



Albertslund Kommune



CITY OF COPENHAGEN



CITY UNDER  
MICROSCOPE

ALBERTSLUND  

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COPENHAGEN

DENMARK



17th to 20th  
September 2014



Even though Albertslund is a relatively small municipality within Greater Copenhagen, we have become a green game changer. To do so we have had to develop innovative strategies.

We work closely in new ways with companies, researchers and other municipalities. We use the city as a living lab for developing and testing green technologies, actively engaging our citizens.

Increasingly, we are focused on lighting, aiming mainly on future technologies within outdoor lighting, SSL and smart city. Our new Living Lighting Lab will open this year and is set to become a hub for cutting edge lighting technology in Europe.

We do this to reach the goals of our ambitious carbon reduction plan and to create a strong platform for green business growth.

We strongly believe that good ideas arise in dialogue. In this spirit we are very pleased to welcome you to the city of Albertslund for this LUCI City under Microscope.

#### **Steen Christiansen**

Mayor of Albertslund



The City of Copenhagen, the capital of Denmark, has a strong focus on green perspectives and high ambitions for our urban lighting.

Within the next year and a half, Copenhagen will change 20 000 light points and over 65 % of the urban lighting will use LED technology. By 2016, the technology change will reduce the total electricity consumption for urban lighting by 57%. The lighting master plan for the 20 000 fixture renewal project reflects the City's ambition to create consistency in the lighting and also to create local atmospheres within city districts.

This renewal project is in coherence with Copenhagen's ambition for being a CO<sub>2</sub> neutral city by 2025 and becoming the first CO<sub>2</sub> neutral capital of the world. At the same time Copenhagen has a great focus on improving quality of life, innovation and creating new jobs and investments.

This LUCI City under Microscope is a partnership with the City of Albertslund, and together we would like to show how we work with and plan urban lighting and promote green thinking.

#### **Morten Kabell**

Mayor of Technical and Environmental  
Administration in Copenhagen



We are very pleased to bring together the LUCI network in Albertslund and Copenhagen, two cities engaged in developing some of the most pioneering and exemplary lighting strategies in Europe.

As a frontrunner in sustainable development, Albertslund has developed a great number of innovations in the lighting domain. From the Albertslund lamp in the 70's to the DOLL test centre today, the city constitutes a living lab which we will be eager to discover.

With its new lighting strategy aiming to replace 20 000 light points with LEDs, Copenhagen will also offer a unique opportunity to discuss some of the main questions cities still have concerning LEDs, from quality issues to lifecycle costs. It will also be interesting to see how lighting can contribute to Copenhagen's smart city strategy and its objective to become carbon neutral by 2025.

With all my LUCI colleagues, I am looking forward to the unique learning and networking opportunities this LUCI City under Microscope will offer.

#### **Martine De Regge**

LUCI President  
Deputy Mayor of Ghent

## Wednesday 17 September

- 8:30 Light & Art Commission meeting *(for Commission members only)*
- 17:30 LUCI Executive Committee meeting *(for EC members only)*
- 19:30 Welcome to Copenhagen - the European Green Capital 2014
- 21:00 Copenhagen lights - an excursion through the city

## Thursday 18 September

- 9:30 Welcome to Albertslund - a frontrunner for sustainable city development
- 9:45 Albertslund - a triple helix Living Lab for lighting and smart city
- 10:45 The lighting plan of Albertslund and the tradition of Nordic Light
- 11:45 Lunch
- 13:15 Design, management and maintenance  
- involving citizens and pushing lighting technology
- 14:15 Parallel excursions: DOLL Quality Lab or Albertslund, the planned city
- 16:15 International opening of DOLL
- 18:30 Dinner
- 20:30 Tour of DOLL Living Lab - the outdoor showroom  
for state-of-the-art LED-lighting solutions
- 22:30 Albertslund lights - an excursion through the city

## Friday 19 September

- 9:30 The Loop City Vision - creating an urban region across national borders
- 10:15 Copenhagen 2025 - the world's first carbon neutral capital
- 11:30 Copenhagen lighting strategy and lessons learned from the tender  
process - changing 20 000 fixtures to LED
- 12:30 Lunch
- 14:00 Parallel sessions with 4 lighting projects in Copenhagen and Albertslund
- 16:30 LUCI announcements
- 20:00 Dinner

## Saturday 20 September

(optional programme)

- 10:00 Canal tour - architecture and daylight from a harbour perspective
- 12:00 Lunch
- 13:00 Guided tour in Nordhavn





