and make them available to everyone who needs them. That would bring about a difference.

Lord Rees of Ludlow: We have heard people say that although we focus on street lights, they are only a small fraction of the light emitted in built-up areas, and the rest of it is far harder to control and calibrate.

Andrew Bissell: It is more difficult, particularly as we see more high-rise buildings and the amount of glazing that they tend to use. Again, that is something that the 2009 royal commission report identified, and here we are in 2023 talking about it again. The commission was certainly well ahead of its time in identifying that this would be an issue, and that we would need to do something. It is easier to do something in an office. You can automate blinds, automate the lighting to turn off and so on, but obviously that is far harder to do if it is someone's residential high-rise property. On the other hand, they have lower lighting levels compared to an office. Still, we need to do something about that.

Lord Rees of Ludlow: Any thoughts about the implications of LEDs?

Andrew Bissell: There is the issue of warm white, cool white and the blue components. We are aware of that, but the other issue is that it is easier to get hold of LEDs and use them. Years ago, people's properties would have one lantern at the front door and maybe a floodlight at the back door or over the garage, but nowadays they might have a string of downlights in their eaves, two or three other lights and some uplighters in a tree. The simplicity of LEDs, and the fact that they are cheap for what they are, means that more people are using more lights when they do not necessarily need to.

France has said that you have to turn off your retail lighting in your shop window at a certain time, and perhaps we need to see that happening in the UK for certain types of lights—leave enough on that people can get to their front door, but then turn everything else off. The problem is more the question of how cheap it is and that everyone wants to compete with their neighbour.

Lord Rees of Ludlow: Thank you. Other questioners may bring up some of these points later.

Q71 **Lord Winston:** We have heard a considerable amount about the effects of noise pollution and the evidence regarding noise pollution and human health being damaged. It seems that on the whole the evidence that we have had is stronger—at least, more research has been done—in that field than in the field of light pollution.

I would like to know how you four feel about this. I suppose I am

concentrating here more on lights in the external environment than in housing, which I think is a different issue; there is different evidence for inside housing, which is interesting. Would you be kind enough to address that for us? Is there a sufficiently robust research evidence base to make regulations, for example about light pollution?

Andrew Bissell: That is an interesting one. Actual research and evidence are sparse on the health effects of light in the external environment—as you say, the internal environment is different. Equally, we are aware that light has an impact on us, on wildlife and so on. It is how we get from where we are—with this understanding, belief and awareness that there is an impact—to where that is strong enough to change policy. There is plenty of anecdotal information, but that is not good enough to change policy. We turned some lights off at a petroleum plant once to measure dark skies with and without all the pollution from the plant, and when we turned the lights back on hundreds of starlings jumped out of a tree because they thought the sun had risen. That is true, but it is not enough to change policy.

From my perspective, CIBSE and the SLL have the *Lighting Research and Technology* journal, and all the research and advice about light pollution and anything lighting-related goes into that journal. Over the last few years, we have seen more and more research papers about lighting and light pollution, but not enough to get us to where you need us to be.

Lord Winston: Allan, you shared a sliver of interest in that question.

Allan Howard: If you want to look at it from a human nuisance point of view, we have guidance, summarised in the ILP GN-01 document, which is a distillation of the research by the International Commission on Illumination, the CIE. Depending on the environment that we are in, this will give us a defined understanding of what is acceptable for vertical light on to a window and the brightness intensity of a light source from a distance, although the latter is hard to measure.

However, apart from looking at those precise levels, some of which we cannot measure, it is very difficult to link that to how we can register the nuisance. We tend to look for case law. If we look at noise, we can look to case law from the lighting point of view as being prejudicial to health. If someone's security light is going on and off all night and it is starting to annoy you and affect your enjoyment of your own premises, we can call on case law from noise, because this is an irritant in the same way that something going "bang, bang, bang, bang" is.

Otherwise, we are lacking case law to follow things up. The only thing we can do is look to the lighting levels that are advised in GN-01. We will then do the assessment that we can measure, which is the light on to a window. We cannot measure the intensity. The international committee is trying to find a different metric by which we can assess what we would effectively call brightness, which is the light source against the background that you are viewing it against.

Lord Winston: Would you agree that there is probably insufficient evidence for guidelines on light pollution?

Stuart Morton: From a human-centric point of view, I would agree that we are missing evidence for the external environment. However, there is clear evidence in guidance note 08 from the ILP on the effect of artificial light on bats, which clearly states that artificial light can create a vacuum for insects and invertebrates.

