



How to Heat Your Greenhouse

Resource Guide

 **BioTherm**®

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Why Efficient Heating Matters for Greenhouse Success



Heating: The Foundation of a Thriving Greenhouse

Heating a greenhouse is more than just keeping plants alive in the winter; it's about maximizing growth, protecting your investment, and turning energy use into profit. For most growers, energy is the second-largest operating expense after labor. That means every wasted BTU is money lost.

This guide explores heating strategies that put your energy dollars to work where it matters most: at the root zone. Whether you operate a backyard greenhouse or a 100-acre facility, the principles here will help you heat smarter, grow stronger crops, and protect your bottom line.



Watch the video!
**How to Heat
Your Greenhouse**

02

The Traditional Approach: Unit Heaters

For decades, unit heaters have been the default choice in North American greenhouses. They're attractive for one simple reason: low upfront cost. Installation is quick and relatively inexpensive, making them an easy "starter" option.

But here's the catch—unit heaters warm the air volume, not the plants. Since crops typically take up only about 10% of the total greenhouse space, most of that energy is wasted heating empty air.



When unit heaters make sense:

- As backup systems for emergencies
- To supplement a primary heating system
- For small, lower-budget systems

If you're relying on them as your only heating source, though, you're likely paying too much for too little return.

03



The Problem with Wasted Heat

Imagine pouring money into a system that heats mostly air above your plants. That's the reality of traditional approaches. In most greenhouses, only a fraction of the total air volume is actually occupied by crops.

Instead of heating the entire building, the smarter approach is to target where the plants are—at the root zone. Roots are the engine of growth, and when they're kept at an ideal temperature, crops thrive faster and resist disease. Heating the roots first ensures plants use the energy efficiently, rather than spending it all on maintaining canopy temperature.



04

Hydronic Heating: The Smart Solution

Hydronic systems use hot water to deliver heat precisely where it's needed. Water is one of the most efficient transfer mediums available—easy to control, reliable, and capable of storing large amounts of energy.

Why hydronics works so well:

- Directs heat to the plant zone instead of the ceiling
- Allows for zoning and precise climate control
- Scales for any greenhouse size
- Provides better uniformity and faster ROI

Think of it this way: you're not just moving water—you're moving money. Every BTU you invest is targeted toward plant growth instead of wasted on air space.



StarFin™ top heat at Lucas Greenhouses | Monroeville, New Jersey

Heating Options with BioTherm

Root Zone Heating Systems - Bench



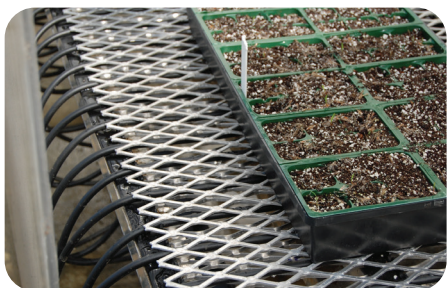
Under-bench heating (DuoFin™):

Great for mobile benches and rolling trays.



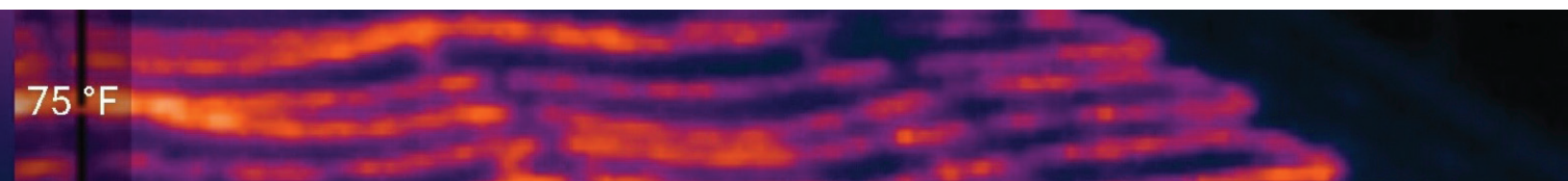
In-bench heating (Bio 2.0™):

Integrated heating inside benches for propagation.



