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**Accelerate SSL Innovation for Europe**

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# **Report on output workshops held to support awareness raising and implementation**

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## Summary

This report gives an overview of the workshops and other events held and/or attended to support awareness raising and implementation for Human Centric Lighting (HCL) during the first and second year of SSL-erate.

It presents these events, including the messages sent to the audience, and it makes an attempt to capture the most interesting outputs of discussions.

In line with the project aim, human centric lighting (HCL) was promoted at a series of open innovation workshops organised by the SSL-erate project lighting cluster partners and at lighting conferences. The aim of programming the topic of human centric lighting to the open innovation workshops was to bring together the small and medium lighting enterprises with their customers and deliver them first-hand information on human centric lighting. At all of them, participants were able to interact with customers in the local area such as schools, hospitals and municipalities, learn from experts about the effects of LED lighting on health and well-being, and take advantage of the opportunity to co-create business value and profit. The goal of presenting at lighting conferences and fairs was to raise the awareness of the lighting manufacturers, lighting designers, customers on human centric lighting and encourage the exchange of scientific and business views.

In the first project year five Open Innovation Workshops were organised by local lighting clusters at Lyon, Eindhoven, Gent, Copenhagen, Bassano del Grappa and Barcelona. At this time, the Work Package 3 human centric lighting stock taking and analyses reports and information materials were not yet available for these workshops as initially planned. Therefore hosts adapted and turnouts were still positive.

In the second project year three Open Innovation Workshops were held in Copenhagen, Bassano del Grappa and Gent at which state-of-the-art and (being made) accessible human centric lighting knowledge was presented by human centric lighting experts. The presentations were based on the results published in the report D3.2-3.4 and also a short insight was given in the economic perspective.

Besides this, SSL-erate gave presentation at the following eleven conferences and fairs: Light and Building 2014 (Frankfurt), LED Professionals Symposium 2014 (Bregenz), BioWi 3rd Practice Forum 2015 (Weimar), Strategies in Light 2014 (Munich), LuxLive 2014 (London), Smart Lighting 2015 (Berlin), Cycled Project closing conference 2015 (Berlin), DIN Expert Panel 2015, LED Professionals Symposium 2015 (Bregenz), Strategies in Light 2015 (London), LuxLive 2015 (London).

The majority of events highlighted the positive effects of human centric lighting. Most of these effects are to be found in the biological and medicinal applications of human centric lighting. The often overlooked effects of human centric lighting in workforce are the most direct application of such features. In spite of the developing profound understanding of the technical aspects of human centric lighting both at academic and industry level, one is experiencing certain difficulties in convincing the public to adopt human centric lighting in their daily lighting environment. One important aspect is here the measurability of the positive yield of human centric lighting applications.

# 1 Events

## 1.1 Light+Building Fair, Frankfurt, Germany, April 2014

Light+Building saw the launch of the SSL-erate platform, as well as presentations from SSL-erate consortium partners and Commission representatives. Prof. Herbert Plischke from the University of Applied Sciences, Munich, presented “Enlighten your Brain, Health Aspects of Human Centric Lighting.”

A self-guided walking tour was available to all attendees at Light+Building to tour any manufacturers who were producing human centric lighting solutions. The Commission was taken on a tour of five such booths to see the products and services arising for human centric lighting.

During the whole launch event at Light+Building there were between 70-120 people in attendance.

[http://www.lightingeurope.org/uploads/files/Panel\\_2\\_Herbert\\_Plischke.pdf](http://www.lightingeurope.org/uploads/files/Panel_2_Herbert_Plischke.pdf)

<http://lightingforpeople.eu/wp-content/uploads/2014/03/Self-guided-walking-tour-of-Human-Centric-Lighting-applications-and-products.pdf>

## 1.2 LED Professional Symposium 2014 (Bregenz, Austria, 30/09-2/10/2014)

The symposium was the occasion for prof. Reine Karlsson of Lund University to deliver a keynote speech on how the platform Lighting For People will help to enhance the added user and business value by promoting solutions that are better for people's health and well-being, and also accentuate green business development.

## 1.3 Strategies in Light Europe 2014 (Munich, Germany, 23/10/2014)

Karin Smolders from the Rijksuniversiteit Groningen made a presentation titled, “Light for Health and Well Being” on Work Package 3 human centric lighting findings in work places at the Strategies in Light Europe 2014 conference in Munich. The conference was a success as it demonstrated clearly the oft-overlooked lighting conditions at offices. This generated a lively discussion among the audience which only augurs well for the future application of this technology in a corporate setting.

## 1.4 LuxLive 2014 (London, UK, 19/11/2014)

Prof. Herbert Plischke presented “Is Light a Drug?” on November 19 at LuxLive in London to a full audience (estimated 100 plus people).

## **1.5 SmartLighting 2015 (Berlin, Germany, 21/05/2015)**

The event featured the state-of-the-art in technology, applications, business models and best practices in intelligent and dynamic solid state lighting worldwide. It was attended by professionals working in the market of commercial lighting, residential lighting and public lighting.

