



# LED – THE AGE OF DIGITAL LIGHTING

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## Where does LED technology go from here? Questions and answers from the everyday practice of an architect and a lighting designer

LED seems to be the new buzzword: no sooner do you say these three letters than a controversial discussion of the pros and cons of the new technology ensues. On the one hand, people are enthusiastic about the unlimited creative possibilities it offers, yet on the other hand designers and users are concerned about the lack of planning reliability associated with a rapidly developing technology and increasing numbers of new market participants.

The fact is that, with LED, digital technology has arrived even in the lighting industry. And as with computer technology, the leaps in performance are gigantic. Thus, LED solutions are being presented at Light+Building 2010 which are far in advance of conventional technology in terms of efficiency.

Stefan Behnisch, who, with his future-oriented designs, was the first architect to create buildings with 100% LED-based lighting, is convinced that the new technology could long since have become much more well-established. "More courage to embrace new ideas" is his motto. Andreas Schulz, CEO of LichtKunstLicht AG, Bonn/Berlin takes a rather more cautious view of the LED euphoria: "What we need from the industry is comparable data and planning reliability". Lightlife caught up with the two free-thinkers to talk about the possibilities and limitations of the new technology.

### Is LED, for you, the revolution that everybody is talking about?

Stefan Behnisch: Yes, I believe that LED marks a new era in lighting, and that it deserves more attention. I've always been baffled at the industry's cautious attitude towards LED. But I believe, for various reasons, that LED technology is a technology of the future. Probably not the only one, but there have never been simple truths, there's never been just one technology. The history of technology shows that there is no definitive technical truth. We had the light bulb, the energy-saving bulb, there was the fluorescent tube, and before the fluorescent tube there was the neon tube.

Andreas Schulz: For me, the development of the LED is a true revolution. However, it's still in the early stages, in terms of changing our lives, but it is in fact revolutionary, because it makes a lot of things possible which we as lighting designers have always wanted but which were difficult to achieve with conventional light sources.

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With his lighting design practice LichtKunstLicht, Professor Andreas Schulz has been creating the right lighting for numerous projects. More than 25 staff in the studios in Bonn and Berlin work on projects around the world, for example the Ruhr Museum in Essen, the Städelmuseum in Frankfurt and the National Gallery in Singapore. Prof. Schulz teaches at the "Hochschule für Angewandte Wissenschaft und Kunst" in Hildesheim, the only university in Europe to offer courses in the discipline of lighting design.



Stefan Behnisch is an internationally renowned architect with offices in Stuttgart, Munich, Boston and Los Angeles, who with more than 50 employees has driven forward the debate about sustainable building, particularly with projects which lead the way in terms of energy use. Projects handled by his practice include, among others, the University in San Francisco, Harvard University and the new Unilever headquarters in Hamburg.

**What are, for you, the most important properties, the most important advantages of LED, as it is available today?**

Andreas Schulz: LED is already available in good quality, it's just that it's still very expensive in comparison with other light sources. Advantages certainly include controllability, the ability to change the colour temperature and of course the compact dimensions of the light source, which make new luminaire designs possible.

Stefan Behnisch: The most important advantage of the LED is its long service life. Also, there is less toxic waste and they require less maintenance. The great benefit of the development of LED is that we need less material, less plastic, less chrome, less copper, and the LED has the advantage that it can be very flat, that is to say it doesn't necessarily require a reflector.

**So how far along is your customer, the developer, the investor, when it comes to LED technology? Are they already well-informed, do they appreciate the advantages or do they still see it as an experiment?**

Stefan Behnisch: It's not really an experiment any longer. In my opinion the lighting industry has failed to get this across adequately. But you have mentioned one keyword: the investor. Unfortunately, that's a problem. The investor has very little interest in the initial additional costs, because after all they are not responsible for the maintenance of the building. Convincing self-users is no problem at all. People who build for themselves see the advantages immediately. Certainly that's been our experience with the two projects where we have only used LEDs.