On-bench heating (MicroClimate™ & Roll'N Grow®):

A light, efficient option for direct crop heating.



Root Zone Heating Systems - Floor



In-floor heating (GreenPEX tubing):

Ideal for concrete slabs, delivering consistent, even warmth from the ground up.



On-floor heating (Roll'N Grow®):

Flexible mats that roll out directly on the floor, perfect for greenhouses without poured slabs.

Root Zone Heating Systems - Supplemental

Even with root-zone systems, some crops and environments require extra heat at the upper levels. That's where high-efficiency finned pipe systems shine:



Overhead finned pipe heating (StarFin™ & DuoFin™)

Mounted near the roofline, ideal for snow melt and hanging baskets.



Perimeter heating (StarFin™, DuoFin™ & SunFin™):

Installed along greenhouse walls to reduce cold infiltration, with high output similar to steel pipe but easier to install.



Institutional/Research-grade heating (SunFin™):

Maximum output, designed for universities and research greenhouses.



Boiler Systems - Low Mass

Low-mass boiler systems deliver high-efficiency, on-demand heating while taking up minimal space—making them ideal for greenhouses with limited mechanical room. These compact systems heat more area with less footprint and respond quickly to temperature changes, reducing energy waste. With low-temperature options and rapid heat delivery, they're a smart choice for growers seeking precision, performance, and space-saving design.

Low mass boilers have come along way!

- Sizes up to 10MBTUH
(enough for 2.5-3 acres)
- On-demand and fast to react
- Modular
- Easier to maintain
- Low emissions



Greenhouses are also "low mass"

08

Why Hydronic Heating Works

Water is 3,500 times more energy-dense per volume than air, making it the most efficient medium for greenhouse heating.

It's easy to transport with minimal loss, simple to zone, and highly adaptable—you can modulate, target, and scale heat exactly where it's needed. Whatever the cheapest way to make hot water is, that becomes your heat source. This flexibility makes hydronics inherently future-proof. Think of it like the difference between a shotgun and a rifle: air heat blasts everywhere, while hydronic heat delivers precision.

What Growers Experience

Those who switch to hydronic heating consistently report measurable improvements:

- **Fuel savings:** More heat delivered where it counts reduces overall energy use.
- **Faster growth:** Warm roots stimulate metabolism and accelerate crop cycles.
- **Healthier plants:** Stable root-zone temperatures reduce disease pressure and strengthen plants.
- **Consistent results:** Zoning and modulation ensure a led, uniform climate across the greenhouse.

Hydronic systems don't just heat—they optimize efficiency, plant health, and long-term resilience.

Lucas Greenhouses • Michael's Greenhouses • Plantpeddler • Robust Cannabis • Bob's Market • Little Prince of Oregon • Bare Roots Produce • AgriStarts • Bauman Farms

