Case study – even light level throughout the greenhouse

An even light level at every spot in the greenhouse. It sounds simple, but it is not always easy to realize in practice. In practice, outer walls, a technical room or a shed can cause disadvantageous shadow spots in the greenhouse. Smart application of the possibilities of the CLX-V1000 full-LED grow light system offers a solution.

The case:
A department in a floriculture company has a considerably lower light level along two gables because of an outer gable and a technical room. Because the department itself is quite small, about 500 [m2], the adverse effects along these edges are relatively large. Mapping this uneven light distribution and adjusting the lighting strategy accordingly is described in this case study.

Situation:
The image below shows a detail of the greenhouse. On the right side is the outer gable and below an adjoining technical room. The width of the truss is 12.8 [m] and the compartment size is 4.5 [m]. The CLX-V1000 luminaires are evenly distributed over the greenhouse and mounted at a height of 3.5 [m].

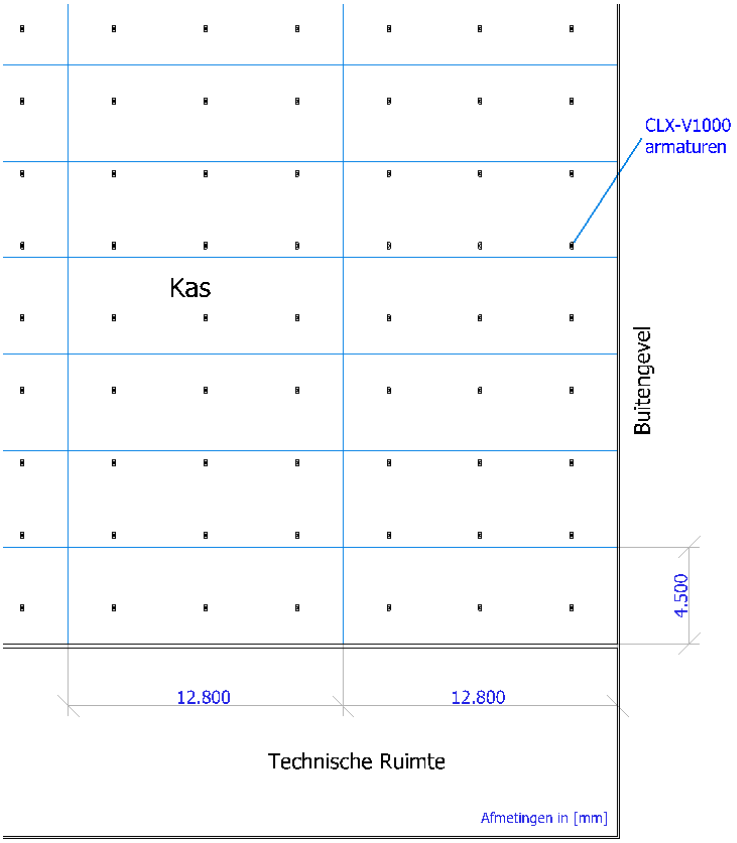

Figure 1: Detail situation sketch along dark gables.

When the grow lights are set to the same light level, the light intensity in the vicinity of these gables naturally decreases. As a result, the uniformity is far from optimal. Figure 2 visually displays the light intensity with different colors in steps of 10 [µmol/m2/s], giving an image of the uniformity.

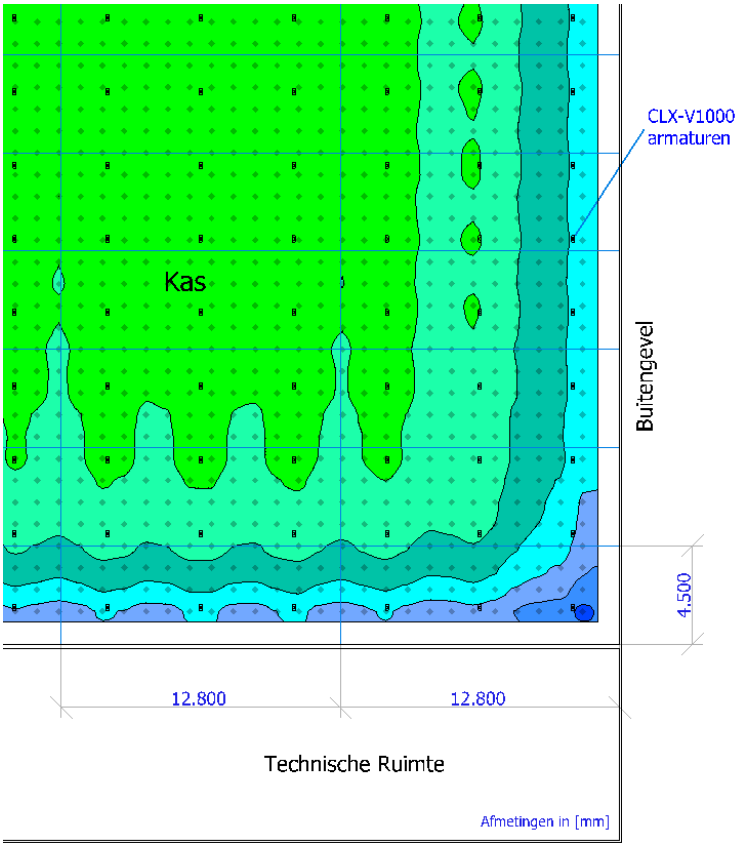

Figure 2: Visualization light intensity, step size = 10 [µmol/m2/s]

As can be seen in the image above, the uniformity is not optimal. On the right side, along the gable there is a difference of -30 [µmol/m2/s] and along the technical room this even rises to -40 [µmol/m2/s].

The plan:
By dividing the grow lights into different light groups using the Horticulture Control Unit, these places with lower light intensity can be additionally illuminated. Figure 3 shows such a possible group division.