The conference started with the presentation of visions of companies: Zumtobel, Philips, Osram, GE and XITACO. The “visionary panel” discussion was chaired and moderated by SSL-erate partner LightingEurope’s president, Jan Denneman. On behalf of LightingEurope, Attila Mórotz was the moderator of two afternoon session on human centric lighting, and market trends.

Herbert Plischke from SSL-erate partner MUAS gave a SSL-erate presentation on human centric lighting dealing with the general aspects of human centric lighting with insights into the methods and the biological efficacy of the measurement of light. He said: “Despite the scientific proven benefits of human centric lighting, nowadays the existing regulations on maximizing energy saving will counteract the beneficial effects of human centric lighting.” This was followed by questions on testing methods and their reliability.

It was interesting to see that this time the majority of presentations were held by high-ranking business people. We heard lots of discussions on what kind of smart things are possible to do on the lighting infrastructure and less about how better light can be provided to people by making lighting applications smarter. It was exciting to listen to the visionary presentations. Zumtobel put design center stage. Osram talked about the need for standardization and for better interoperability, privacy and security. XICATO was advocating for open systems to increase competition. Philips emphasized the energy efficiency potential. GE envisaged a service based lighting business enabled by all kinds of sensors, machine to machine communication solutions. Nest sees the future in self-learning and connected applications - thermostat module, smoke detector and lighting -, which are linked into an open system and supported by novel design.

## **1.6 DIN Expert Panel 2015 (Berlin, Germany, 25/06/2015)**

Unfortunately, the DIN Expert Panel 2014, which was anticipated to provide an overview on the latest state of science, realized projects and best practices in the field of non-visual effects of light on humans was cancelled in 2014 due to the expiration of funding from the German Ministry. As a consequence, the SSL-erate project was not able to participate in it this year. In the end, this worked to the advantage of the project as the WP3 deliverables were finalized later than anticipated, since at the DIN Expert Panel in 2015 we were able to share more complete results.

At the end of June 2015, ZVEI, the German Electrical Industry Association organized a one day lecture program for the DIN Expert Panel about human-centric lighting. This was another opportunity for the SSL-erate project to give and disseminate news and information about the latest findings in the Human Centric Lighting program. The day’s event was attended by more than 80 people from the world of science, government and the lighting industry. The aim of the conference was to educate attendees regarding human centric lighting in the applications of education, healthcare, domestic, workplaces and smart cities. The keynote speaker was Dieter Lang, Principal Key Expert - Biological Effects, OSRAM GmbH Corporate Innovation - Advanced Technology. The lecture program was divided in four thematic areas.

In the first block, research was presented on the effect of light (high illuminance and a high blue component) on the elderly. Observed was an improved diurnal activity, more communication and reduced nocturnal restlessness and agitation. In another block of studies the effects of light were presented on mood and neurocognitive effects. The positive effect of sunlight on ADHD patients and the relationship of light, lack of sleep and caffeine were treated. The third block was the subject of jobs. Here positive effects of light on performance, sleep and a stable circadian rhythm were shown.

In the fourth lecture block, the EU FP7 project SLL-erate and the associated Lighting for People platform were presented. The presentation was held by Dieter Lang and Attila Mórotz (LightingEurope) and gave an overview of the state of the knowledge about human centric lighting from the point of view of both biology and economics. The scientific publications on human centric lighting in recent years were evaluated.. Further approaches to quantitative evaluation of light and to identify dose-response functions were presented as well. It also announced the roadmap of deliverables e.g. report on metrics and report on economic barriers and drivers.

## **1.7 LUCE in Veneto 2015 (Venice/Bassano, Italy, 18-19/06/2015)**

This SSL-erate event was dedicated to presentations of business development experiments. It included speakers who explained the best implementation practices and execution for cities and industries. Architects (42) and lighting companies (26) attended the event.

Fabrizio Tironi (LightingEurope, Assoluce) presented an overview of human centric lighting and its general features for lighting professionals. This was followed by a presentation of Philipp Novotny (MUAS) on the circadian cycle and the economic benefits of human centric lighting. The questions were rather practical and the participants wanted to know how to use light in practice and how to design good human centric lighting and have guidelines for technical aspects of human centric lighting.



## **1.8 LED Professionals Symposium 2015 (Bregenz, Austria, 24/09/2015)**

The conference presented insights on the latest trends in LED and OLED lighting technologies and Green Business. Research institutes, lighting organizations and the lighting industry were present. The topics the symposium touched upon were what the barriers are for selling human centric lighting better and the benefits that human centric lighting might yield to everyone.

