



Building Effective Transnational Partnerships

The Case of Smart Lighting

This policy brief examines the requirements for building effective transnational partnerships in different policy fields, based on the lessons learned from the recent Lighting Metropolis project – a cross-border innovation venture between Denmark and Sweden that sought to develop smart lighting solutions in urban environments. The brief begins with an overview of this new technology area, before outlining the main opportunities and challenges in the implementation of smart lighting throughout Europe. This is followed by a review of the key findings from Lighting Metropolis, with a focus on assessing the experiences of transnational co-operation identified during the project. Finally, the concluding section outlines a number of recommendations for enhancing transnational collaboration. The policy brief has been prepared by Nordregio as part of the BSR Stars S3 project. It is based on a literature review and interviews conducted with partners involved in Lighting Metropolis.

WHAT IS SMART LIGHTING?

Solid State Lighting (SSL), based on light-emitting Diode (LED) technology, is the most energy efficient and eco-friendly lighting technology on the market, offering high-quality light and visual comfort at a low cost.

Lighting accounts for 50% of electricity consumption in European cities, so the European Union (EU) has set itself a target to reduce the energy levels used for general purpose lighting by 20% by the year 2020, through the deployment of smart lighting technologies (European Commission 2011).

SSL technology is regarded as a central component in developing smart, sustainable cities, and is already used widely, e.g. in everyday objects, including in street lamps, advertising boards, traffic lights, car headlights, TVs and automated lighting systems in homes and businesses.

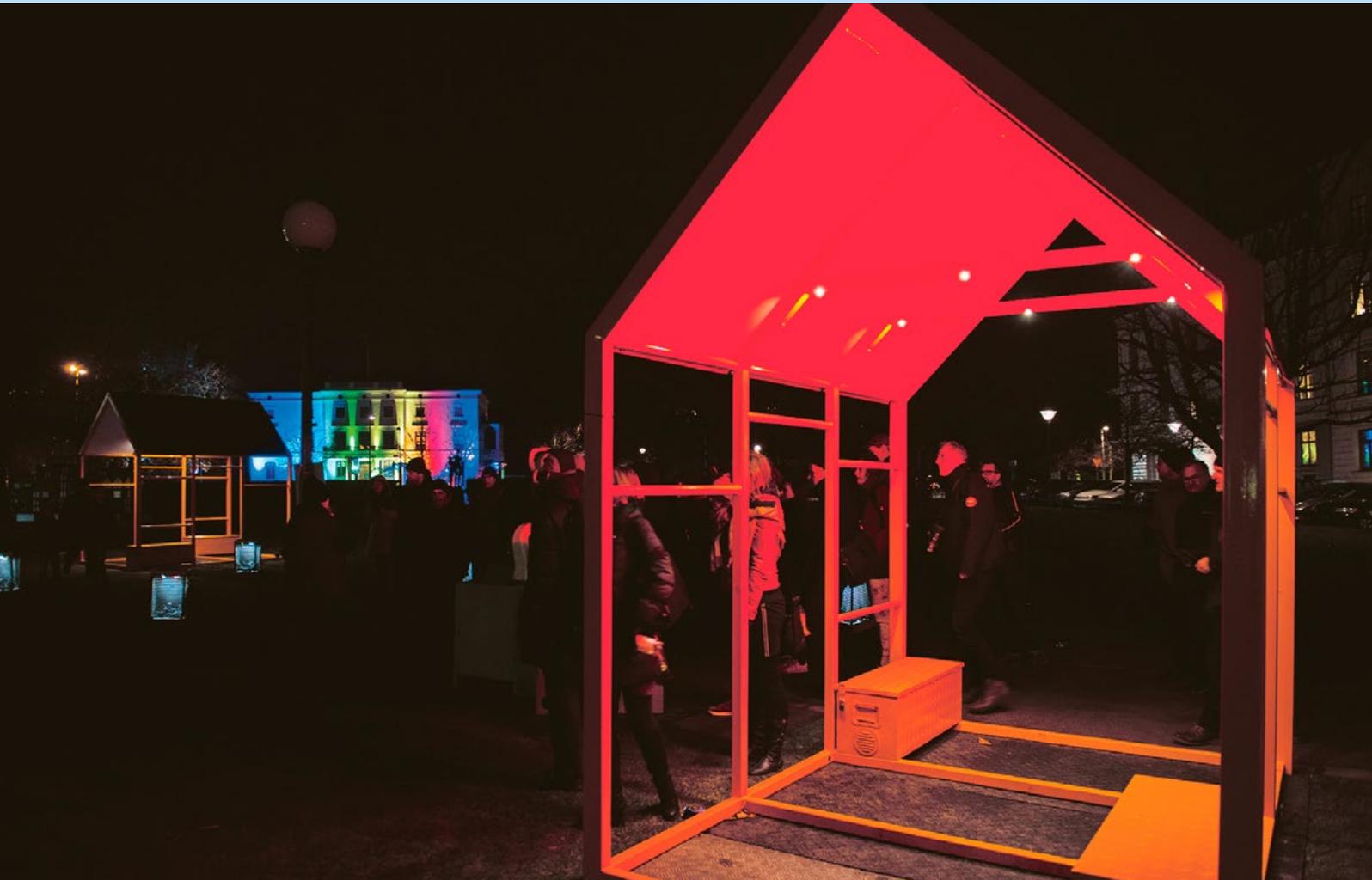
Policy- and decision-makers have highlighted smart lighting's potential to create brighter and safer urban environments, and to deliver significant energy savings