Wednesday  
17 September

**8:30 Light & Art Commission meeting** *(for Commission members only)*  
/ "Dantes Plads" room, Njalsgade 13, Copenhagen

**17:30 LUCI Executive Committee meeting** *(for EC members only)*  
/ "Saxo" room, Black Diamond - Royal Library, Copenhagen

**19:30 Welcome to Copenhagen - the European Green Capital 2014**  
/ Black Diamond - Royal Library, Copenhagen

*Jakob Hougaard, Deputy Chairman of the Technical and Environmental Committee, City of Copenhagen*

*Martine De Regge, President of LUCI and Deputy Mayor of Ghent*

**21:00 Copenhagen lights - an excursion through the city (on foot)**

- Kalvebod Bølge - room for motion and relaxation
- Safety for cyclists
- Vester Voldgade and Istedgade - examples of Copenhagen street lighting

**22:30 Return to the hotel**





8:30 Departure from the hotel

9:00 Registration and coffee / MusikTeatret Albertslund

Moderator: Kenneth Agerholm

**Kenneth Agerholm** has designed, moderated and managed more than 150 conferences, workshops, and seminars on innovation, sustainability, leadership, creativity and business strategy. Kenneth has also been a facilitator of large cross-sectoral partnership projects and programmes in Albertslund.



9:30 Welcome to Albertslund - a frontrunner for sustainable city development

**Steen Christiansen**, Mayor of Albertslund

This presentation will introduce you to new town Albertslund and its committed approach to reducing CO<sub>2</sub> emissions since 1992. A strong political and citizen driven strategy developed the young suburb into an environmental game changer. Innovation in lighting and the city as a living lab became key strategic approaches.

**Steen Christiansen** has been Mayor of the Municipality of Albertslund since 2010. Since 2002 he has been a member of the Municipal Government Board and Chairman of Environment and Planning. Today he plays a significant role in a large number of organisations and companies taking care of cross-municipal issues and tasks in both the national and regional agenda.



9:45 Albertslund - a triple helix Living Lab for lighting and smart city

**Anne Marie Holt Christensen**, M.Arch., Head of City and Environment, Albertslund Municipality

**Jacob Lundgaard**, Programme Manager, Albertslund Municipality

Built in 10 years in the 1960's, Albertslund is a young municipality based on the ideals of the welfare state, political engagement and town planning on a human scale. Albertslund has a strong tradition of leading the way with innovative and ambitious green solutions. Through triple helix partnerships with leading companies and researchers, Albertslund today offers itself as a living lab for demonstrating tomorrow's solutions for sustainable cities and green business development. In recent years, the focus has been on developing a large scale living lab for intelligent lighting and smart city solutions.

**Anne Marie Holt Christensen** is head of the unit responsible for developing Albertslund on the basis of its existing qualities: green areas, well-functioning dwellings, and an innovative and citizen-based approach to city development. Anne Marie holds a Master's degree in Strategic City Planning and has for the last 7 years worked with city planning and climate issues in Albertslund Municipality.



**Jacob Lundgaard** leads the transition of Albertslund's largest industrial area into Copenhagen Photonics Science Park. He is experienced in public-private innovation and partnerships - bringing together cities, private companies and knowledge institutions in the field of energy and climate. He is the former Director of Denmark's largest city-driven triple-helix organisation Gate 21.

10:15 Coffee break

10:45 The lighting plan of Albertslund and the tradition of Nordic Light

**Kenneth Munck**, M.Sc.E.Eng., Project Manager, Senior Lighting Engineer, ÅF Lighting

Albertslund's original street lighting was developed in the 1960's and 1970's. The city's first complete lighting plan was developed in the years 2005-2013 on the basis of the Nordic lighting design tradition – a tradition focusing on energy efficient lighting technology, lighting quality and specially designed luminaires with low glare. A big renovation plan and conversion to LED is now a part of the master plan.

**Kenneth Munck** has many years of experience in the lighting business and extensive knowledge of LED technology, light sources, control of lighting, and regulations and standardisations in relation to street lighting and energy efficiency. Kenneth primarily works with master plans and procurement strategies for street lighting.



11:45 Lunch / MusikTeatret Albertslund

### 13:15 Design, management and maintenance - involving citizens and pushing lighting technology

**Sif Enevold**, Lighting Programme Manager, Albertslund Municipality



This presentation offers detailed insight into lighting innovation in Albertslund, the A-lamp, the strategy for ownership, the variety and character of the public lighting network, the installation programme for LED and intelligent lighting, operational issues and the organisation of the public lighting.