Going back to Andrew's point, we are seeing more and more lighting everywhere, as it is cheaper and more energy efficient. However, we can stop them (bats) commuting and foraging, and sever their habitats. If we look at conservation, the evidence base is there, and obviously the link between the ecosystems in the United Kingdom and human health is there. From the evidence, we know that it affects protected species, insects and invertebrates. We might find out more in the detail of how much damage is being done and about the nature recovery networks.

Lord Winston: There is also a bit of tension here between having low light levels in streets and people's vision being incapacitated. I do not know whether either of you have any comment on that.

Stuart Morton: I can perhaps comment slightly. Some of the work that we are doing with local government is in investigating the impact of not lighting some residential streets in rural areas in order to reduce the impact on protected species and invertebrates. The *Manual for Streets* states that you can have full-height curbs, and partially sighted people can move around more freely in those areas, but a lot of urban designers go for aesthetic appeal, a lot of shared surfaces, which are challenging for people to get around. From our perspective, you can design our streets through a sensible approach to highway design.

Lord Borwick: You mentioned security lighting systems, which are motion sensitive. Sometimes they are badly set and go off. Those are the most annoying ones. Would you discourage those motion-sensitive systems, from the point of view of the person who owns the house lighting up an intruder as their top priority?

Allan Howard: I developed a guidance document for the ILP, *Domestic Exterior Lighting: Getting it Right*. As you have heard, we are very good at developing lots of guidance documents. This one says that there is nothing wrong with domestic security lighting as long it is pointing downwards, so that it lights the area that you want and not the people opposite you, and the sensors are aimed properly so that they are picking up people coming up your driveway and not a car driving down the road. If so, they are absolutely fine. I spend a lot of time in the Peak District, and it seems to be the trend now to buy these up-down lighters, which people are putting round their houses. They do not do anything. If you have a bit of light up and down, they are not needed.

The problem is that you cannot go to any of the major retail outlets and buy a luminaire, a security light with a sensor, that would do what we want it to do. We have had discussions with B&Q and other retailers as an industry, but they still stock a very flat thing with an LED lump in the middle that shines light everywhere. Until we have the right products on the market, we cannot encourage people who rightly want to create a

little bit of security for their premises towards the right product. It is just not available in the domestic market.

Baroness Northover: You have talked about street lighting and such like, and made it clear collectively that this is perhaps not the major area of lighting that you are looking at. I would very much hope that, when it comes to street lighting, you are looking at the gender impact, given that women and girls often do not report attacks on them and the effect of your work on street lighting might be to drive them off the streets. It is not research but it is my gut reaction that at night I will be walking down the middle of the street and the fact that it is lit means that I can be more aware of somebody coming from the vehicles or whatever. Therefore, I hope very much that you are properly researching the gender impact of the work that you are doing on street lighting.

Stuart Morton: Absolutely. Diversity and inclusion is top of the agenda for us at the moment. I refer to University College London's recent document on how street lighting may enable rather than hinder street crime. We are looking at that and taking it seriously. These are all measures to reduce the impact of light pollution and of our energy consumption and carbon emissions. We are looking at this very seriously as an institution, which is why we are here today.

Q72 **Lord Krebs:** You have answered the question that I was going to ask, which was whether the problem of light pollution has got substantially worse over the course of your careers, particularly with the introduction of LEDs. I think I have heard that "yes" is the answer. Perhaps I could reframe it by asking whether it is possible for any of you to produce a graph that shows that trend, some actual data. It would be very useful for our report if there was a graph that had years along the x axis and along the y axis some index of light pollution. You have all said that it has got worse, but is it documentable?

Andrew Bissell: There are satellite images that you can make use of, measuring light pollution. The light pollution has been measured every year. You could look at this data. However, there is some debate in its accuracy in that generally it measures towards the infrared spectrum in order for it to deal with the atmosphere, et cetera. Of course, with the introduction of LEDs, particularly the early LEDs approximately eight years ago, 4,000 and 5,000 Kelvin LEDs were used which have a higher blue component. That blue component is not being measured accurately due to the type of instruments on the satellite. So there are some areas that show that light pollution has reduced, but in reality that might not be true.