and reduced costs for public authorities, businesses and citizens.

Smart lighting has the potential to make cities more environmentally friendly, with energy savings of up to 70% and reduced installation and maintenance costs (European Commission 2013). It can also help to boost local innovation processes, promote economic growth, create new jobs, and present new opportunities for the European lighting industry to build strong business links with other key stakeholders in the smart cities network, including in the communications, renewable energy, construction and transport sectors (European Commission 2013).

European cities have the potential to take the lead in LED technologies and markets. However, in order to take advantage of this opportunity, greater collaboration is required at the transnational level between key stakeholders throughout the innovation chain, from public authorities to the European lighting industry.

Photo: Brighter Brunshög project in Lund / Petter Duvander



SMART LIGHTING OPPORTUNITIES

Smart lighting can help deliver important opportunities and benefits to public authorities, business and citizens, including:

■ **Energy savings:** LED smart lights are more energy efficient than existing lighting technologies. EU cities that have already introduced SSL report energy savings of up to 70%, as well as lower maintenance costs, contributing to significant financial savings and a reduction in CO2 levels.

■ **Higher quality lighting:** LED technology offers high-quality lighting that is easily controllable in terms of both intensity and colour. Smart lighting can adjust to the demands of the consumer to create optimal living and working conditions that

can have a positive impact on citizens' ability to concentrate and their general well-being.

■ **Innovative design features:** LED technology gives lighting industry designers greater opportunities and scope to customise lighting systems to meet the needs of different environments and consumers, including the integration of lights into buildings (walls, ceilings, windows) and furnishings.

■ **New business Opportunities:** SSL technology opens up new business potentials for the European lighting industry, from selling new light sources and systems, to integrating them into furnishings and buildings, thereby creating economic growth and job opportunities. (Source: European Commission 2011 and 2013)

SMART LIGHTING CHALLENGES

Smart lighting is still in its relative infancy, and LED technology is constantly being developed and improved. However, certain key challenges need to be overcome in order to increase the uptake of smart lighting technologies across Europe. For example:

■ **Purchasing costs:** Due to high manufacturing costs, LED lights are more expensive than traditional lighting technologies, which may deter consumers.

■ **Technology quality:** Due to a lack of market regulation and monitoring, LED products are sometimes poorly designed and manufactured, emit lower quality light and have shorter than advertised life cycles.

■ **Safety:** Some health and safety concerns have been raised about the potentially damaging effects of LED light on the retina, but scientific tests have proved inconclusive.

■ **Stakeholder collaboration:** At present, there is a lack of collaboration between public authorities and the lighting industry. This means that the structural

and financial basis for the development of smart lighting is weak. In connection with the development and implementation of smart lighting processes, enhanced co-operation is required between key stakeholders throughout the value chain, including public authorities, the lighting industry, urban planners, architects and designers, electrical manufacturers and the construction industry.

(Source: European Commission 2011 and 2013)

In response to these challenges, cities across Europe are developing sustainable urban lighting strategies in close co-operation with urban planners, designers and architects from the lighting industry. National governments are supporting pioneering SSL pilot projects, demonstrations and trials in Belgium, France, Denmark, Hungary, Netherlands and the UK. Furthermore, the EU is also funding smart lighting projects to help develop transnational networks and promote best practice learning across Europe. The key findings and lessons learned from the EU Interreg Project Lighting Metropolis are discussed in more detail in the following section.

