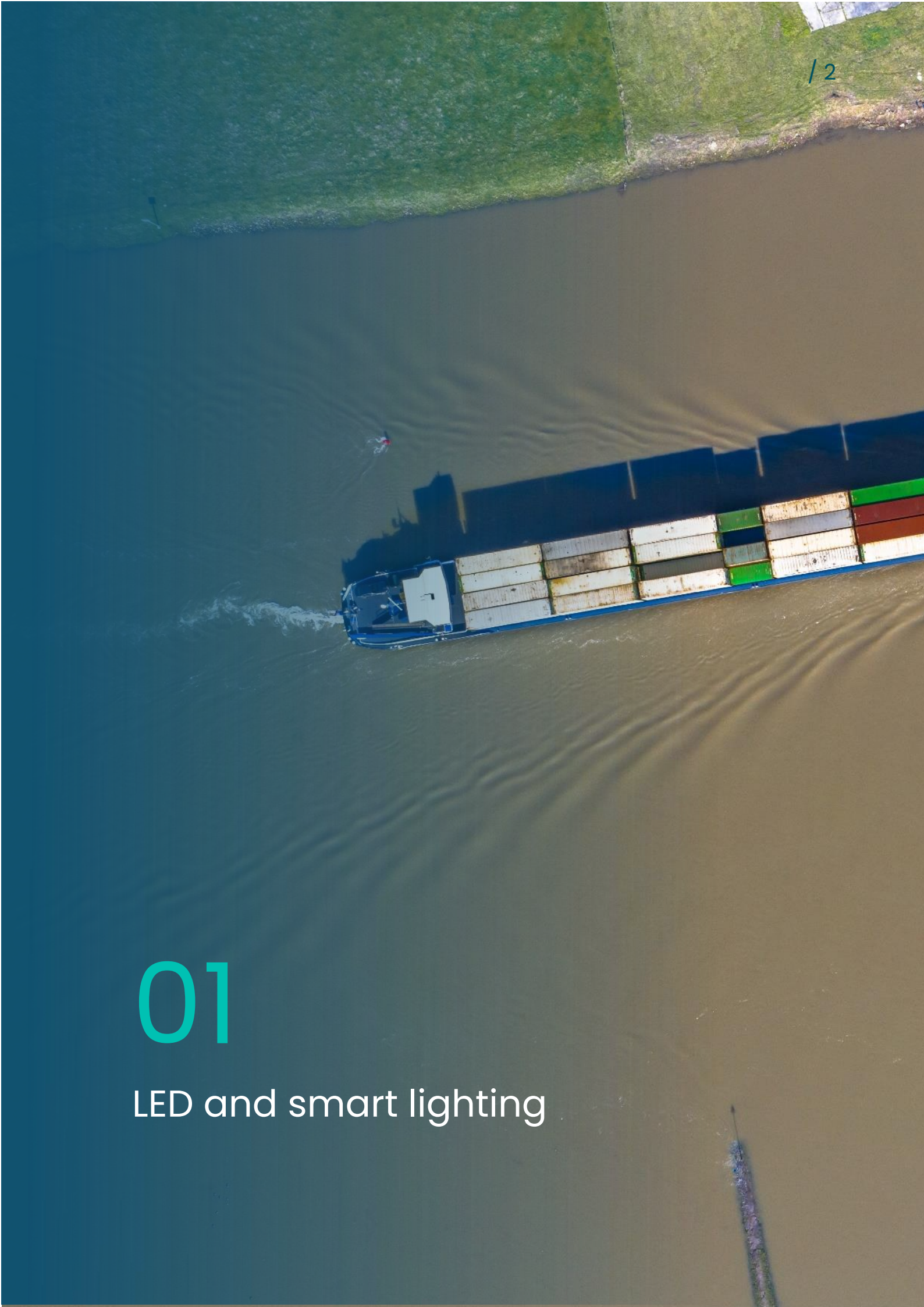
Green Inland Ports

Good Practices

Funded by
the European Union



01

LED and smart lighting

1.0 LED and smart lighting

1.1 Description

LED lighting can be used to reduce energy consumption, reduced maintenance costs, better lifespans compared to traditional lighting systems. Smart lighting systems can also be used to prevent useless light emissions with the goal to limit lighting to only when it is needed to execute work.

The results from the surveys conducted by the Green Inland Port project (2023 and 2024) that already many inland ports have been experimenting with using LED lighting instead of conventional lighting. Smart lighting has been implemented on a lesser scale.

1.2 Aim of the measure

The aim is to limit GHG emissions due to lighting and to limit light pollution on surrounding areas, as surrounding areas often include relatively fragile ecosystems. According to Niedersachsen Ports, one of the port authorities that have implemented this measure, around 20% of the energy consumption within the port area is light energy. It indicated that that around 70-80% of energy can be saved by regulating lighting within the port, controlling it and converting it to LED. When smart lighting is also implemented using sensors, chips or other methods to have more control over the lighting, the possible energy consumption can be even higher.

Ports that have implemented noise and/or odour management

- Ports of Lille
- Port of Den Helder
- Bremerhaven
- Niedersachsen Ports
- Port of Dörpen
- Port of Andernach
- Minden Port
- Port of Giurgiulesti
- Port of Wittingen
- Port of Venlo
- KOTUG

- ZULU Associates
- Van Berkel Logistics
- Rheinhafen Weil am Rhein

1.3 Realised/potential impact

According to Niedersachsen Ports, energy for lighting equals approximately to 20% of total energy consumption within the port area. According to Sifakis, N. et al., (2021), lighting exceeds 70% of a port's energy demand in most cases. The article also suggests that by using smart lighting, energy reduction can be up to 70% and in some scenarios even reach 90%. By changing all conventional lights to smart LED lights, Niedersachsen Ports recently passed 40% energy reduction.

1.4 Possible obstacles when implementing

- Changing conventional lights to LED is relatively expensive, especially when the port covers an extensive area. Next to lighting, also additional infrastructure might need to be changed. This costs time, human resources and money.
- Public port authorities that outsource the change to LED and/or smart lighting often need to tender the work due to the high costs.
- The brightness of LED lights in combination with insufficient shielding can lead to light pollution.
- LED lights in general have a longer lifespan. However, fixing or replacing them can be more complex than changing a conventional light bulb.
- For smart lighting, the limitations and possibilities for errors is largely depending on how smart the lighting will be. It is possible to use historical data to greatly reduce energy consumption, however this increases the chances of forecast errors.
- Inland ports that have participated in the second Green Inland Ports survey have indicated that this good practice is relatively easy to implement.

1.5 Key learnings from practice

- LED and smart lighting is an effective measure, as a large part of lighting emissions can be reduced, and light consumption is a significant part of the entire energy consumption within the port area.
- Light pollution is a severe problem in fragile ecosystems, and smart lighting can realize that light is only used when necessary.
- It is an expensive and time-consuming measure to implement, as in many cases, it is not only the light bulbs that need to be replaced.

- Implementing LED lighting is relatively straightforward. However, for smart lighting the decrease in energy consumption and errors that might occur due to forecasting is depending on how smart the lighting system is.

1.6 Sources

Sifakis, N., Kalaitzakis, K. & Tsoutsos, T., 2021. Integrating a novel smart control system for outdoor lighting infrastructures in ports *Energy Conversion and Management*.