

CLEAResult[®]

Growing your agricultural savings

Indoor agriculture climate control

We understand how important it is to control the indoor environment to achieve optimal plant growth. We're using this knowledge to capitalize on utility incentives for energy efficient dehumidification, heat recovery, air movement and equipment upgrades.

Technical details

Temperature, humidity and air movement all play a critical role in plant growth. Plants need the proper environment to draw water up through their roots and out through the leaves—a process called “evapotranspiration.” If the air surrounding the plant is stagnant or temperature and humidity conditions don't support evapotranspiration, plants won't grow, and conditions can be ripe for disease. Providing the ideal indoor environment in a converted warehouse or greenhouse is more challenging when energy efficiency is a top priority. To further complicate matters, most indoor plant environments use supplemental CO₂, so economizers aren't a viable option for energy efficient cooling and dehumidification. Fortunately, there are energy efficient ways to create an ideal growing indoor environment.

For example, fans designed to move air across the plant surface come in many efficiency levels. Growers can choose a fan that produces more air flow for less power (measured in CFM/watt) to save energy. What's more, efficient dehumidification strategies—such as heat exchangers, desiccant systems, and equipment designed for high humidity environments—can meet growing needs while using less energy than conventional equipment. Lastly, control systems can be upgraded to provide more precise control and operational efficiency for existing equipment.

Our capabilities

Our engineering team can measure and verify savings on indoor agricultural projects – even new construction facilities. While many program implementers stop at horticultural lighting, our experts go further to look at the whole system. Our systems approach unlocks additional savings and value for our utility clients and their customers.



Sample projects

Advanced Dehumidification Heat Exchanger

“Free” cooling of warm moist air stream with incoming air.

Liquid Desiccant Conditioning

Utilizing liquid desiccant material to absorb moisture prior to final cooling.

Chiller Heat Recovery

Adjusting chiller operations to improve heat recovery.

High Efficiency Boiler Plant

Provide heating to indoor grow environments with less environmental impact.

High Efficiency Air Movement

Provide air movement with less input power than standard systems.

Customer testimonial

“The upgrades allow us not only to save energy, but we were also able to pass along the savings to our customers by dropping our wholesale prices 10%”, said Grace Hyde, COO of Beaver Creek Farming. “Our community is important to us and sustainability is a big part of our future focus.”



We change the way people use energy, *for Agriculture*.

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Our experience

We increase energy savings in the agricultural sector by working alongside utility clients and their customers on various electricity and gas energy efficiency projects. We've built relationships with growers and manufacturers to develop best practices in environmental control as well as to optimize savings and incentives. For example, in the case of a newly constructed lettuce greenhouse that didn't fall under typical building codes or calculation methods, our experts built a simulation model to quantify incentives. Our engineers consulted with growers, manufacturers and academics to understand the appropriate baselines.

Our M&V project experience includes providing natural gas and electric energy savings across North America. What's more, we've overseen data logger installation and worked with growers to gather data from growing automation software programs to claim defensible savings. Our data analysis undergoes a high level of rigor on every project.



Related projects

Horticultural lighting greatly impacts energy consumption in a controlled environment. Updating one's lighting and controls has the power to generate remarkable energy savings. Horticultural lighting is a large part of the work we do for indoor agriculture. The full breadth of our horticultural lighting capabilities is featured in a separate case study.



Results

We've helped customers receive incentives for controlled environment agriculture from custom utility incentive programs. Incentives, which vary by program, are typically based on a \$ per kWh or therms saved. So far, incentives have ranged from a few thousand dollars to hundreds of thousands!

Projects at a glance

6

Indoor Agriculture Climate Control Projects

100,000 Therms

Typical HVAC&D Gas Savings

750,000 kWh

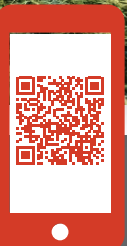
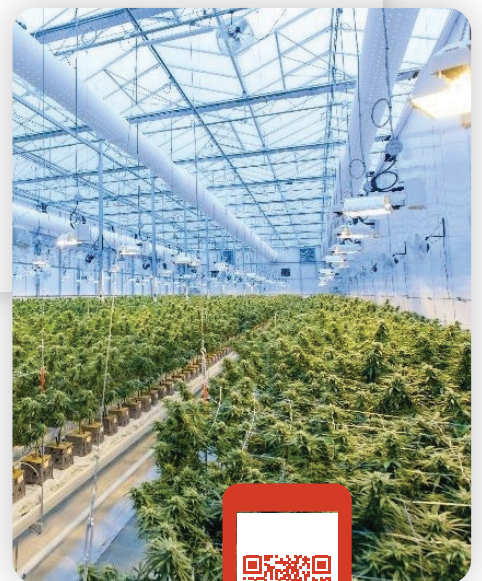
Typical HVAC&D Electricity Savings

Facility Types

- Fully indoors
- Greenhouses

Crop Types

- Cannabis
- Produce
- Leafy greens



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