From the symposium a consensus grew that more works needs to be done around design education and awareness as well as around the quality of the human centric lighting equipment. Despite the countless well-known academic and industry participants at the event such as Dr. Jy Bhardwaj (Lumileds), Zary Segall (KTH, Stockholm), Peter Dehoff (Zumtobel), Pranciskus Vitta (Vilnius University), Dr. Peter Bodrogi (Technical University Darmstadt), Ken Modeste (UL), the question what the most relevant colour metric is for human centric lighting remained without answer. In addition some cooperation partners such as the Bauhaus-Universität Weimar and LiTG – Deutsche Lichttechnische Gesellschaft e.V. were also present. Moreover, the sponsors Trilux, Waldmann, Zumtobel and ZVEI (Zentralverband der Elektroindustrie) took part as well.

<http://www.led-professional-symposium.com/symposium/LpS%202015%20-%20Call%20for%20Papers>

## **1.9 BioWi – 3rd practice forum – Biological light effects 2015 (Weimar, Germany, 23-24/09/2015)**

At the BioWi, there have been several presentations on different highly relevant practical topics. On the first day, introducing the topic light and health, Prof. Dr. Plischke from SSL-erate partner MUAS was presenting news from science about the non-visual effects of light. Mr. Lang from Osram was talking about the work of the FNL27 lighting standard committee on transferring the non-visual effects of light into standards within the german DIN standards. Additional presentations followed by Dr. Flüchter and Mr. Treptow about the challenges, the advantage and the benefit of modern lighting technologies for Germany and Europe. Within their practical oriented presentations Dr. Wojtysiak and Mr. Winkler presented new data within optimized lighting environments for education and Mr. Köhler, Mr. Smida, and Mrs. Hülsmann were talking about light and its' use as a tool for creativity and creator of atmosphere. On the second day, presentations continued with talks focused on light in an aging society by Mrs. Sust, Mr. Novotny, Dr. Hammer, and Mr. Linek. PD Dr. Kunz talked about the effects of light on performance, sleep and circadian stability while Prof. Dr. Reidenbach presented the risk potentials by optical radiation. The 3rd practice forum finished with presentations on simulated and implemented light scenarios for offices, workplaces, and equivalent environments. The studies were presented by Mrs. Sona, Mr. Canazei, Mr. Auber, Dr. Holzer, Mr Rudolph, and Prof. Wambganß.

## **1.10 Strategies in Light Europe 2015 (London, UK, 18-19/11/2015)**

The Conference raised public awareness and provided a first-hand presentation on how the lightning business can keep up-to-date with current regulations, technologies and trends within the lighting industry. LED component manufacturers, LED luminaire and lamp manufacturers, lighting wholesalers and distributors along with lighting specifiers were present.

LightingEurope board member Massimiliano Guzzini gave a key note speech about his vision on human centric lighting and gave a quick run through its implementations in call-centers, airports and museums. Philips showed also its interpretation, how to exploit the visual, biological and emotional character of light and link it with the data economy.

The conference witnessed the use of new terms describing the “beyond” aspect of lighting: human centric lighting, connected human centric lighting, social centric lighting and citizen centric lighting. <http://www.sileurope.com/index.html>



## **1.11 LuxLive 2015 (London, UK, 18-19/11/2015)**

At LuxLive, a SSL-erate session was held with presentations by SSL-erate partners Christian Cajochen (Basel University) and Marc Steen (TNO) about the current state of affairs of human centric lighting as well as the power of open innovation approach in the lighting clusters. This was followed by a very lively panel discussion was held with the participation of Trilux, Basel University, Swedish Parents Association and a skeptical lighting designer. The event was visited by more than 60 participants.

At the event some fear was expressed that human centric lighting's role would be limited to increasing people's work output, hence increasing the already heavy work burden. The panel discussion resulted in some important issues being raised such as the importance of having the right metrics and design guidelines or where to measure lighting for e.g. standardization purposes (on desk level or on eye level). From the Swedish parents association the wish was expressed that parents (customers) need more facts, less marketing talk and more personal experience of human centric lighting.

## 2 Conclusions

As more data becomes available from WP3, the Work Package looks forward to giving stronger, more meaningful, more comprehensive and subtle information to the target groups. By popularizing the Lighting for people platform, it is becoming a well-known and recognized source for Human Centric Lighting, where academia and industry people find information and ideas.

An increasing interest in human centric lighting can be found at event organizers and companies. The organizers of the listed events in this report, devoted only a few presentations to human centric lighting in 2014. In early 2015 there were already full sessions filled with the topic. By the end of 2015 e.g. at Strategies in Light in London all keynote speakers were talking about human centric lighting and a full (parallel session) block was devoted to it, too. This trend goes hand in hand with how the message of companies at lighting fairs is evolving. Previously, the main message was about energy efficiency of lighting, now they are talking about smart, connected and human centric lighting. We also experienced a continuous increase in attendance size.

This happens all in spite of the fact that still difficulties are experienced in translating the available scientific evidence into reliable technical applications. More specifically, most customers are demanding more reliable facts, first on the biological cause-effect mechanisms, secondly on the economic viability.