

# PRINCIPLES FOR ENVIRONMENTALLY-SOUND LIGHTING

Prof. Dr.-Ing. Carolin Liedtke, HAW Hamburg - Hamburg University of Applied Sciences



The following list of lighting principles serves as overview and checklist but does not claim to be exhaustive.

## LIGHTING PRINCIPLES FOR LIGHT POLLUTION PREVENTION

These principles aim to avoid lighting when- and wherever possible to protect lives in nature and enable astronomic observations.

- Artificial lighting must only be installed where needed.
- Lighting must only be switched on when needed.
- Lighting levels must only be as high as needed.
- The lighting needs to be directed to where exactly it is needed.
- The spectral composition of the lighting should be least harmful in accordance with the surrounding flora, fauna and humans.

## LIGHTING PRINCIPLES FOR (LIGHTING) QUALITY INCREASEMENT

These principles are aimed at achieving high quality lighting for human needs; lighting that does not fulfil this requirement should not be installed.

- Lighting must serve its purpose which needs to be defined before designing the installation.
- Lighting must not glare.
- Lighting must not flicker.
- Lighting must not distract and misguide.
- Lighting must not penetrate interiors.
- Lighting must not prevent from dark adaptation.

## LIGHTING PRINCIPLES FOR ENERGY, COST & OPERATION OPTIMISATION

- The luminous efficacy (lm/W) of the fixture must be as high as possible.
- The optical efficiency of the fixture must be as high as possible.
- The lamp lifetime must be as long as possible.
- The luminaire must be controllable, better dimmable.
- A dimming strategy must be designed carefully and applied throughout the complete operation time of the installation.
- The maintenance of the installation must be carried out according to maintenance plan.
- The lighting must be measured by experts after the initialization of the lighting installation.
- The initial dim levels should be applied according to the outcomes of these measurements.
- The lighting purpose and the operation times of the installation should be scrutinized at regular intervals.