**Sif Enevold** is head of the city lighting programme and holds a Master's degree in Civil Engineering and Urban Planning. She has a background as programme manager of innovation projects in energy renewal across municipalities, private sector and research. Sif has also been the project manager of several strategic planning projects and has worked with strategic planning in the regional authority and the home rule of Greenland.

### 14:15 Parallel excursions

- Lighting the planned city - guided tour in Albertslund

**Guides:** **Sif Enevold**, Lighting Programme Manager and **Torben Christian Zinn**, Project Manager for Outdoor Lighting, Albertslund Municipality

This tour will take you through the city centre and the large social housing district "Albertslund Syd." It will provide insights into how the transformation of the city has resulted in changes in the lighting of the city. On foot you will experience the city's unique traffic separation system and we will discuss the choice of lighting and how it has had an impact on the citizens and the environment.



**Torben Christian Zinn** has been a driving force behind the development of Albertslund's lighting plan, playing a key role in forging the modernisation strategy and design plan. He has been the head of the municipal parks and traffic team and has more than 20 years of urban planning experience as well as expertise in traffic management and park development.

- DOLL Quality Lab - testing light sources, lamps and lighting components / Risø DTU National Laboratory for Sustainable Energy, Roskilde

**Guide:** **Jakob Munkgaard Andersen**, Chief Science Officer, DOLL Photonics GreenLab

Based at the Technical University of Denmark (DTU), DOLL Quality Lighting Lab is a leading test and characterisation facility for photometry and colorimetry in Northern Europe. It plays a central role in the lighting industry validating LED lighting solutions and participates in research and development of commercial products.



**Jakob Munkgaard Andersen** holds an engineering degree in production management and has managed product development as well as testing and characterisation in the lighting and design industry for the past 10 years. He was one of the LED lighting pioneers and has worked with research and LED implementation since the early days of commercial LED.







## 16:15 International opening of DOLL / Hersted Industripark

- DOLL - Europe's new large scale test and demonstration centre for lighting

*Paul Michael Petersen, Professor, Department of Photonics Engineering, Technical University of Denmark*

How do you approach a future-proof transition to LED technologies? Why is it relevant to accelerate the uptake of LED lighting solutions? With the purpose of supporting municipalities, regions and private companies, in corporation with scientists, DOLL is Europe's new platform for developing the future's LED-lighting solutions. The DOLL platform consists of three lighting labs: Quality Lab, Virtual Lab, and Living Lab.

*Paul Michael Petersen received a M.Sc. degree in engineering and a Ph.D. degree in physics from the Technical University of Denmark in 1983 and 1986, respectively. Prof. Petersen has more than 25 years of research experience in optics and photonics and has headed several collaborative research projects within laser physics and LED lighting. From 2002 to 2012 he was adjunct professor in Optics at the Niels Bohr Institute, Copenhagen University. In 2011, he was appointed full professor in New Light Sources at the Technical University of Denmark.*

- Cities as drivers for the lighting solutions of tomorrow

*Niels Carsten Bluhme, Director of the City, Environment and Employment Department, Albertslund Municipality*

The current major shift in outdoor lighting technologies should be driven by the demands of well-informed cities. Switching to SSL-technologies, lighting is becoming part of an intelligent system, utilising new options for real-time control and sophisticated use. These new possibilities should be developed, tested and demonstrated in close cooperation between industry, research and municipalities. That is why Albertslund is a dedicated partner in DOLL and has initiated the process of transforming the city's largest industrial area into Copenhagen Photonics Science Park.

*Niels Carsten Bluhme chairs and sits on the boards of a wide range of Danish and international initiatives concerning triple helix green innovation and is considered a driving force in bringing together the public sector and business to boost sustainable city development. In recent years, Carsten's focus has been on photonics, intelligent lighting, and the smart city.*

- DOLL - a part of the Global Smart City by Kent Larson, Director of the City Science Initiative, MIT Media Lab, Massachusetts Institute of Technology (in live from Boston)

- Lighting - the backbone of the smart city (panel discussion)

*Panel: representatives from DOLL Living Lab, Cisco, Citelum, City of Copenhagen and Aarhus University*

Urban lighting has a strong potential to become a central part of the smart city, not only providing the actual light itself, but potentially providing a central communication infrastructure that intelligent applications in an urban environment connect to. What does intelligent urban lighting mean and how can it become the backbone of the smart city?

Together with DOLL partners, we will unfold and discuss the short- and long-term implications of positioning urban lighting at the centre of the future smart city.

