DARKER SKY | Interreg North Sea | Co-funded by the European Union

CO-DESIGN APPROACHES TO REDUCE LIGHT POLLUTION

Norddeich, Germany

The Eastern Harbour of Norddeich serves as the German demonstrator port within DARKER SKY. The project builds on an **already advanced lighting conversion** process led by Niedersachsen Ports GmbH & Co. KG (NPorts), the operator of the port infrastructure.

DARKER SKY provided the opportunity to optimize these plans from an **ecological perspective** in cooperation with the Lower Saxony Wadden Sea National Park Authority and other external experts . The focus in Norddeich is therefore less on co-design in the classical participatory sense, and more on **integrating** environmental considerations into an ongoing, technically driven lighting modernisation process.

CO-DESIGN APPROACH

© Burmann/NPorts

The approach in Norddeich is **primarily top-down.** At the start of DARKER SKY, NPorts had already defined the lighting modifications to be implemented in the Eastern Harbour. This was based on the goal of converting all NPorts ports to LED by 2025 and the company's own guidelines for environmentally friendly lighting.

Planning for conversion to LED technology and the introduction of an intelligent, demand-oriented control system was already well advanced, including lighting design and calculations.

Optimisation of planning

Within DARKER SKY, this existing planning was further optimised by the Lower Saxony project team, especially from an ecological point of view. In cooperation with the Lower Saxony Wadden Sea National Park Authority (NLPVW) and external experts, eight specific measures for environmentally friendly port lighting were defined.

The objective is to establish a demonstration lighting system that complies with legal and occupational safety requirements while minimising light emissions and negative environmental impacts as far as possible.

Governance Context

NPorts is responsible for the port infrastructure in Norddeich and therefore also for lighting in the main port areas. On rented or leased plots, tenants are responsible for their own lighting. This creates a mixed governance situation in which NPorts can directly control part of the lighting but must rely on awareness raising and guidance for privately operated areas.

Environmental expertise is contributed by the Lower Saxony Wadden Sea National Park Authority, which plays an advisory and ecological role but does not have direct decision-making power over port infrastructure. Regulatory frameworks, especially occupational health and safety requirements for workplaces, strongly influence lighting levels and technical solutions. These norms represent an important boundary condition for ecological optimisation.

© Ziegeler/NPorts

Stakeholder Involvement

Stakeholder involvement has mainly taken the form of information exchange and technical dialogue rather than co-design of solutions.

Workshop 2023

- A **stakeholder workshop** had already been organised in early 2023 in Norddeich as part of the Keep It Dark (KID) project.
- When DARKER SKY began, the **lighting conversion** plans were already too advanced to restart a broad participatory process, particularly with port customers.
- Nevertheless, **NPorts informs port stakeholders** about retrofit plans and developments and presents the project as a best-practice example of environmentally friendly port lighting.

Workshop 2024

- On 18 April 2024, a **workshop** focused on **technical and legal aspects** of port lighting and retrofitting was held, where electricians and electrical engineers from different NPorts locations took part in a round-table discussion.
- The afternoon session was opened to the Lower Saxony DARKER SKY team and other interested ports and stakeholders to **clarify** technical and legal questions and to **discuss** how environmental protection goals can be reconciled with port lighting requirements.

© NPorts/Buczior

Informative event 2025

On 25 November 2025, our partners NPorts, the University of Oldenburg (CVO), and the Lower Saxony Wadden Sea National Park Authority (NLPVW) invited the public to an **information event** in the port of Norddeich.

After presenting the **light reduction solutions** for the east port of Norddeich a guided **evening walk** through the port allowed guests to see the new lighting systems in action.

The event offered an opportunity for local stakeholders and visitors to **engage directly** with the project and its results, to **explore** how DARKER SKY approaches sustainable lighting and **why this work is important** for the region.

SWOT ANALYSIS

STRENGHTS

- Clear responsibilities and decision-making structures through NPorts as infrastructure operator.
- Strong management support for implementing uniform, environmentally oriented lighting standards.
- Integration of ecological expertise from the National Park Authority and external experts into technical planning.
- Efficient implementation due to centralized planning and procurement processes

WEAKNESSES

- Limited involvement of users and tenants in the design phase.
- Lower potential to incorporate practical insights from day-to-day port users.

NORDDEICH TOP-DOWN APPROACH

OPPORTUNITIES

- Development of a scalable model for environmentally friendly lighting across other NPorts locations.
- Testing and demonstration of new technologies and control systems under real port conditions.
- The Demonstrator is designed as a “learning system” and we can respond to specific feedback/changes in the framework conditions (e.g., legal requirements) at any time.

THREATS

- Risk that users or tenants perceive the new lighting as insufficient or uncomfortable.
- Constraints from occupational safety regulations may limit how far lighting levels can be reduced.
- Negative feedback could reduce willingness to replicate the approach at other ports.