It is very difficult to do what you are saying. We can use the satellite data and falsecolour maps. They are useful if you know what the light in that particular area is. If they have not introduced white-blue lighting and you are measuring like for like with respect to colour temperature. Beyond that, you might just have to look at one or two areas at a time and collect data on what lighting has been changed. It is quite a task. It is not easy.

Allan Howard: It would be a difficult thing to do, because we have moved through different light sources—low-pressure sodium orange, then high-pressure sodium and now white light. We are seeing that white light reflects to a higher degree off aerosols and particulates in the sky, so you are more aware of it. If you had the same area lit with high-pressure sodium, you would not notice the beam of light coming from the luminaire.

It is also true that LEDs cannot perform as well in a lot of applications as a lamp can with a good reflector and optic, because it is basically a flat light source that is sending light one way as opposed to being a small tube. Where we see LED-retrofitted lamps, they fit in the luminaire and turn on, but they have nowhere near the optical performance for the installation that they had before. Still, to plot you a graph would be an interesting challenge.

Lord Krebs: If I can paraphrase that and play it back to you, the impression that we have, given both the sale of LEDs and the way they spread the light around, is that light pollution has increased over the last decade or so but it is hard to pin that down in a quantitative way, for the reasons that you have given.

Allan Howard: Yes.

Guy Harding: Yes.

Q73 ***Lord Krebs:*** My subsidiary question, which Andrew certainly started to answer and Allan may have done so too, is about the tuneability of LEDs—the fact that you can tune them to certain wavelengths. You also referred to the security lights that Lord Borwick was asking about and their direction. Are we taking advantage of the tuneability of LEDs to minimise light pollution or maximise the advantage of the light that is emitted?

Andrew Bissell: I would say that we are not. Thorn has Night Tune, and other similar systems exist. Night Tune is a fantastic solution, which they have installed in Cumbria. It has a whiter colour temperature early on in the evening but it shifts towards a much warmer, calmer colour temperature and decreases in intensity as the evening passes, so you have a lower level of light and a warmer colour temperature of light. All those things are good. That has been trialled and has been a huge success.

What is preventing a large uptake is the fact that it is not in the guidelines. A lot of people, particularly in local authorities, feel that if they were to deviate from a lighting guide that said to use 4,000 Kelvin and achieve 10 lux on a particular path or road, they would be the ones at risk if something should happen. The guidance needs to catch up and demonstrate that these are useful technologies and tools. We need case studies to write that guidance so that it will enable local authorities to say, "We'll use this and we know that we're safe to do so".

The use of Night Tune type solutions is being used for the turtles in Saudi Arabia where the luxury hotels are being built: we are tuning the lighting

all the way down to 1,800 Kelvin in some cases where there is turtle nesting, and even turning the lights off altogether. That is happening more and more but it is not in the guidance, which prevents a lot of people from feeling comfortable about using it.

Q74 **Baroness Neville-Jones:** What Mr Bissell has just said leads into the question that I wanted to ask. From what you say, there appears to be a huge variation in behaviour. One of the themes running through the evidence we have had is that there are lots of different government bodies involved, from planning through to enforcement, mostly at local level. Does such a range of organisations actually hinder the development of policy, or do you think that in fact they can be so organised that that is not necessarily the case? How do you assess the level of communication between the different bits? That links to the question of whether people are clear about the level of responsibility that they bear. My question really is: is the system really working? Do we need some kind of national strategy so that people know what they are meant to be doing and at what level they are meant to be doing it?

Stuart Morton: There is a level of co-ordination between institutions. For instance, the ILP has recently worked with the Bat Conservation Trust where we have heavily gone at the specification of the tuneability of the wavelength of light to preserve conservation and biodiversity. There is the Lighting Liaison Group, and I will hand over to Allan shortly to discuss that with you.

Regarding a national strategy, in the statement that we sent in there were recommendations for areas that we could focus on, such as saving the dark skies that we have in the UK and some of the nature reserves. It would absolutely be beneficial to have a national strategy.

Allan Howard: The membership of the UK Lighting Liaison Group, for which I am secretary, includes all the professional bodies and government bodies that have an interest in light and lighting. We touch base and do our best to co-ordinate. Different parties, as you might expect, are more engaged in sharing information than others but, as was said earlier, we have a whole range of documents that each professional body produces. Some of those are tied up in commercial activities and so on, but it would be nice to bring them together and look at an overall lighting policy and strategy for the UK, depending on what areas we are looking at. Artificial light is everywhere—daytime, interior and outside—and affects absolutely everything, so it is quite a big subject to tie down and we have taken it in slices at times. There is certainly a need here.