18:30 Dinner / Hersted Industripark

## 20:30 Tour of DOLL Living Lab - the outdoor showroom for state-of-the-art LED-lighting solutions

The DOLL Living Lab offers a 1:1 experience of intelligent urban lighting and other smart city technologies in a live urban environment. The Living Lab features 10 kilometres of roads, bike lanes and urban spaces demonstrating up to 50 unique solutions, 300 points of light, a Sustainable Lighting Park, a Smart Urban Control Room, and a DOLL Visitor Center. Every point of light has an IP-address and some are monitored by cameras and connected in a highly advanced Internet-of-Everything installation.

## 22:30 Albertslund lights - an excursion through the city

*Guides: Sif Enevold, Lighting Programme Manager and Torben Christian Zinn, Project Manager for Outdoor Lighting, Albertslund Municipality*

The guided tour will highlight buildings and installations which, with their light and architecture, stand as landmarks in the city. Along the way, we will look at some of the roads and paths where LED lighting is being installed in the city and has created a new identity in the urban space. We will also look at how the Nordic tradition of light and dark operate in practice.

23:30 Return to the hotel



8:30 Departure from the hotel

9:00 Registration and coffee

### 9:30 The Loop City Vision - creating an urban region across national borders

*Søren Martinussen, Architect - Project Leader, BIG-Bjarke Ingels Group*

This presentation offers insights into how upgrading a planned light rail by extending it to form a regional ring around Öresund, connecting similar development areas, can create a 50 year development perspective for a cross-border region between Sweden and Denmark. The hereby formed "Loop City" will link a string of highly-differentiated urban nodes, universities and working spaces in a centre-less metropolitan region around a blue void comparable in size to the San Francisco Bay area.

*Søren Martinussen joined BIG, a group of architects and designers, in 2010 as an architect and urban planner, and has since been a project leader for many projects and competitions. He has experience working on national and international projects and expertise in urban planning, building design, and concept development. Søren holds a Master of Science in Architecture from Aarhus School of Architecture, Department of City and Landscape.*



### 10:15 Copenhagen 2025 - the world's first carbon neutral capital

*Jørgen Abildgaard, Executive Climate Project Director, City of Copenhagen*

Copenhagen will become the first carbon neutral capital by 2025 and at the same time combine growth, development and a higher quality of life. Extensive retrofitting of buildings, reorganisation of the energy supply and change in transport habits are some of the many initiatives that the City of Copenhagen is implementing in order to become carbon neutral by 2025.

*Jørgen Abildgaard is an experienced project manager and strategic adviser. From 2002 to 2010, he was Director in the Nordic consultancy companies ECON and Poyry Management Consulting. Jørgen previously spent two years as special adviser to the former Danish Minister for Environment and Energy, Mr. Svend Auken, and before that as adviser in several positions in the Danish Ministry for Energy.*



11:00 Coffee break

### 11:30 Copenhagen lighting strategy and lessons learned from the tender process - changing 20 000 fixtures to LED

*Thomas Maare, City Lighting Responsible, City of Copenhagen*

The City of Copenhagen has recently been through a public procurement process with competitive dialogue resulting in a 12-year service contract which includes changing 20 000 old fluorescent and sodium fixtures into RF-controllable LED-lighting according to the city's lighting strategy and a politically-approved lighting master plan.

*Thomas Maare has 19 years of lighting experience and, since 2006, has been responsible for the street lighting in Copenhagen, giving input to numerous outdoor lighting projects. He is currently a main driver in the large renewal project for changing 20 000 lighting fixtures in Copenhagen, reducing CO<sub>2</sub> emissions and energy consumption by 57 % by 2016 as compared to 2010.*



12:30 Lunch / MusikTeatret Albertslund





## 14:00 Parallel sessions with 4 lighting projects in Copenhagen and Albertslund

## Developing a wind and sun powered hybrid streetlamp

**Peter Behrendorff Poulsen**, Project Manager,  
Department of Photonics Engineering, Technical  
University of Denmark

A Danish research project has investigated the potential of using stand-alone street lighting in Copenhagen to harvest energy from the sun and wind to make CO<sub>2</sub> neutral street lighting for the city. Several commercial systems have been investigated, a dimensioning tool developed, and a prototype of hybrid street lighting solutions produced.



**Peter Behrendorff Poulsen** has a Master's degree in Materials Science and Engineering and has worked within the field of solar cells for most of his career. In his latest role, Peter has been a project manager for the Diodes Lasers & LED Systems Group at the Department of Photonics Engineering, DTU, managing several research and development projects on LEDs and solar cells.