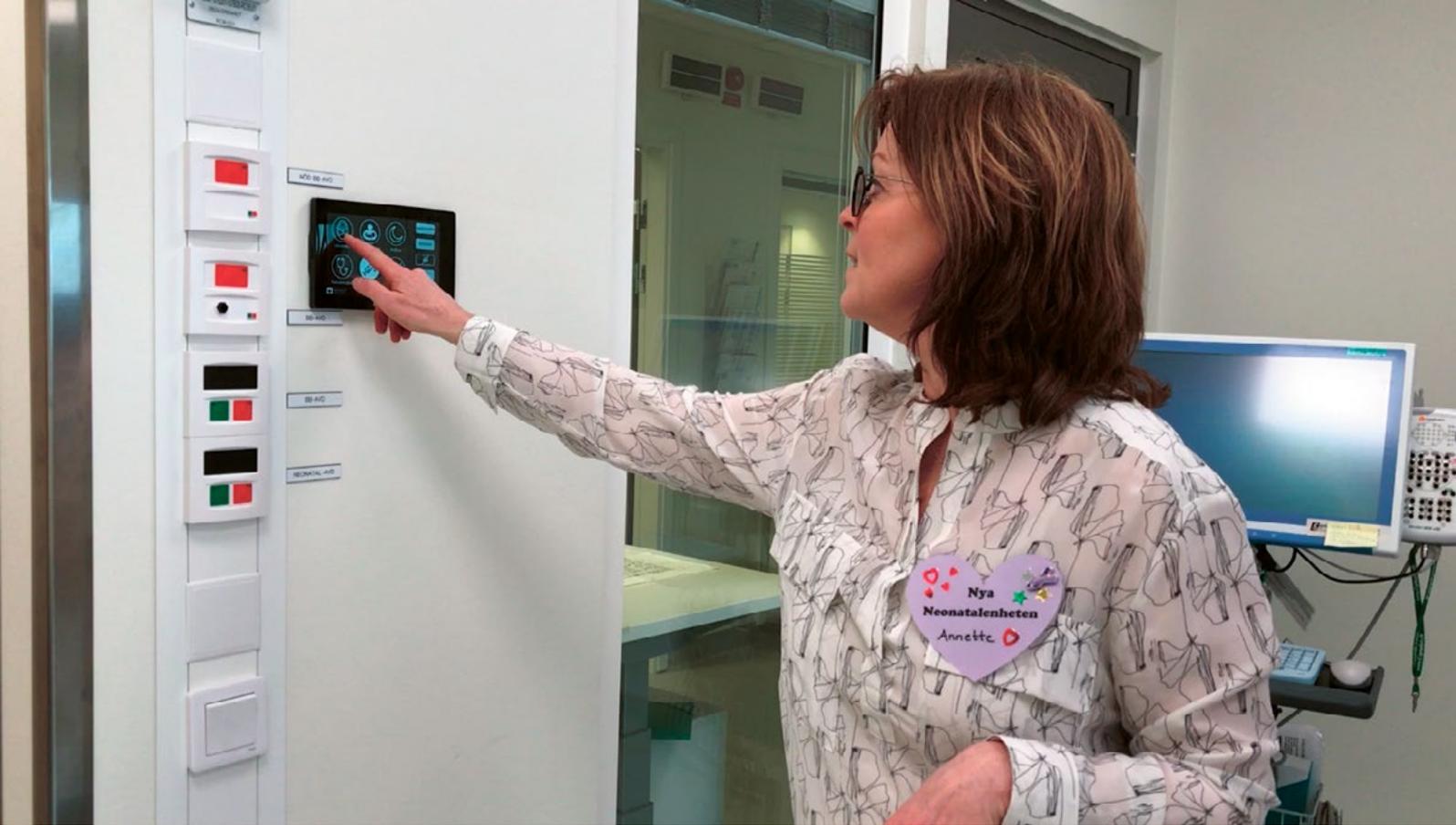


Photo: The new neonatal ward at Helsingborg General Hospital / Peter Liljenberg

SMART LIGHTING IN A NORDIC TRANS-NATIONAL CONTEXT: THE LIGHTING METROPOLIS PROJECT IN THE GREATER COPENHAGEN REGION

The EU Interreg Lighting Metropolis project is a cross-border innovation venture between Danish and Swedish actors in the field of smart lighting solutions. The project covers the regions of Skåne in Sweden, the Capital Region of Copenhagen and Zealand in Denmark, all of which have strong research environments in lighting design, photonics and biological lighting. Cross-border collaboration has been limited to the area of smart lighting. The project brings together transnational stakeholders (local authorities, universities, industry, and investment and innovation organisations) in order to take advantage of their geographic proximity and the potential economic benefits of developing joint smart lighting innovation strategies and policy instruments.

