LASSI Pilot: Juniper Hill, Inc.

Suffolk County, New York

LASSI Pilot Launches Evaluation of Energy use and Crop Performance in Greenhouses

Background:

This series of case studies presents findings from pilot demonstrations of the Light and Shade System Implementation (LASSI), a project supported by the New York State Energy Research and Development Authority (NYSERDA). The work focuses on implementing LASSI in commercial facilities to evaluate its effectiveness in improving energy efficiency and crop productivity under real-world conditions.

The pilots represent a collaborative effort to translate scientific research into practical applications for greenhouse operators. Over the course of one year, each facility collected data on sensors, crop yields, and utility use, which was normalized using weather data and compared to baseline performance.

These case studies highlight operational insights, economic considerations, and user benefits related to each lighting system.

Operations at a Glance:

Company: Juniper Hill, Inc.
Industry: Agriculture
Crop: Floriculture

Juniper Hill, Inc. operates a well-established greenhouse business in Mattituck, New York, producing flowering annuals and ground covers. They have embraced automation production with advanced irrigation and transplanting systems. Through the use of a proprietary soil blend they can reduce transplant shock and promote plant longevity.

Lighting Control

The Juniper Hill greenhouse is equipped with a Priva control system, that controls their light and shading system. Juniper Hill did not use their lighting system prior to the project (though the Priva system could be used to control the lights based on a timed schedule). Shading control was primarily based on temperature setpoints as they did not have a light sensor incorporated into their system.

The greenhouse is equipped with a non-dimmable LED supplemental lighting system that provides an average of 30 µmol/m2/s at crop level. Supplemental lighting was restricted to primarily daylight hours with no lighting permitted from 6 pm to 6 am.

The greenhouse is also equipped with a retractable shading system, that can reduce incoming sunlight by approximately 50%. Because the shade system for the greenhouse section is controlled by their Priva system based on temperature setpoints, we were unable to assume control over the shade system, to demonstrate the shading capabilities of LASSI.

LASSI Performance

Unfortunately, the lighting system in the Juniper Hill greenhouse was only on one circuit (and also not in use before the project) and so we were unable to directly compare lighting system performance. With a lighting system capacity of 30 µmol/m2/s and greatly reduced hours of lighting availability, the daily light integrals were essentially dominated by the natural light. In contrast to a lighting system based on a timeclock, the ability of LASSI to predict the natural DLI's for the day, avoids over-lighting when the DLI was met.

Recommendations

The shading capabilities of LASSI would be a good demonstration to test, provided a temperature over-ride could be implemented. Shading for light control would also help to control temperatures, and it is possible better temperature control could be achieved due to the predictive nature of the LASSI algorithm.

The lighting system at Juniper Hill is not currently designed to provide enough light to significantly increase production and was likely sized for photoperiod adjustment. Should crops requiring a higher light integral be grown in this greenhouse section, it is recommended that the lighting system be upgraded to meet those needs.