

When light comes to algae production. SANSOL increases efficiency of university research biorefinery project with customized illumination solution.

When specialists join forces and exploit project-specific synergies, something new usually emerges. Together with micro algae systems specialist Varicon Aqua Solutions Ltd., SANSOL has realized a customized plant with an innovative illumination system for an efficient algae production. The project benefited from SANSOL's many years of lighting experience in the field of algae production and its specifically developed lighting solutions.

Jennersdorf, February 04, 2021 - The project to be realized required the competences of several specialists. Primarily the vision of the leading biological scientists of Bogazici University who took great care in the conception of the Biorefinery project and who worked closely with suppliers to determine the suitability and efficacy of the various technologies selected. Then on the one hand, Varicon Aqua Solutions Ltd. ensures efficient and reliable production of algae species using its innovative algae photobioreactors (PBRs) the Phyco-Flow™ and Phyco Bubble™. More than thirty years of experience in the development, planning and construction of customized algae photobioreactors and cultivation systems went into the project. SANSOL, on the other hand, with its exposure solutions and comprehensive project expertise, guaranteed a solution perfectly tailored to the plant and the operator's needs: a season-independent, cost-efficient as well as high-yield production. To fully exploit the potential of the lighting solution, the following success factors had to be met:

- A system solution explicitly tailored to the situation, consisting of algae photobioreactor plant and optimized exposure solution.
- A preliminary planning and definition of the parameters for the use of a professional exposure solution.
- Ensuring a cost-efficient and durable solution for industrial use with increased protection requirements.
- A professional, technical comparative analysis of alternative lighting solutions highlighting the superior efficacy of the SANSOL.

Algae growth is largely determined by solar radiation, ambient temperature and the addition of nutrients. With the help of the customized SANSOL exposure solution with tuned light spectrum, the throughput and yield of the plant could be measurably increased while using energy sparingly. It had to be ensured that the photons could penetrate the algae solution with minimal reflection losses at the glass wall of the bioreactor. The Lighting System FLEX-PRO Series by SANSOL ensures this with optimized lens optics. It is specifically adapted to the geometry of the algae photobioreactors. The light rods, which are arranged parallel to the algae photobioreactors on both sides, radiate evenly onto the glass tubes. This reduces reflection from the glass wall and promotes algae growth. A broadband emission spectrum adjusted to the algae species ensures efficient biomass growth. The intelligent arrangement of the sixteen FLEX-PRO Series luminaires minimizes shadowing without compromising the

availability and complementary synergy of natural daylight. The final installation and energy use of the FLEX-PRO Series are also characterized by efficiency. The compact design as well as the use of protective extra-low voltage to supply the light rods enable cost-effective, time-saving installation on the corrosion resistant support structure. In addition, energy efficiency and safe 24-hour operation of the system are guaranteed. The dimmable system allows smart operation depending on the growth stage of the algae and the daylight conditions.

The close cooperation with SANSOL and the successful implementation of the Flex-Pro Series LED luminaires guarantee the following benefits for the Turkish operator of the 33,000l Phyco-Flow™ PBR plant:

- Enhanced biomass yield with optimal energy demand.
- Bridging of sunless days and night. The system can provide light for up to 24 hours, depending on the type of algae.
- Durability in industrial environments due to extreme impact and emission protection.
- Dimmable design allows variable adjustment in changing weather and thus energy-efficient optimization of the amount of light.
- Brightness can be flexibly adjusted according to the growth stage of the algae.

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