The project is built on a triple-helix constellation, comprising 26 partners who collectively form a transnational ecosystem for lighting innovation. Approximately 100 stakeholders, especially SMEs, are attached to the project as affiliates. The project has implemented 30 living labs and real-scale demonstration projects in the Greater Copenhagen region and surrounding local authorities. This has contributed to regional job creation in different sectors relevant to smart lighting, from construction and engineering to business and R&D.

Lars Gaardhøj, chairman of Interreg Öresund-Kattegat-Skagerrak, notes that: "Lighting Metropolis is an extension of the shared political ambitions and growth plans of Region Zealand (Denmark), the Capital Region of Copenhagen (Denmark), and Region Skåne (Sweden). It presents an opportunity to position this region as an important global growth area in intelligent lighting."

PROJECT AIMS

1. To make the Greater Copenhagen a central hub where regions, local authorities, private businesses, and knowledge institutions can collaborate to develop and showcase leading smart urban lighting.
2. To strengthen the significant ways in which lighting can support safety, accessibility, identity, health and education for people in cities.

TRANSNATIONAL COLLABORATION IN SMART LIGHTING: EXPERIENCES FROM THE LIGHTING METROPOLIS PROJECT

The Lighting Metropolis project is transnational by nature and extends far beyond its Nordic roots. It has been a positive source for promoting learning and developing best practices in smart lighting that can be applied across different levels of governance throughout Europe.

The project has made Copenhagen an international hub for intelligent lighting solutions, which has attracted companies to the region and fostered international research exchanges. One example of such an exchange occurred in Zabrze, Poland, the sister city of Lund, Sweden, where the Lighting Metropolis project inspired the city's Sustainable Mobility Strategy. Some international learning beyond the project territory has also taken place, in the form of a study visit by a South Korean delegation.

The Lighting Metropolis project also identifies opportunities to transfer regionally tested practices to EU and national level. For instance, Lund University's work to develop a LED procurement checklist for local authorities has the potential to be extended at national level. Furthermore, the Swedish Energy Agency is engaged in creating new sustainable lighting procurement rules that have the potential to be applied nationwide. While the project has led to numerous positive transnational and national learning experiences, there have also been challenges in relation to transnational collaboration, e.g.:

Implementing the triple helix approach: Facilitating co-operation through a triple-helix arrangement across sectors and disciplines has proved challenging due to the difficulties of bringing together all the necessary stakeholder competencies required to implement an effective smart lighting strategy. In terms of getting businesses and industries on board, the project has not managed to secure the involvement of the most influential and robust LED and smart lighting businesses. Many stakeholders simply do not have the resources to participate in often expensive and time-consuming joint ventures. Implementing a transnational triple-helix approach involves continuous work and daily negotiation, with a particular focus on conveying the project's collaborative aspects and common goals to a diverse range of partners

Lack of transnational experience: Stakeholders all have different ways of working – this has been particularly evident in relation to local authorities and smaller companies with limited experience of transnational and cross-sectoral innovative projects.

Most local councils have their own operative models and certain approaches to administrative matters and project implementation.

Competing interests: Stakeholders have different aims and objectives, and the consortium members have diverging ideas in relation to core project outcomes, particularly when it comes to striking a balance between sustainability and innovation. For some stakeholders, the project focused too heavily on innovation at the expense of sustainability, i.e. there was insufficient emphasis on sustainability aspects (including life-cycle analyses of smart lighting) and inclusiveness in relation to citizens.

Stakeholder outreach: The local authorities involved have had only limited knowledge of smart lighting, with just a few council workers being aware of the project and related opportunities. There is a need to include more stakeholder groups, e.g. through targeting development managers and organising seminars to inform a wider audience about smart lighting activities. Local councils could also help to identify real, tangible problems in relation to lighting issues, in order to help mobilise stakeholders in the search for common solutions.

Administrative and financial burdens: Administrative burdens and heavy reporting procedures are often identified as the main downsides of territorial co-operation projects. These hamper the involvement of partners, primarily SMEs, that have limited resources and experience of other projects. Interreg's high co-funding requirement (e.g. 40%–60% for local authorities and universities) can also make such projects unprofitable for partners.

Communication and language barriers: Language barriers have created communication challenges that have led to problems with information flows. A generational difference has been noted here, as older stakeholders have proved more confident communicating in Scandinavian languages, while younger stakeholders prefer to use English as a common language.