## Virtual Lab - using virtual models and physics based software to visualise and validate the lighting solutions of tomorrow

**Jesper Wolff**, Cand. Arch., Project and Design Manager,  
Department of Photonics Engineering, Technical  
University of Denmark

By using 3D models and validated photometric data on light sources, luminaires and materials, it is possible to make very exact light analysis and realistic visualisations of almost any lighting solution, whether it is lighting plans for public spaces or product development of new luminaires. The presentation will address how virtual simulation of light can create value for various stakeholders in the lighting industry.



**Jesper Wolff** is responsible for establishing the DOLL Virtual Lab at DTU. He has for the past 10 years worked with concept development and project management of a wide variety of projects on product development and innovation.

## "Tingbjerg" - creating visual uniformity and enhancing safety in a suburb

**Bjarne Schläger**, Architect MAA., BSID

Like the best H.C. Andersen fairytale, the old outdoor lighting in this district has been transformed from an ugly duckling into a beautiful swan. With the new lighting master plan and lighting designs, this has succeeded in full, while the poetry of architecture has been preserved, life between the houses optimised, and the new urban spaces rediscovered for active use and enjoyment of children and adults.



**Bjarne Schläger** works with urban lighting and industrial design in the field of culture, art, design and architecture in a holistic way. Bjarne is an innovator and jack-of-all-trades in many ways, searching for ideas on architectural and urban development in the 21st century – the sustainable city landscape of tomorrow.

## "Nordvestparken" - creating identity and improving quality of life by prioritising light in a community park

**Rasmus Astrup**, Partner and Project Director, SLA

"The North West quarter of Copenhagen needed some adventure". This idea inspired "Nordvestparken": a new public space in the most culturally diverse district of Copenhagen. Using lights, colours, trees, poetry and even small mountains, SLA transformed an empty lot into a green and lively space. The park's characteristic, colourful and sustainable lighting won the Danish Light Award 2010.



**Rasmus Astrup** is one of Denmark's leading landscape specialists in climate adaptation and sustainable outdoor lighting. Rasmus is behind the development and design of Denmark's first cradle-2-cradle lamppost for use in sustainable development projects, including Nordvestparken.

## 16:30 LUCI announcements

17:00 Departure from Albertslund

17:30 Free time

19:30 Departure from the hotel

20:00 Dinner / Tivoli - Nimb Terrasse



## Optional programme



9:30 Departure from the hotel

### 10:00 Canal tour - architecture and daylight from a harbour perspective

*Tina Saaby, Architect MAA., City Architect of Copenhagen*

The canal tour in the northern harbour of Copenhagen will be guided by the City Architect of Copenhagen Tina Saaby. It will focus on how architecture can use daylight to create a more liveable city.

**Tina Saaby** is educated from the The Royal Danish Academy of Fine Arts, School of Architecture and has been the Vice President of the Danish Architects' Association. She has experience as a sketching and designing architect partly as a leader and partner of Witraz Architects. Tina is a member of the Think Tank "The city 2025" by the Ministry of Housing, Urban and Rural Affairs, and is also the Chairman of the Advisory board of the employer panel at The Royal Academy of Art.

12:00 Lunch / Restaurant Paustian (Nordhavn)

In 1987 Paustian built their iconic furniture house and restaurant, designed by the world-famous architect Jørn Utzon in collaboration with his sons, Kim and Jan Utzon. The food is inspired by the Nordic Cuisine.