We are very good at publicising these things among ourselves. For example, PLG 05, which I mentioned we have just produced, talks about illuminated advertisements, those big media screens. Where do we go to tell people, the planners and so on, that it is now here? We have told ourselves, but that is no good; we have to get it out to everyone else who gets involved in these areas. We need to look at how those links come about.

Baroness Neville-Jones: How do you assess enforcement? I suppose

local authorities are the main conduit for enforcement, but you have lots of people doing things with lighting over which they have no control at all. I can stick something up in my garden whenever I want. How do you assess that bit of the system?

Allan Howard: I suggest that the only time when we can look at full enforcement is under light nuisance, but that relates only to artificial light emitted from a premise affecting someone else's enjoyment of their own premise. At the time when that legislation was put into place, the Department for Transport would not support it. That department was given exclusions for railway stations, transportation hubs and other areas that can be lit very well and control the light. We want those exclusions removed, and we would like it to cover any artificial light, not just from one premise affecting another premise.

Baroness Neville-Jones: So the only control at the moment is nuisance.

Allan Howard: That is the only way we can approach it if someone has a problem. Is it on a premise? In that case, we can look at nuisance. If not, we have to talk nicely—"Can we persuade you to do this?", "It would be nice if you did that"—but there is nothing you can really do to enforce it.

Stuart Morton: We have had success with some of our local government clients, using gentle persuasion when we have lit sensitive species with amber and red lights, to get them to understand why it is different and when the lighting dims slightly later. That has been quite successful, and that is where we have managed to light areas and be inclusive and diverse, for instance. At the moment, I would say that gently changing people's mindset is helping, but being firm otherwise is quite a challenge for local authorities.

Guy Harding: I can only agree with what has been said. We as an industry are working together to an extent but, while we are very good at talking to ourselves, it is different when it comes to trying to get information out there. I struggle to get information on to the GOV.UK website with our documents.

Baroness Neville-Jones: It does sound, however, as though some local authorities have dispensed with the experts who they might have listened to.

Guy Harding: There is not always the expertise in the local authority. As Allan mentioned earlier, they do not necessarily have the funds to go to an external consultant and sometimes it is just ignored. There is a problem there. All the guidance we put together as the ILP—I am sure it is the same in the SLL—is done on a voluntary basis. My technical committee is full of volunteers like Allan who give up time from their day jobs to produce this guidance. As the ILP we have a very small number of staff, so it is very volunteer based. We do as much as we can, but it could go a lot further.

Baroness Neville-Jones: There are no penalties.

Andrew Bissell: A lot of local authorities we work with have produced some amazing documents like technical advice notes. We are seeing that the great information in one document is not necessarily being shared. You start to find that there is a technical advice note for Cumbria, another one for north Wales and one for the South Downs. Although each area has its own nuances, a lot of that information could be shared.

As an industry we need to get together more often. There is not just the ILP and the SLL. We also have the IDA, IALD and the IES. There are so many different lighting bodies. The only document I can think of on which we have all joined together to sign and support something was the ROLAN lighting manifesto. That is the only time six or seven bodies have come together and agreed on 10 statements that we should all follow. We need to do that more often to help the local authorities, but they can collectively get the right people together to help themselves.

Baroness Neville-Jones: Have you tried engaging the Local Government Association?

Andrew Bissell: No, we need to.

Baroness Neville-Jones: Perhaps you might try that, because it sounds like the local authorities could talk to each other with benefit.

Q75 **Lord Borwick:** By way of a closing statement, could each of you set out what you think is the most pressing priority for the Government to address on light policy in the UK and what your key recommendations would be?

Andrew Bissell: As I have mentioned, and it came up in the 2009 royal commission report, we have to look everywhere. It is absolutely right that we look at national parks, but we have to start looking at towns and cities and stop giving exemptions. We cannot reduce the criteria just because it is already a bright area. If anything, we should be harsher on those areas because they are bright.

The guidance, standards and policies need to take a step forward. They should say to the towns, cities and bigger polluters, "You have more work to do, and we're going to set more onerous criteria for you". It is all achievable. This is not going to suddenly cost a fortune. It is about good design and good products used the right way. I would focus on the bigger polluters now that we have a really good handle on national parks and areas of outstanding natural beauty.