Evaluation indicators: The Lighting Metropolis project set a number of ambitious, self-defined indicators to evaluate the project's implementation and impact. However, measuring the direct and tangible impact of the project has proved difficult in relation to indicators such as jobs created, new businesses developed, new products on the market, new products for the company, collaborations established, and companies that have received consultancy contracts through the project.



Photo: Johannes Jansson / norden.org

CONCLUSIONS AND RECOMMENDATIONS

The Lighting Metropolis project has helped to develop transnational partnerships and foster learning and best practices across borders. However, challenges remain in relation to promoting transnational collaboration in the area of smart lighting. Based on key findings from the project outlined above, the following recommendations are proposed to encourage effective transnational collaborations in smart lighting and other fields in the future:

- Ensure that transnational projects have strong, proactive and diplomatic leadership to drive co-operation forward and help partners reach consensus.
- Engage more private actors and citizens in the governance process by holding events and seminars with innovation experts in the local authorities.
- Identify and define real and tangible problems, with a view towards engaging stakeholders in discussion.
- Increase the attractiveness for SMEs of participation in transnational projects by reducing administrative and financial burdens, including lower co-funding rates.
- Ensure a balance between innovation and sustainability issues when developing project activities and outcomes.
- Establish intermediaries and consulting roles within projects to support partners with limited experience of participating in transnational collaborations.
- Consider making better use of Public Procurement of Innovative solutions (PPI) to improve innovation processes and company involvement in transnational collaborations.
- Increase the number of public outreach activities to enhance awareness of activities among stakeholders and citizens via more effective advertising of project aims, results and best practices across different levels of governance (at transnational, national and local levels).
- After the end of a project, consider the issue of project sustainability by creating permanent policy instruments, e.g. in the form of a strategy and national funding with reduced co-funding rates.
- Encourage international benchmarking with other regions, based on areas of regional strength.
- Be realistic in the number of suggested demonstrations and trials, which require significant leadership and administrative support.
- Develop realistic and quantifiable indicators for evaluating the impact of project activities.

FUTURE DIRECTIONS

The Lighting Metropolis project has strengthened existing networks and established new collaborations between stakeholders. At the same time, it has identified regional strongholds and market niches in the field of intelligent lighting.

The project has helped to crystallise smart lighting as one of the comparative advantages of the Greater Copenhagen Region, and provided a thematic umbrella for development targets such as digitalisation, new materials and health.

All of these components have reciprocal linkages with smart lighting and the pressing societal and sustainability challenges that the Greater Copenhagen

Region faces in the 21st century. This provides a strong link with the new EU Vanguard Initiative, which seeks to increase economic growth through smart specialisation.

Besides the Lighting Metropolis project, Region Skåne has committed to the Vanguard Initiative, which seeks to develop interregional co-operation on the development of supporting clusters and regional ecosystems, with a focus on smart specialisations and priority areas for transforming and emerging industries. Smart lighting has the potential to be an important theme in the evolution of the Vanguard Initiative. ●



Photo: Congress Reykjavík. Ragnar Th. Sigurdsson / norden.org

References:

European Commission (2011), *Lighting the Future: Accelerating the deployment of innovative lighting technologies*, Green Paper, Brussels (2011) 889 final.

European Commission (2013), *Lighting the Cities: Accelerating the Deployment of Innovative Lighting in European Cities*, Brussels June 2013.

Nordregio (2017), *Lighting Metropolis Diagnostic Report*, Stockholm August 2017.

ABOUT THIS POLICY BRIEF

This policy brief is a part of **BSR Stars S3** (Smart specialization through cross-sectoral bio-, circular and digital ecosystems) project which seeks to enhance growth opportunities in the Baltic Sea Region, focusing on the bio-/circular and digital economy fields.

Read more: www.bsr-stars.eu/bsr-stars-s3

About Lighting Metropolis project:
www.lightingmetropolis.com/eu-interreg/

URL: <http://doi.org/10.30689/PB2018:1.2001-3876>



Research contacts

John Moodie
Senior Research Fellow
Phone: +46 8 463 54 48
john.moodie@nordregio.org

Jukka Teräs
Senior Research Fellow
Phone: + 46 8 463 5458
jukka.teras@nordregio.org

Linda Randall
Research Fellow
Phone: +46 7 395 640 39
linda.randall@nordregio.org

Photos:

Front page: Bridge between Sweden and Denmark / Shutterstock

ISSN 2001-3876
www.nordregio.org