### 13:00 Guided tour in Nordhavn

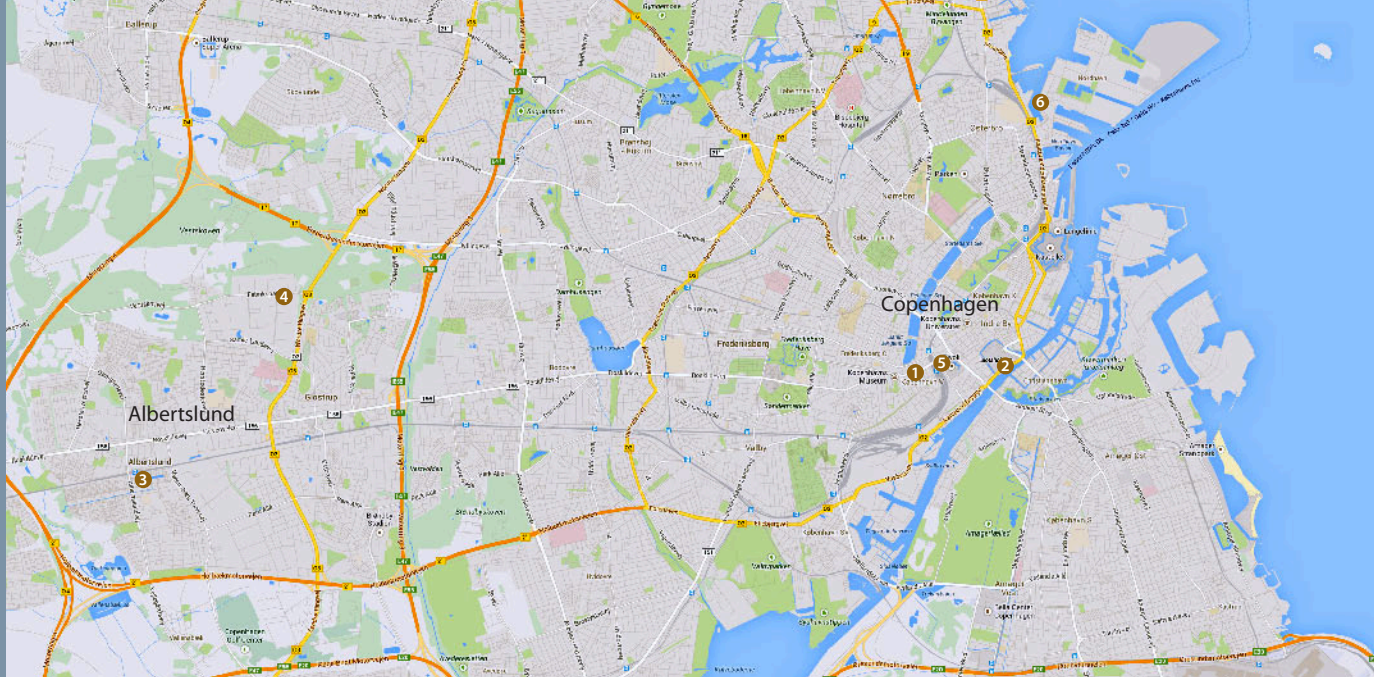
*Rita Justesen, Head of Planning and Architecture, City of Copenhagen*

Understanding the opportunities within daylight is of great importance in Nordic architecture where light is a scarce resource in the wintertime. One of the architect's most important tasks is to correctly place buildings relative to the position of the sun, so the lighting fits the functions of the buildings. The city planning process will be introduced and you will be guided through Nordhavn. Rita Justesen will focus on how sustainability and the use of light as an aesthetic tool are used to create a liveable city in Nordhavn. Furthermore you will get an exclusive look at Copenhagen from the recently rebuilt silos.

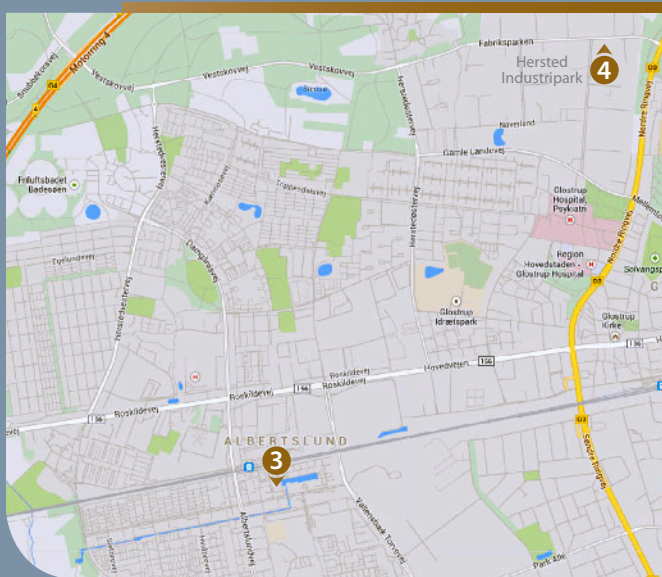
**Rita Justesen** has worked with the development of Copenhagen for almost 30 years. She is in charge of developing long-term strategies and overall structures for complete city areas as well as masterplans and urban projects.