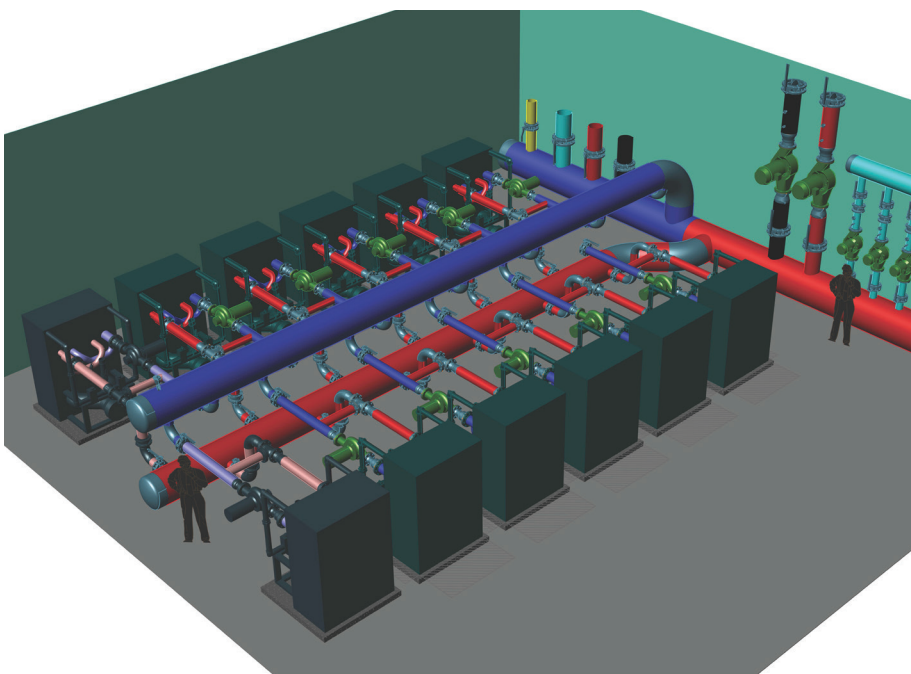


Lucas Greenhouses • Michael's Greenhouses • Plantpeddler • Robust Cannabis • Bob's Market • Little Prince of Oregon • Bare Roots Produce • AgriStarts • Bauman Farms

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Scale for Any Operation

Hydronic systems aren't just for industrial-scale facilities. BioTherm has systems running in greenhouses as small as 500 sq. ft. and as large as 100 acres. Whatever the scale, the principle is the same: put the heat at the plant zone and maximize your return.



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Easy to Install, Easy to Use

Some growers hesitate because they assume hydronic systems are complicated. The reality? If you can run irrigation lines, you can install BioTherm heating. No welding, no specialized labor—systems are designed to be DIY-friendly, with support available every step of the way.



Plugs on MicroClimate™ bench heat system at Bauman Farms | Gervais, Oregon



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Grower Stories

Meet the Growers: How BioTherm's Climate Solutions are Helping Plants Thrive and Growers Succeed.

Our "Grower Stories" series provides an inside look at how innovative growers are utilizing BioTherm systems to improve their greenhouse operations. Each grower shares their unique experience, highlighting how BioTherm's advanced climate technologies have helped them boost productivity, reduce energy consumption, and create an ideal environment for healthy plant growth.

These stories serve as a testament to the proven reliability and effectiveness of BioTherm solutions, offering valuable insights for other growers looking to optimize their facilities. By hearing directly from those who have experienced the benefits firsthand, the series aims to inspire and educate the next generation of successful growers.

View these stories and more on our YouTube channel



@biothermsolutions
Connect with us on our socials!



Lucas Greenhouses
New Jersey



Plantpeddler
Iowa



Pleasant View Gardens
New Hampshire



Scan the QR codes with your smartphone to watch the videos!

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Resources

Want to heat smarter? Scan the QR codes below to explore how today's most advanced heating systems — from finned pipes to high-efficiency boilers — are transforming greenhouse performance.



"The Benefits of Finned Pipes"



GrowerTalks



"Not Your Grandfather's Boiler Room"



GrowerTalks



"Greenhouse Climate Solutions for a Changing Industry"



GPN Magazine

Powered by precision. Inspired by growth.
Bio Therm delivers heating innovation that keeps your greenhouse thriving in every season.



In-Slab heating system at Lucas Greenhouses | Monroeville, New Jersey

Next Steps for Smarter Greenhouse Heating

Heating isn't just about keeping plants alive through the winter — it's about maximizing growth, protecting your investment, and turning energy into profit. For most growers, heating is the second-largest operating expense after labor, which means every wasted BTU is money lost.

Here's how to move forward:

Fill out a CED Form – Share your greenhouse details and project goals.

Start the Collaboration Process – Our team will connect with you to design a solution tailored to your operation.

Tap into Resources – Explore grower stories, case studies, and proven strategies to see how BioTherm helps growers heat smarter.

Every greenhouse is different, but the principle is the same: efficient heating drives stronger crops and a healthier bottom line. By taking the next step today, you're starting the path toward a more productive, resilient, and profitable growing environment.



Roll'N Grow® Heating System at Michael's Greenhouses | Cheshire, Connecticut



Follow Our Updates

Providing Cultivation Climate Technologies
to growers since 1980.

Visit us at biothermsolutions.com