Stuart Morton: We should move to protect rural areas as dark zones to limit the impacts now before it gets any worse. It is quite simple for me.

Allan Howard: I think it would be good to see artificial light brought properly into planning and that installations are required to be designed by competent lighting professionals who know what they are doing. I would suggest that, as part of that—it is picked up in an EU document on green public procurement for lighting—the designers are involved in the process all the way through to commissioning. In installations that I have been called to investigate because they have been really bad, we find that they look good on paper but there has been contractor substitution.

If a contractor says, "I could do this a bit more cheaply for you", suddenly we have lost the light control and energy efficiency and it becomes a very poor installation because the designer is no longer involved. The client does not say, "I'll just check back with the designer". You then find that you are going through all the issues after that.

We need to ensure that, where conditions are put into planning, they are checked off. If you have the designer in that loop signing off the installation as being installed, set up, commissioned and the client knows how to use the control system, we will solve an awful lot of problems, interior and exterior.

Guy Harding: I can only add to what my colleagues have said. I think they covered the main points. The one left for me is the availability of cheap unregulated products through DIY wholesalers and Amazon. Internet exports from the Far East completely lack light control and are really popular. Even on social media, really poor products are popping up on my feed, and you think, "Why is this being allowed?"

Lord Borwick: Would you ban those products from being sold in the UK in a perfect scenario? Is there no way of educating people not to want that sort of product?

Guy Harding: That is a tough one. Education is part of it, but there are certain products that should be banned as they are not suitable for any purpose apart from just providing glare.

Q76 **The Chair:** Andrew, you mentioned lighting in hospitals. We have been interested in that because of the importance of people in hospitals being able to sleep and the impact of light on the quality of sleep. Do you have any insights that might be helpful to us?

Andrew Bissell: We updated SLL *Lighting Guide 2* on lighting for healthcare a couple of years ago and recognised that issue. Historically there would be a light outside the ward door and the light comes in or under the door. It does not sound like a lot, but if you are not well and trying to sleep it is like in some hotels where you can see a line of light. It is a problem and we recognised that. In the guide, we talk about having lights to one side of the door or turning corridor lights down at night. However, they are recommendations and guides. If a contract is being awarded on cost, someone putting one big light in a corridor instead of two lights either side of the door is potentially going to win. Good guidance is there, but we need to somehow see that through in the procurement process.

The Chair: Does it make any use of the tuneable lighting we are talking about?

Andrew Bissell: A lot more tuneable lighting is being used. Hospitals are a perfect place for that. I worked on a European project, which I think started in 2008, looking at the patient environment and tuneable white light was part of the recovery process and sleep process. It even looked at having only red lighting on at night, so that when people get out of bed they can see the floor and do not fall over. People falling getting out

of bed and needing a new hip is quite expensive. People could see the floor but it did not wake them up as such. There is a lot of research. That was from 2008, and here we are. We need to somehow take all this knowledge forward.

The Chair: It is not being seen in hospitals as far as I think any of us can tell.

Andrew Bissell: Not often enough.

Q77 **The Chair:** The other question is: can anyone define human-centric lighting? It is a term we have heard, and we were interested in it.

Allan Howard: Essentially, it all depends on the light levels. We are not sure what the light levels are, but if you are under a cold white light of a low colour temperature, you will be more awake. It will create a certain level of alertness. There are sensors in the eye called the photosensitive retinal ganglion cells, which are sensitive to blue light wavelengths. If we reduce that, it can affect different people's moods. There is a theory that we could adjust how productive and alert people are during the day if we adjust the lighting levels across the spectrum of white light in an office.

On the other hand, it works in nature. To create it with artificial light possibly needs a high lighting level. We do not have enough research or understanding. The term is chucked around an awful lot, but there is no sound evidence about when it would actually work. However, we do know that people do not like to be in an environment with a cold white light. They like to be in environments with a warm white light. It has been shown in retail that they spend more time in shops with warm white light and spend more money.

Lord Krebs: I have a very quick question. In an earlier panel this morning on noise, the witnesses commented that the Government's environmental improvement plan makes no reference to noise as part of the environment that should be measured or managed. Is the same true of light? Are you aware of whether the plans refer to light?

Allan Howard: I am not aware of anything.

The Chair: Thank you, there are no more questions from the committee. That has been a very interesting session and we thank you very much for your time. I think some of you said you would be able to send us some further evidence. We would be very pleased to receive that.