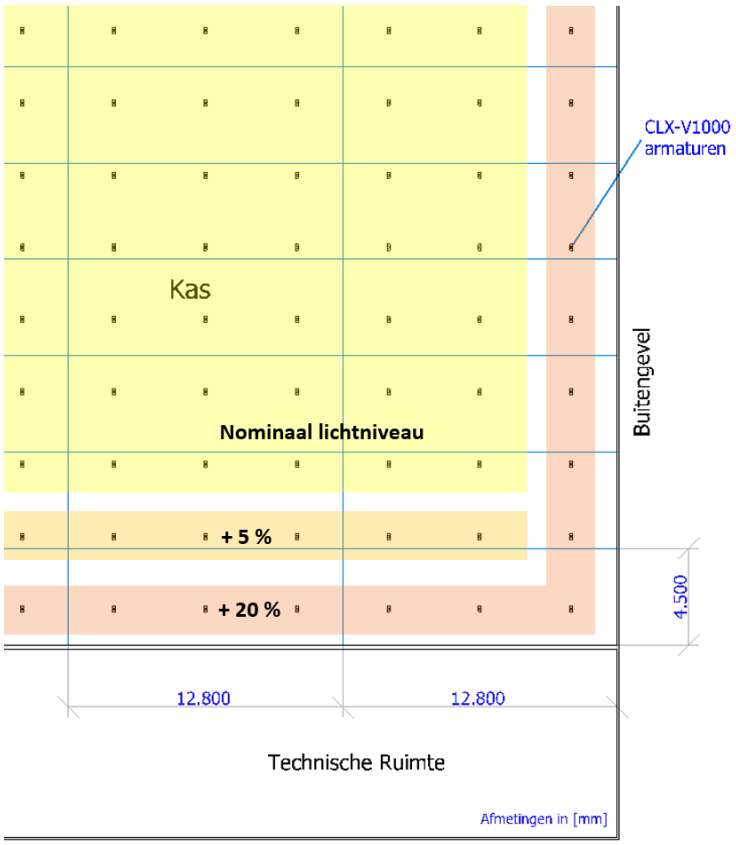

Figure 3: Grouping of CLX-V1000 grow lights.

The grow lights immediately adjacent to the outer wall and technical room are controlled separately in a group with a light level of +20 [%] and the second row of grow lights along the technical room are also controlled separately with a light intensity of +5 [%].

Figure 4 again shows the uniformity of the light, but now with the adjusted light intensity as described above. Again this is visualized with a step size of 10 [µmol/m2/s].

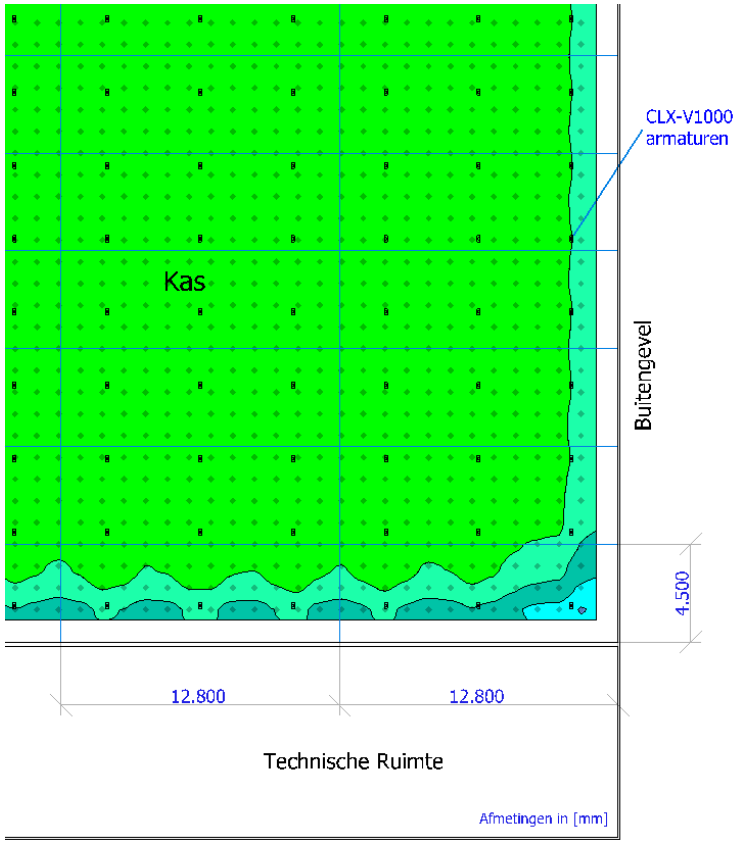

Figure 4: Uniformity with adjusted light strategy, step size = 10 [µmol/m2/s].

It is clearly visible that the uniformity over the entire surface of the greenhouse has improved considerably. For example, the inequality in the above case has increased by 15 [%].

Practice:
To put this plan into practice, several light measurements were carried out. One light measurement with all grow lights set to the same light level. The grow lights were then divided into groups along the gables and adjusted to different light levels. Measurements were then carried out again to determine the best adjustment.

In the end, only the grow lights directly adjacent to the facades were adjusted separately with an offset of +10 [%]. This gave a +12 [%] increase in light and proved to be the most efficient for application in this situation.

Conclusion:
Mapping out problematic shadow zones in the greenhouse, and also using the possibilities of the CLX-V1000 grow light system in a smart way, can significantly improve the negative consequences of poor light distribution in the greenhouse.

Do you have any questions about using the CLX-V1000 grow light system in your greenhouse? Contact Niels Damen, Operational Manager Climalux. Call +31 (0)6 18 67 81 29 or email n.damen@climalux.nu.