

Steer Plant Growth With a Balanced Climate

How The Green Organic Dutchman employs a 'whole system approach' in its new 150,000-square-foot facility.

Jolene Hansen



When TGOD moved to its 150,000-square-foot growing facility, it adjusted its HVAC to be able to accommodate a much larger growing space.
Photos by AMer Nabulsi

When The Green Organic Dutchman (TGOD) expanded operations recently, the move transcended simply scaling what the Canadian cultivator had done before. Instead of a 7,000-square-foot indoor grow lit only with artificial lighting, the new 150,000-square-foot hybrid greenhouse offered natural light that the company could just supplement with artificial lighting—as well as much more room.

David Bernard-Perron, TGOD's vice president of growing operations, says the change required a redesign of the growing environment and environmental controls.

“We kept our growing methods. We kept the nutrient systems and the plant genetics and the type of artificial lights,” Bernard-Perron says. “But the question was how we could adapt that into a commercial greenhouse production setting. We had to rethink the way we were growing to make sure it would be possible to do so at scale.”

Canopy Climate

Some of TGOD's biggest changes involved workflow. The company focused on optimizing floor space to create an ergonomic environment for greenhouse workers to execute tasks—involving considerations to allow them to do their jobs more efficiently all while maximizing and optimizing their available canopy space. Keeping that process seamless for the 60-person grow team was inextricably linked to environmental controls for the enhanced greenhouse space.

Ensuring the heating, ventilation and air conditioning (HVAC) system was sized appropriately for the greenhouse, which Bernard-Perron describes as a glass-roofed warehouse, was top of mind. Compared to a limited ceiling height in conventional indoor gardens, the 23-foot-high greenhouse ceilings dramatically impact air circulation throughout the grow. To capitalize on climate stratification in the room, the team chose a design with roots in traditional greenhouse agriculture.

The approach targets climate at canopy level—the first 7 feet of grow-room height. TGOD plants grow on mobile benches, while HVAC systems deliver air from underneath. “We always inject the air from our HVAC where it's most critical to us,” Bernard-Perron explains.

As cool air at crop level warms, it moves through the canopy, eliminating detrimental microclimates on its way to the ceiling-based exhaust. “We're really managing the canopy level instead of managing the whole grow room. Our profitability comes from the canopy, not from the whole room,” Bernard-Perron says. “It's a very efficient way to cool a greenhouse.”



TGOD accounted for the fact it cultivates with soil, which can block airflow and increase humidity levels, when installing an HVAC system.

Living Soil Considerations

TGOD's use of soil, essential to its operations and its organic certification, creates unusual dynamics within the grow. Bernard-Perron explains that soil not only blocks airflow in the canopy, it also contributes to higher humidity levels. Canopy-level climate control mitigates those effects and keeps the living soil TGOD uses and is known for at room temperature.

“[Living soil] is basically a living system, so it works better or works faster if your soil is warm. The microbes are more active, the roots are more permeable, so the plant is just growing faster,” he says. “We do have some efficacy gains when the soil is warmer. That's one of the benefits.”

Given the large volume of soil used in TGOD operations, optimizing canopy airflow is critical. “These pockets of high humidity are where your disease always starts first. If you don't have proper airflow and proper setpoints for that airflow to be delivered to your plants, then that's where disease and pests start,” he stresses.

‘Whole System Approach’

Systems designed separately often need adjustments once everything comes together, Bernard-Perron says. “There are little details that you only see once you're physically there and you walk the room yourself and you see all those components interacting together,” he says.

TGOD didn't require major post-expansion adjustments largely due to pre-construction adjustments to HVAC plans, Bernard-Perron says. After deciding on the facility's cooling requirements, TGOD's expansion team double-checked calculations and talked with other growers about system sizing to make a more informed decision. The team opted to more than double the amount of cooling it had initially planned.

Bernard-Perron says he often hears stories about greenhouses that can't use all their lights. “It's always about cooling,” he says. “When we have the amount of supplemental light that we're using in cannabis, you have to make sure that you're able to cool for that amount, and that's on top of the dehumidification and all that.”

Environmental setpoints are only one piece. “It's still how you are going to bring those target levels of CO2, humidity and temperature to your plants,” he says. “If your system can give them to you, but then the air gets warmed up before it can cool your crop, you may have issues. This is why it's really the whole system approach you need to look at.”



Determining HVAC size for a growing facility requires several considerations, including heat emitted from supplemental lighting, as TGOD discovered.

Climate's Essential Role

For Bernard-Perron, climate outweighs nutrients in importance. He compares plants to racehorses given the finest feed, then subjected to hot workouts where performance takes a back seat to survival. In the same way, plants in stress-response mode pace themselves to stay alive. “We're in the business of producing secondary metabolites, the business of producing cannabinoids, so this is where it really matters,” he says.

He notes that, unlike animals, plants in hostile environments can't find shelter or leave. Instead, they turn to survival mechanisms like reductions in growth and yield. “They're going to limit themselves,” he says. “If you remove that limitation, then they're going to use all that fertilizer you give them. Then they're going to produce all those secondary metabolites.”

With proper controls, you can truly steer plants. “If you want to dry them out to increase your terpene production, you want to be able to do that at the right time by decreasing your relative humidity and your soil or growing medium moisture when you decide to do so, not because suddenly your HVAC or climate control couldn't keep up with whatever the environmental conditions were,” he adds.

For growers designing a new grow or an expansion, Bernard-Perron emphasizes getting reliable HVAC equipment with a good warranty and a vendor you trust for training and service—and don't sell your HVAC short. “If you're setting it up, don't go for just the bare minimum,” he says. “Make sure you have a bit of extra capacity in there.”

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