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

CO-DESIGN APPROACHES TO REDUCE LIGHT POLLUTION

Lauwersoog, The Netherlands

The Port of Lauwersoog is one of the Dutch demonstrator sites within the DARKER SKY project, located between the Wadden Sea World Heritage Site, the National Park, and Dark Sky Park Lauwersmeer.
The harbour has a long history of various sustainability efforts. Within this tradition, the Harbour Coalition, representing port management, local entrepreneurs, municipalities, provinces, and NGOs, expressed strong interest in tackling light pollution.

Together with the University of Groningen (RUG), this collaboration forms the *Masterplan Darkness Lauwersoog*, aiming to reduce light pollution while maintaining safety and functionality.

CO-DESIGN APPROACH

The Lauwersoog demonstrator site uses a **bottom-up co-design approach**, coordinated by RUG together with the Harbour Coalition. This approach was chosen to build strong local ownership, integrate practical knowledge from harbour users, and align with broader sustainability ambitions.

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Governance Context

Lauwersoog has a layered governance structure involving Rijkswaterstaat (national), Province of Groningen (regional), Municipality of Het Hogeland (local), and the Port Authority. The *Harbour Coalition* acts as a central platform enabling cross-level coordination and decisionmaking.

Stakeholder Involvement

Stakeholder engagement in Lauwersoog is primarily channelled through the Harbour Coalition as organisational core of the Masterplan Darkness. This coalition brings together all key actors of the harbour area:

- port management
- local entrepreneurs and fisheries
- ship and ferry operators
- the provinces of Groningen and Friesland
- the municipalities of Het Hogeland and Noardeast-Fryslân
- representatives of NGOs and nature organisations.

The Harbour Coalition meets approximately four times per year in Lauwersoog. These meetings provide a structured forum for information exchange, discussion of technical options, and coordination with other sustainability themes. Light reduction is approached as part of a broader vision for a sustainable and nature-inclusive harbour, ensuring that lighting changes align with ongoing developments.

Beyond formal meetings, smaller working sessions and one-on-one consultations take place between stakeholders and experts.

Village engagement is a central element of the Lauwersoog co-design process. The village of Lauwersoog is a small but active community of around 150 inhabitants, many of whom are directly connected to the harbour as fishermen, business owners, or
employees. This overlap between residents and stakeholders makes citizen engagement not just desirable but essential: decisions on lighting affect both daily life and professional activity.

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To ensure transparency, inclusivity, and local ownership, several activities were organised:

Community Workshop

- Project **introduction** and **demonstration** of different lighting appliances.
- Residents compared and discussed the environmental and practical **effects** of various luminaires.
- Triggered a shared reflection on the **role of light** in daily life, safety, and the harbour's identity.
- Strong support for **immediate implementation** of light-reducing measures.

Night Walk

- Follow-up **'night walk'** through the village
- Participants explored **existing lighting installations** and identified locations with excessive brightness.
- Helped translate abstract ideas about light pollution into **concrete, lived experiences.**
- Effective form of **participatory design**, enabling residents to co-decide where and how lighting could be improved.

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SCIENTIFIC MONITORING

To assess and guide the effects of the light modifications, an AllSky camera and Sky Quality Meter (SQM) continuously measures sky brightness and light levels. Acoustic and sticky trap monitoring provide insights into ecological responses such as bat and insect activity. This combination of technologies allows the team to **link changes in lighting design directly to environmental effects.**

In parallel, these scientific activities are reinforced by public **outreach and education**, including events such as Nacht van de Nacht and Landelijke Sterrenkijkdagen. These initiatives connect local research in Lauwersoog to a broader societal conversation about sustainable lighting.

SWOT ANALYSIS

STRENGHTS

- Strong local motivation and sense of ownership among stakeholders and residents.
- Integrated cooperation through the Harbour Coalition linking community, business, and governance.
- Strong alignment with broader sustainability goals (energy, mobility, biodiversity).
- Tailored, site-specific solutions responding to real local needs.
- Builds long-term awareness and engagement around light pollution.

WEAKNESSES

- Limited local capacity and resources for implementation and monitoring.
- Complexities in measuring ecological impact across diverse indicators (species, light spectra, seasons).
- Dependency on voluntary participation and ongoing stakeholder motivation.
- Tailor-made solutions take time and are less feasible for bigger ports.

LAUWERSOOG BOTTOM-UP CO-DESIGN APPROACH

OPPORTUNITIES

- Potential to transfer knowledge and methods to similar small ports in the North Sea Region.
- Chance to test and refine innovative lighting technologies in a real-world setting.
- Growing policy and public interest in dark-sky and biodiversity-friendly initiatives.
- Strengthening Lauwersoog's image as a model for sustainable harbour management.

THREATS

- Possible misalignment with existing safety regulations or insurance requirements.
- Risk of delays due to multi-actor coordination and differing priorities.
- Limited local or regional budgets for large-scale lighting replacement.
- Changes in political support or policy focus could slow implementation.

RECOMMENDATIONS

- Engage local coalitions **early**. In Lauwersoog, the Harbour Coalition played a crucial role in shaping decisions and maintaining continuity. Similar partnerships can anchor change in other regions.
- Combine ecological monitoring with social **dialogue**. Presenting clear and accessible data builds trust and makes the scientific dimension tangible to citizens and policymakers.
- Mix meetings with powerpoints with physical **engagement**. Activities like workshops and night walks turn abstract discussions about “light pollution” into lived, visible experiences.
- Show visible **early wins**. Even small pilot installations can demonstrate progress and help maintain enthusiasm among stakeholders.
- Maintain **alignment** across governance levels. Close coordination between municipalities, provinces, and national agencies prevents regulatory bottlenecks.

Next Steps for Lauwersoog

The next **major milestone** for Lauwersoog is the **implementation of the lighting modifications** defined in the Masterplan Darkness. Once the new lighting is in place, the project team will:

- Host an **informative evening** to share results, collect feedback, and maintain transparency.
- Continue Harbour Coalition **meetings to monitor progress** and integrate lessons learned.
- Expand **educational and outreach activities** to reach students, professionals, and the public.
- Strengthen **collaboration** with ecological and social researchers **to evaluate** the impact of the changes.
- **Share results** with partners across the North Sea Region **to inform** future guidelines on community-based lighting design.

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