International Commission on Illumination
Commission Internationale de l'Eclairage
Internationale Beleuchtungskommission

CIE Tutorial on Urban Lighting Masterplanning

Istanbul, Turkey

May 3 – 5, 2023

The manner in which a city is lit not only determines its image at night but also impacts how inhabitants, workers, visitors and tourists perceive and use the city during night time. A well-lit city maintains a balance between the functional aspects such as road lighting and the elective aspects such as the lighting of buildings, infrastructure and landscapes. While road and street lighting is predominantly provided for the safe movement of vehicles, cyclists and pedestrians, architectural lighting creates visual expression, contributes to the urban identity and makes the cities visually attractive when the sun goes down.

The primary objective of a lighting masterplan is to identify all forms of lighting that contribute to the urban nightscape and to ensure that these are provided and operated in a manner which creates a balanced overall ambience with respect to the users' activities and energetic/environmental aspects. In order to achieve this aim, consideration must be given to not only the visual objectives but also to the legislative, managerial, and economic aspects. Hence, it is not easy to plan the urban nightscape in a holistic way

The Technical Report CIE 234 "A Guide to Urban Lighting Masterplanning" gives comprehensive guidance on designing lighting masterplans for cities, towns and even villages. This valuable tool is appreciated by all parties involved in urban lighting in whatever form. It allows to establish legal and technical framework for preparing, designing, installing, operating, maintaining, refurbishing and budgeting lighting systems that constitute the overall urban lighting of a city. Evolution of lighting tends to lean towards digitally empowered adaptive and integrative lighting as organic part of the "smart city" concept, approaching to lighting tasks in an innovative way. Energy performance, preservation of the environment and sustainability are indispensable aspects of masterplanning.

The tutorial aims to present and explain essential theses of the CIE 234:2019 complemented by illustratory examples and case studies. The particular topics comprise conceptual and methodological basics, detailed description and tratise on inputs, processes and outcomes of the analytical stage, recommendations for designing of the lighting masterplan and its implementation. Theoretical knowledge will be supported by practical examples, case studies and most of all, by technical tour at day and night. Because many examples presented in the Technical Report are showcasing Istanbul, the tutorial participants will have opportunity to see these places of interest on site and experience the real world applications. Round table with Q&A and open discussion will conculde the tutorial.

Who should attend: The tutorial is beneficial and interesting to broad range of subjects involved in public lighting of cities such as municipalities, governmental and non-governmental organizations, lighting architects, lighting designers, manufacturers and vendors of lighting products, operators and maintainers of lighting systems, professional institutes and societies, lighting educators, environmental organizations, utility services, building owners etc.

What you will learn: Fundamental concepts and methodology of lighting masterplanning. Who should initiate and prepare a lighting masterplan. How to build-up a masterplanning team and what consultation groups should be involved. Relationship between urban planning, transportation and lighting. What is important to analyse and consider in details. How to create the luminous concept and to draft lighting solutions. Why to take into account environmental impacts of lighting and what measures can reduce unnecessary light spills. Financial and operational considerations in planning for lighting implementation.

How to attend: The tutorial is to be held as in-person event. Pre-registration to the tutorial will ensure that You miss no updates about the event!

The tutorial is accompanied by optional functions:

- Bosphorus boat cruise with dinner where participants can see the illuminated banks from a different perspective
- Lighting lab tour at the Istanbul Technical University (ITU)
- Regular meetings of CIE Technical Committees relevant to the subject of the tutorial, accessible for the participants as observers

List of presentations:

Presenter	Topic
Mujgan (TR)	Scope and general considerations
Tuba Baskan (TR)	Concepts, definitions and methodology
Mujgan (TR)	Analysis of a city or town
Tuba Baskan (TR)	Analysis of city districts and individual elements
Dionyz Gasparovsky (DG)	Designing the masterplan for utility lighting
Diana Del-Negro (PT)	Designing the masterplan for architectural lighting
Steve Lau (CN)	Energy and environment
Steve Lau (CN)	Implementation of the masterplan

The tutorial team and their presentations:

	Presenter	Abstracts
	**Prof Mujgan Serefhanoglu-Sozen** *Yildiz Technical University (YTU), Faculty of Architecture, Istanbul (TR)* Mujgan took an active role in the courses such as especially Architectural Lighting, Acoustics, Solar Energy and Control within the scope of Building Physics (BP), in the establishment of the Lighting Laboratory and the post graduate program (BP), in the management of theses, seminars and research projects in the Faculty of Architecture at YTU since 1967. She became a member of IES-CIBS in GB (1972) and IESNA in the USA (1984), maintained these memberships for years, and participated in some activities. She has done many projects and consultancy as the first female architect who works continuously on architectural lighting in Turkey. When the establishment of Turkish National Committee on Lighting (ATMK) in 1995, she served as the Vice President and then on the board of directors for about 15 years. She gave lectures on urban lighting at ATMK seminars. As the CIE D5 Turkey representative, she attended the general assemblies of the CIE Division from 1996 until its closure. In 1999, she prepared a report on "City Beautification" and ensured the establishment of a new TC with the same name and served as its chair for many years. In the case of "TC 5.21 – A Guide to Urban Lighting Masterplanning" and "TC 5.24 – Guide for Architectural Urban Lighting" of this very extensive study, she presided both of them for nearly three years. TC 21 continued to operate as TC 56 within the scope of Division 4. It was published in 2019 as Guide on Urban Lighting Masterplanning. She has several publications on lighting - espacially urban lighting and masterplanning. After retirement, she continues to give some postgraduate courses as a visiting professor at YTU. Besides she gives consultations on Lighting and Acoustics projects.	**Scope and general considerations** A well-lit city maintains a balance between the essential, functional aspects such as road and street lighting and the elective aspects such as the lighting of buildings, infrastructure and landscapes. The primary objective of a lighting masterplan is to identify all forms of lighting that contribute to the urban nightscape and to ensure that these are provided and operated in a manner which creates a balanced overall ambience with respect to the users' activities and energetic/environmental aspects. In order to achieve this, consideration must be given to not only the visual objectives but also to the legislative, managerial, and economic aspects. This presentation will introduce the scope of a lighting masterplan, organizations that have an interest in lighting development. Besides groups that benefit from successful lighting masterplan will be mentioned. **Analysis of a city or town** The first stage in preparing a master plan is the analytic process. This process requires a detailed study of the total urban area or, if the exercise is restricted to agreed areas, selected section(s) of the city. The resulting data will form the basis of the lighting planning process. In analysing a city's existing and future lighting needs, both utility and architectural lighting should be considered as of equal importance in the overall nightscape. In this presentation the different stages of analysis of a city or town will be examined through examples. Also, masterplan analysis will be determined according to city users, natural properties, image of the city/town, urban identity, silhouette effect of the city, hierarchy between buildings, landmarks of the city, viewing points, terraces, directions and viewing distances.

	Presenter	Abstracts
	**Dr Tuba Baskan** *Istanbul Commerce University, Faculty of Architecture and Design, Istanbul (TR)* Tuba worked at Yildiz Technical University, Faculty of Architecture, Building Physics Department as a research assistant during her post graduate and doctoral studies on Lighting. She worked at Philips Lighting (currently Signify) as a senior lighting designer and Lighting Academy manager, in between 1999-2018. She did many indoor and outdoor architectural lighting projects. She gave lectures on several lighting subjects in trainings and seminars. She is a member of Turkish National Committe on Lighting (ATMK) since it was established in 1995. She has participated national and international Lighting Congresses that ATMK organized. She worked on the preparation of "TC 5.21 – A Guide to Urban Lighting Masterplanning" with her doctorate professor Mujgan Serefhanoglu Sozen (Prof., M.Arch). Tuba is a lecturer at Istanbul Commerce University, Faculty of Architecture and Design; and gives courses especially on Architectural Lighting and Acoustics since 2018.	**Concepts, definitions and methodology** The primary purpose of urban lighting is the provision of sufficient illumination to perceive the environment and to facilitate orientation, safety and security. This aspect of urban lighting is related to utility lighting such as roads, squares, open spaces, airports, bus stations, car parks etc. The further purpose of lighting is to enhance the urban nightscape by emphasizing its aesthetic values, such as its architecture and cultural heritage, plus natural vegetation and landscape. The objective of masterplanning the urban nightscape is to integrate all these aspects in order that they visually complement each other rather than distract from each other, by taking into account not only the basic functional lighting, but also the aesthetic and emotional aspects of lighting design. In this presentation masterplanning the urban nightscape will be expressed within the scope of Utility (functional) Lighting and Architectural Lighting. Besides work stages of lighting masterplanning will be mentioned. **Analysis of city districts and individual elements** Varieties of districts are the basic components of a city's image. The physical characteristics may consist of different aspects, such as texture, space, form, building type, symbol, activity, cultural aspects, topography, and in a closely built area, homogeneity of facade, material, colour, modelling, and ornamentation. All these provide the basic physical variations that create the identities of individual districts. Together with the city and district analysis, detailed analysis of individual elements is also needed. This presentation will express criteria of analysis of individual elements. Also, the objectives of a lighting masterplan will be mentioned.

