CO_2 CAPTURE FROM CALIFORNIA TO JAPAN WITH RAYPAK® BOILERS

BioTherm® makes CO_2 conditions right for their customers' indoor growing with help from Raypak XVers® Condensing Boilers

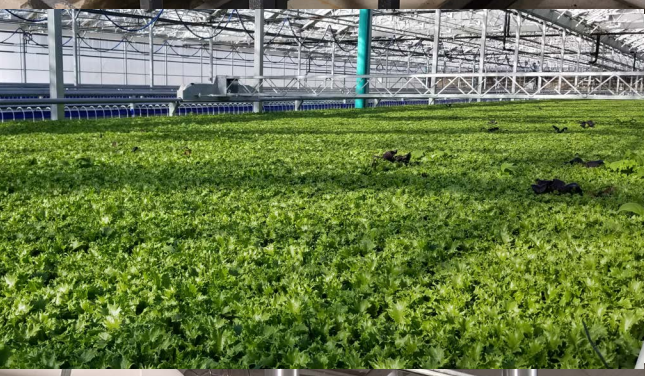
The Customer

Jim Rearden and Mike Muchow,
BioTherm

California-based BioTherm is the exclusive dealer for Raypak boilers to the Controlled Environment Agriculture (CEA) industry. BioTherm has been at the forefront of developing highly efficient greenhouse solutions since 1980. They specialize in providing climate control solutions for indoor and greenhouse operations from heat and hydro sciences to optimized air.

The Challenge

Indoor and greenhouse farming are growing industries and will continue on this path as consumers look for produce grown closer to where it is sold. But no matter where they are, all plants need just the right levels of light, temperature, moisture and air composition. Greenhouse and indoor farming mean these factors can be dialed in for the best result possible. Many plants require a dose of Carbon Dioxide (CO_2) to increase the efficiency of photosynthesis and maximize growth, and in Fukushima, Japan, it is no different. So, when vegetable facilities there, as part of the regrowth of the Fukushima fallout, sought out BioTherm to find a CO_2 recapture solution, the team at BioTherm got to work. Until this point, the only real solutions for introducing CO_2 into an indoor farm or greenhouse were large bulk tanks or individual CO_2 burners.



The Solution

After experimenting with other Raypak solutions, the introduction of Raypak's XVers® and XVers L Condensing Boiler lines was a game-changer! BioTherm knew that with the right condensing boiler system in place, BioTherm CO_2 Systems can easily be integrated for more customers to achieve the perfect CO_2 levels in indoor and greenhouse operations with clean, safe and dry CO_2.

BioTherm systems harvest CO_2 directly from the boiler's exhaust gases and distribute them uniformly into the growing environment while ensuring other harmful gases are kept at a safe level. With a BioTherm CO_2 System, there is no need for large bulk tanks or individual CO_2 burners.

Raypak's XVers Family efficiently serves two functions in one for BioTherm's customers. First, the boiler provides the hot water needed for successful farming. And secondly, it helps optimize the CO_2 levels in the air. By adding the simple process of collecting the boiler's exhaust, the controllability of the XVers Family allows for a precise level of CO_2 to be introduced into the space for further improved growing efficiency.

Benefits

High Efficiency & Clean Burning:
Up to 99% Thermal Efficiency

Air Optimization Friendly:
Burns clean and is easy to get the right amount of CO_2 from the exhaust

Wide Range:
From 399 to 3000 MBTUH

Small Footprint:
Well suited for small to large facilities

Raypak® A Rheem® Company

The Installation

The BioTherm CO_2 System features a Raypak XVers Condensing Boiler and secondary heat exchanger paired with BioTherm's Control System and Inline Fan.

The Final Result

"The other options they (cultivators) have are to have a gas provider bring out a giant tank they keep filled to emit the CO_2. Others use CO_2 generator products with an open burner that generates CO_2 but makes it hard to reach the desired parts per million. With our system, they make it on-site and it burns clean. It doesn't take much to get them to the desired set point.

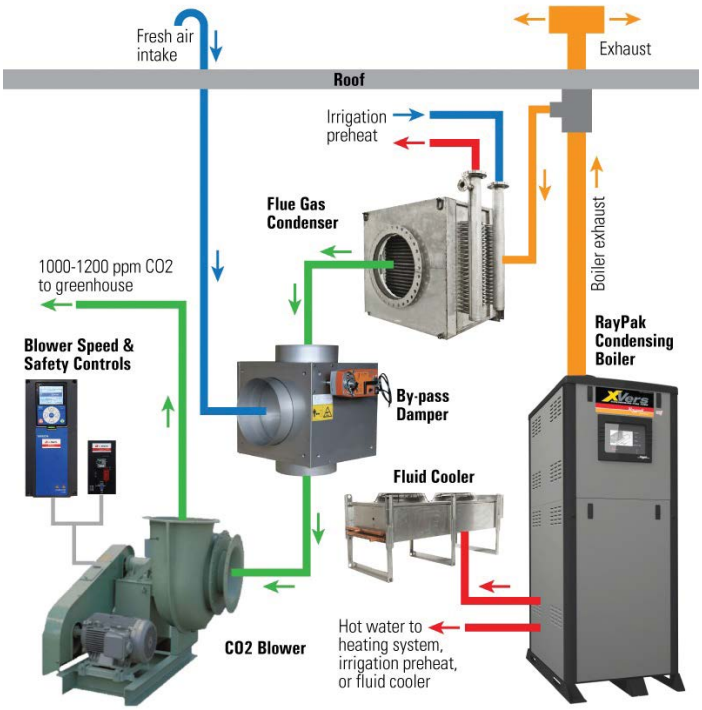
It's a much more economical way to do it and easier logistically without having to get it delivered. It's dry and clean and gives them a big benefit for their buck.

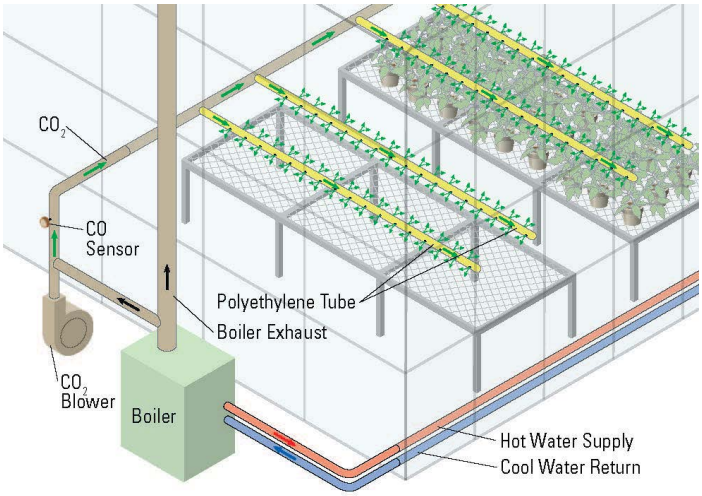
If they have an existing BioTherm system, this is a simple add on."

— Jim Rearden, President of BioTherm

"BioTherm is impacting this industry and using Raypak boilers to do it!"

— James Kastigar, Regional Sales Manager for Raypak





Here are results from some users of BioTherm's CO_2 System with Raypak XVers Family Condensing Boilers:

- 50% savings on supplemental lighting hours through increased efficiency of photosynthesis with CO_2 (Lef Farms New Hampshire)
- $90k annual savings for a single site using CO_2 from the Raypak Boiler System (Large, multi-state horticulture operation)

Note: Stated savings are self-reported from BioTherm customers.

To learn more about our High-Efficiency Condensing Boiler Solutions, visit **Raypak.com**

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