Andreas Schulz: The customer is informed, but only very superficially. And sometimes we are pressed to use LEDs in projects without the technical justifications having been properly established. The media has pushed us a bit far in this respect, and the industry also plays a considerable role here.

**Do the technical possibilities of the LED mean you are involved more as a luminaire designer?**

Andreas Schulz: We see ourselves more as luminaire developers or design engineers. When we develop an LED illuminated ceiling with which we want to create lighting suitable for a museum, in a certain sense we are also luminaire designers, but it is actually a technical application. Potentially, we can also work creatively, and there are a few really big projects where we use designed luminaires. However, we are primarily concerned with offering technical solutions which perhaps may not be industrially available, but which are necessary for our uses. Particularly in museums and very large commercial projects, special applications are often required. Because of our technical know-how and our contacts within the industry, we can come up with an application which is not yet available on the market, but which is certainly state-of-the-art.



Stefan Behnisch: I'm not a designer, I'm an architect. I don't even think that I can design particularly well, but one of the reasons why I find LED so exciting is that the technical prerequisites are very simple, and this means that I can use a relatively functional design. This is where I get my creative motivation. LED is a new concept, and in my view there are two ways to go in lighting design: there is the lighting fixture as an object, as sculpture. And then there's this illuminating "nothing" – that's an approach which I find very exciting

**What support you expect from the industry?**

Andreas Schulz: We are waiting quite impatiently for a certain modularisation and also standardisation of this light source. With every technical specification which we receive from the manufacturer, we don't know whether it is comparable with others. In terms of efficiency, service life, heat emissions and so forth, we need reliable data which help us designers to arrive at objective estimates. Since our projects run for a very long time, planning reliability is extremely important to us. If, one and half years ago, we had been thinking about the type of LEDs which we have today, we would have had to have been looking far into the future; such advances in performance could not have been foreseen at that time.

Stefan Behnisch: The rapid development, I have to say, presents a special challenge. We are talking about a light source the big advantage of which is long life; but we find at the same time that this light source is currently undergoing rapid development, a bit like the computer in the 1990s - each year the price halves and performance doubles. Naturally, this somewhat counters the advantage of long life. Another point is the luminaire manufacturers, who should really now also be making use of the technical opportunities to come up with a revolutionary new luminaire design. We all need to rethink our approach, even though people are reluctant to depart from tried and tested technologies in order to embrace completely new concepts. That's always a risk.

**What makes LED so popular?**

Stefan Behnisch: In discussions, we frequently find that not only does the LED luminaire have technical advantages, at the moment it also has a big image advantage, in terms of innovation, environmental technology and so on. The debate about the prohibition of light bulbs has also had a positive influence on the image of LED. It is in fact the right direction to take when it comes to reducing material use and construction volumes.

Andreas Schulz: Yes, it's got a lot to do with image. We're currently working on a project for a big steelmaking group. In the headquarters, we are using big LED lighting solutions for the conference rooms in the management areas. They are more expensive, but of course in this way the company is demonstrating its progressive attitude and the energy-saving potential represents sustainability in practice. The LED is clearly very suitable for this purpose.

**What do you see as being the advantages of the OLED and how do you see it developing?**

Andreas Schulz: The OLED is an LED light source which can generate a diffuse, flat light, which the individual LED light source is not able to do. When I imagine that in future we will have OLED light sources which we can, for example, use like diffuse, large panel lighting, that will be a big step forward, because suddenly we no longer need installation depth. It's a tempting idea that at some point we will be able to install a light source directly on the ceiling, or turn a window into a

luminaire. However, I believe it will be many years yet before the technology is that far advanced.

Stefan Behnisch: Essentially, the OLED achieves what I've always tried to accomplish with the LED. The "nothing" which illuminates, the surface which illuminates. I believe that the LED was a minor revolution. But it still works with the illuminating point, and not the illuminating surface. The OLED is clearly the next step. I'm assuming that at some point it will also become sustainable in terms of price.

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