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	**Prof Dionyz Gasparovsky** *Slovak University of Technology in Bratislava (SK)* Dionyz is Division Director of the International Commission on Illumination (CIE) responsible for transportation and exterior applications. As professor at the Slovak University of Technology in Bratislava he is lecturer, researcher and supervisor to PhD students for the problems of lighting technology. Focus of his professional interest cover road lighting, obtrusive light, smart lighting, energy performance of lighting systems, also some interior lighting applications (lighting of workplaces, school lighting, home lighting) and low-voltage electrical installations. Technical experience with auditing, designing and measuring of lighting systems. Author or co-author of tens of peer reviewed publications. In the CIE Dionyz chairs the technical committee on maintenance of lighting systems and contributes to the work of many other technical committees. Active also in standardization committees on light and lighting – CEN/TC169 and ISO/TC274. Dionyz contributed to the Technical Report CIE 234 on urban lighting masterplanning as advisor, also incorporating examples from Bratislava. Seldom when not busy with lighting problems or other labour, Dionyz is keen to ski, dive, ride on motobikes, practice martial arts or just listen to music or watch movies.	**Designing the masterplan for utility lighting** In creating a practical and effective luminous concept of the masterplan, both the essential utility (or amenity) lighting and the architectural lighting should be considered together as two contributions to the total visual image of the city at night. Utility lighting, in the form of road, street, footpath and security lighting remains a constant prerequisite for the safe and comfortable use of a city at night. Functional lighting elements are visually predominant, and contribute significantly to the lit city, they form a key part of the foundational elements of a masterplan. Similarly, the functional lighting of sports, industrial, railway and port areas should be considered in relation to the city's visual characteristics. It is important that such forms of utility lighting be in harmony with the overall nightscape and that they are planned to support the objectives of the lighting masterplan. The presentation is dealing with classification of various functional lighting elements, differentiating hierarchy between roads, arrangements of lighting systems, illumination of urban spaces (pedestrian areas, squares, local precinct centres), contribution of the trespassing indoor lighting, selection of light sources, luminaires, lampposts, lighting control and lighting management systems.

	Presenter	Abstracts
	**Diana Del-Negro** *(PT)* Diana is an architect, with a PhD fom University College London in Urban Lighting and a Master's degree on the Conservation of the Built Heritage from the University of Lisbon. She is the Founder and Director of Lightware.pt, an architectural lighting design firm based in Lisbon that delivers large scale exterior and interior lighting projects for architecture and urbanism. She combines 20 years of lighting practice with academic research, being the author of a book and several publications on the subjects related to urban lighting and heritage lighting. Prior to founding Lightware she was responsible for the exterior lighting of the monuments of the city of Lisbon, for over 15 years, where she designed and helped implement several lighting projects for its main monuments and public spaces. These include Praça do Comércio, Rotunda Marquês de Pombal and most of Lisbon's churches.	**Designing the masterplan for architectural lighting** A fundamental aspect of the lighting masterplan is to select and set some broad guidelines for lighting urban elements. The lighting of elements such as public buildings, monuments, significant infraestructures, statues, public art, among others, can express the functional, historical, architectural, social and aesthetic significance of an area at night, and also of the city as a whole. This presentation will discuss the importance of the legibility of these elements at night, present some case studies and discuss the development of the future new CIE guide for lighting urban elements, which is currently under development.

	Presenter	Abstracts
	**Steve Lau** *YD Illumination, Hangzhou China* Steve Lau is Vice President for Institute of Intelligent Lighting & Control system at YD Illumination. His interests are photometric and radiometric measurements of light and lighting, developing lighting system and control system, landscape lighting design and its application. He is advisor to many outdoor lighting and architectural lighting projects. He is a member of CIES (China Illuminating Engineering Society). He is advisor for 8th Council Intelligent Transportation Lighting Committee of CIES. He is author or co-author for 20 over papers and publications. He is a regular speaker for both domestic and international forums, conferences and seminars in CIE, LUCI (Lighting Urban City International), ALC (Asia Lighting Conferences), CIES etc. Steve Lau is the chair for TC 4-58 “Obtrusive Light from Colourful and Dynamic Lighting and its Limitation" . He is member of TC2-79 “Integrating Sphere Photometry and Spectroradiometry and members of several TCs in both CIE Division 2 and Division 4. He serves the CIE as its Division Secretary for Division 4 (Transportation and Exterior Application).	**Energy and environment** A lighting masterplan should prescribe the avoidance of light pollution, sky glow or any other from of obtrusive light. Under some circumstance, or a neighbour’s lighting that illuminates the interior of an adjacent dwelling, can create disturbance of sleep patterns and cause ill health for residents. Improper luminaire type, location and mounting height and inappropriate light distribution can cause glare and visual discomfort. The increase of usage of dynamic and colourful LED media façade and a significant increase in the use of saturated colour for the lighting of building facades can create a danger of ‘colour pollution’ where the constant use and movement of colour leads to visual fatigue and repetition. This presentation will present real examples on lighting masterplan from China and focusing on the transient from the design stage to the implementation stage of lighting masterplan in order not to over-lit, waste energy or cause any obtrusive light. **Implementation of the masterplan** One of the important aspects of lighting masterplan is to predict the cost of the proposed lighting installation which includes capital costs and operational costs. Besides that, the maintenance factor of the lumianaires and its energy consumption are important factor to be considered during the implementation stage. It is essential for a city to establish a system to review and approve lighting plan for each installation in order to ensure these are completed in accordance with the approved plans and are correctly commissioned. The presentation is dealing with financial and operational considerations in the lighting masterplan implementation stage, maintenance, lighting operation policy, city lighting management and developing the lighting budget will be examined through examples.