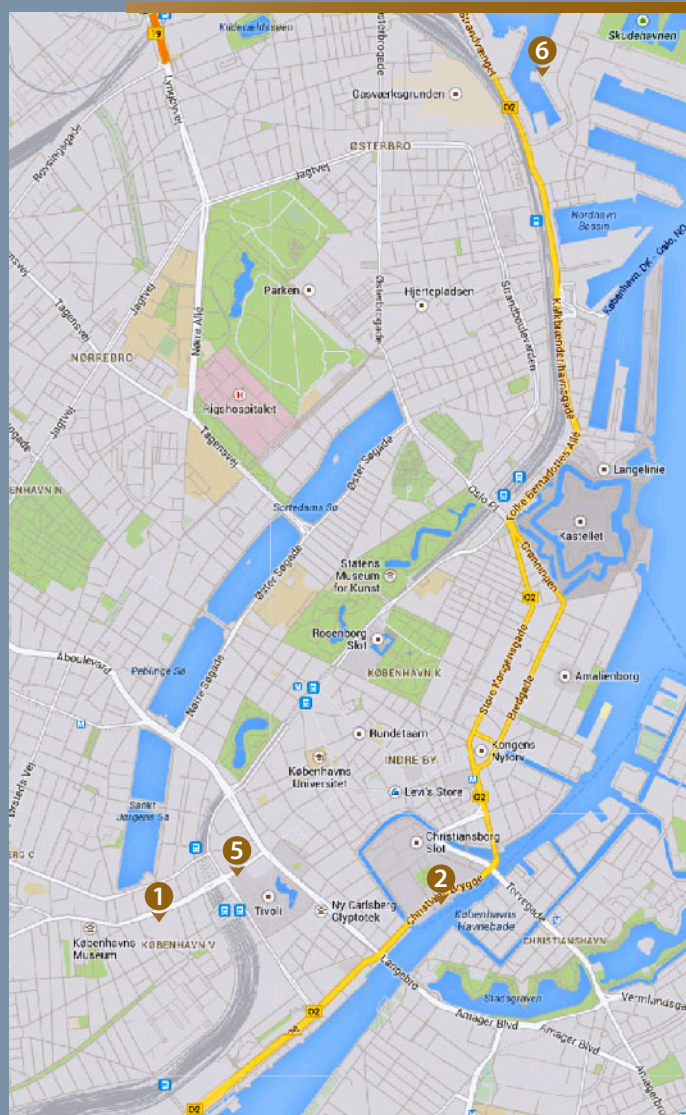




## ALBERTSLUND



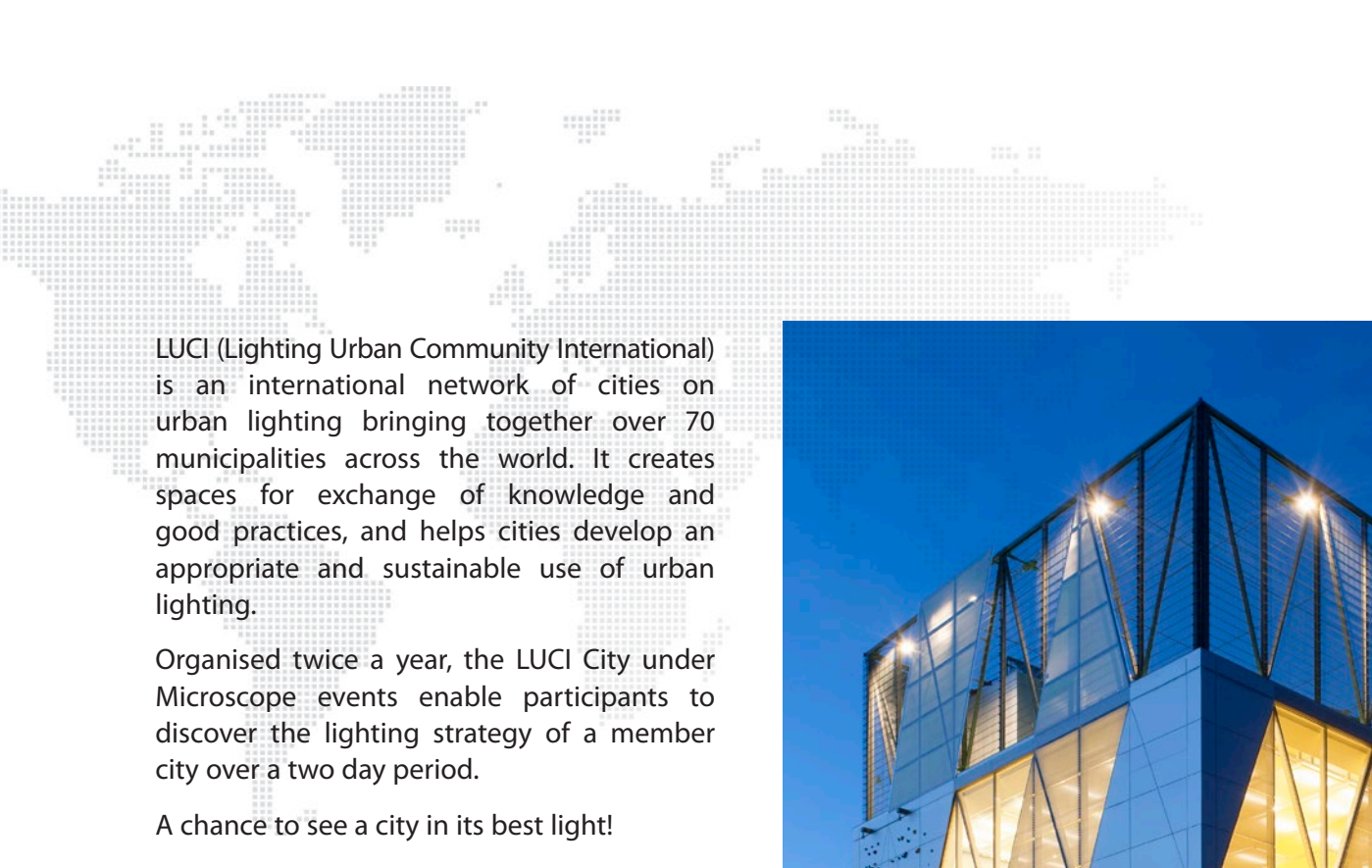
## COPENHAGEN



## Venues

- 1 Accomodation**  
Comfort Hotel Vesterbro  
Vesterbrogade 23 - 29, Copenhagen
- 2 Welcome cocktail (Wed)**  
Black Diamond - Royal Library  
Søren Kierkegaards Plads 1, Copenhagen
- 3 Conference venue (Thu-Fri)**  
MusikTeatret Albertslund  
Bibliotekstorvet 1-3, Albertslund
- 4 International opening of DOLL (Thu)**  
Hersted Industripark  
Fabriksparken 7-9, Glostrup
- 5 Dinner (Fri)**  
Nimb Terrasse  
Tivoli - Vesterbrogade 3, Copenhagen
- 6 Lunch (Sat)**  
Restaurant Paustian  
Kalkbrænderiløbskaj 2, Copenhagen

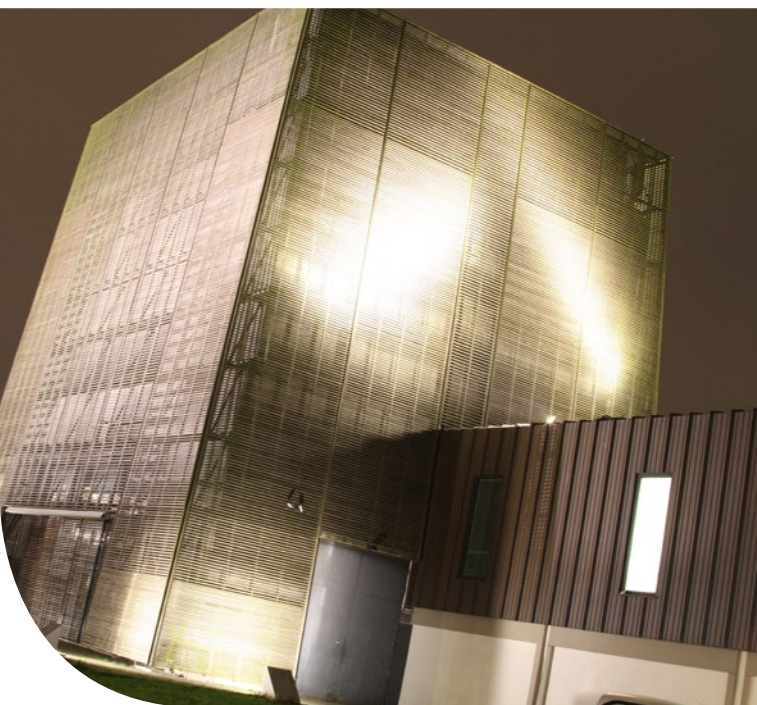




LUCI (Lighting Urban Community International) is an international network of cities on urban lighting bringing together over 70 municipalities across the world. It creates spaces for exchange of knowledge and good practices, and helps cities develop an appropriate and sustainable use of urban lighting.

Organised twice a year, the LUCI City under Microscope events enable participants to discover the lighting strategy of a member city over a two day period.

A chance to see a city in its best light!



More information and registrations on the LUCI website: [www.luciassociation.org](http://www.luciassociation.org)

- Free participation for LUCI members
- 300 euros for non-LUCI members (accommodation not included)

## LUCI ASSOCIATION

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