SCIENTIFIC MONITORING

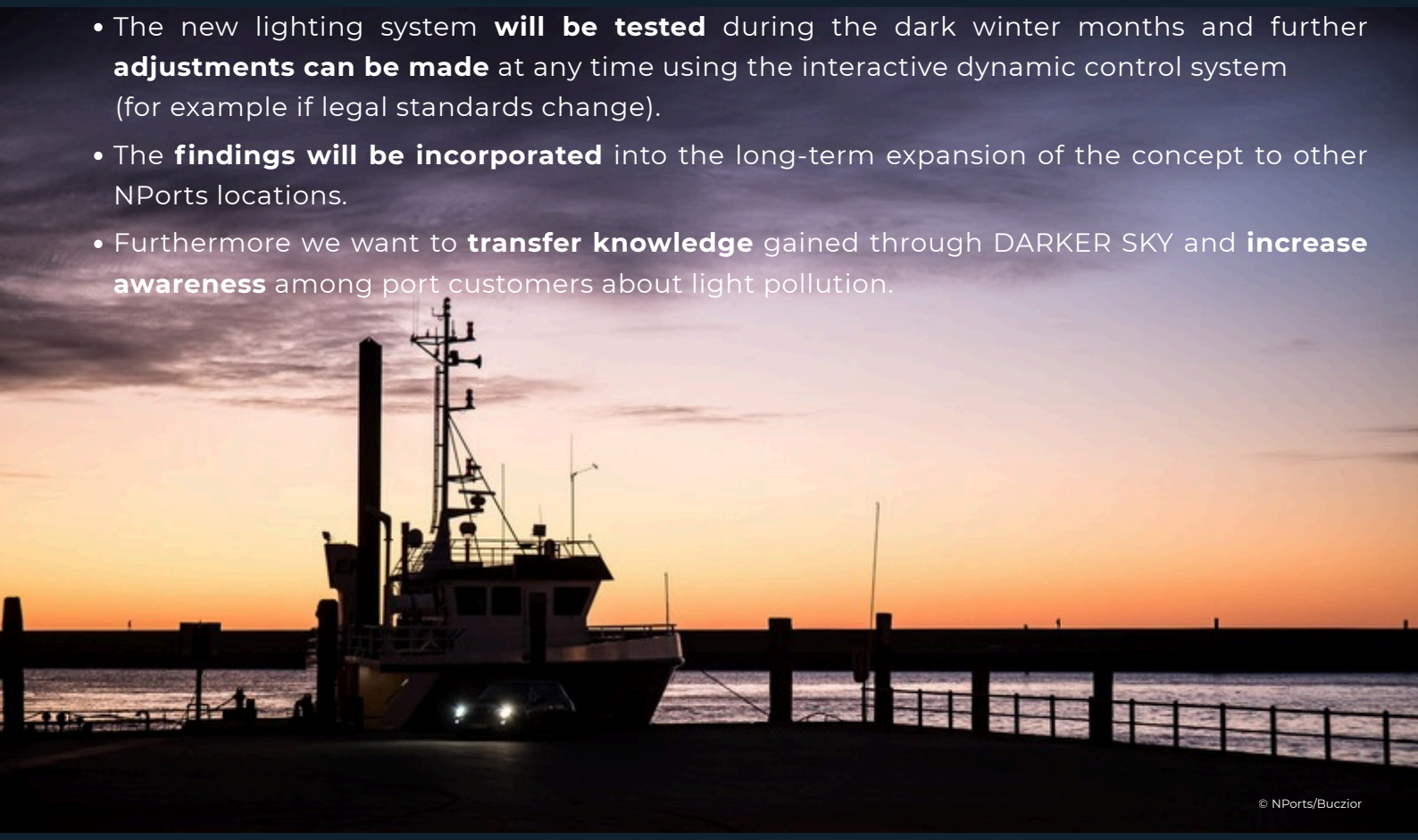
In order to verify the effects of the lighting conversion, comprehensive monitoring was carried out both before and after the conversion. Measuring instruments installed in the port (e.g., Sky Quality Meter (SQM)) continuously measure the brightness of the sky above Norddeich. In addition, light measurements were also carried out on the ground. The flora and fauna were also taken into account. We recorded and evaluated bat and bird calls and counted insects and benthic species.

RECOMMENDATIONS

- The development of **clear** internal lighting **guidelines** (that integrate environmental criteria), facilitates consistent implementation across multiple sites.
- **Early** cooperation between technical operators and ecological experts can significantly improve outcomes even within a top-down framework.
- **Sharing** concrete technical measures, such as the eight measures developed in Norddeich, supports transfer to other port or industrial contexts.

Next Steps for Norddeich

- The new lighting system **will be tested** during the dark winter months and further **adjustments can be made** at any time using the interactive dynamic control system (for example if legal standards change).
- The **findings will be incorporated** into the long-term expansion of the concept to other NPorts locations.
- Furthermore we want to **transfer knowledge** gained through DARKER SKY and **increase awareness** among port customers about light pollution.



CONTACT
Denise Schablitzki, Niedersachsen Ports GmbH + Co. KG
DARKER SKY Project Manager for Norddeich
dschablitzki@nports.de