CERES GREENHOUSE SOLUTIONS®

(Ground To Air Heat Transfer)

GAHT® SYSTEM

ENERGY-EFFICIENT CLIMATE CONTROL

The GAHT® system is a ground to air heat exchanger, a system often referred to as a 'Climate Battery'. Ceres Greenhouse Solutions is an industry leader in climate battery technology, having designed and installed more systems in greenhouses than any other company in the world. The GAHT® system maximizes heat transfer to the soil, making it one of the most cost-effective climate control solutions for residential and commercial greenhouses alike.

WHY THE GAHT® SYSTEM?

COOLING

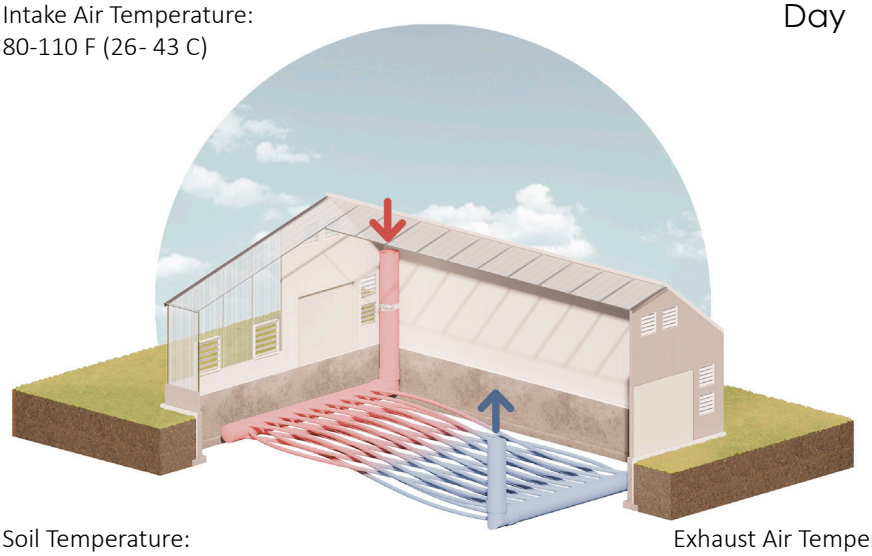
When the greenhouse heats up during the day, the GAHT® system draws the hot air from the greenhouse underground. The cooler soil absorbs thermal energy from the air running through the pipes. The air is then exhausted back into the greenhouse cooler.

HEATING

A GAHT® system also allows the greenhouse to be 'self-heating.' At night or on cold days, the GAHT® system circulates air through the soil again. The warmer soil now heats the air. Warmer air is exhausted back into the greenhouse, providing low-cost, sustainable heating.

Day

Intake Air Temperature:
80-110 F (26- 43 C)

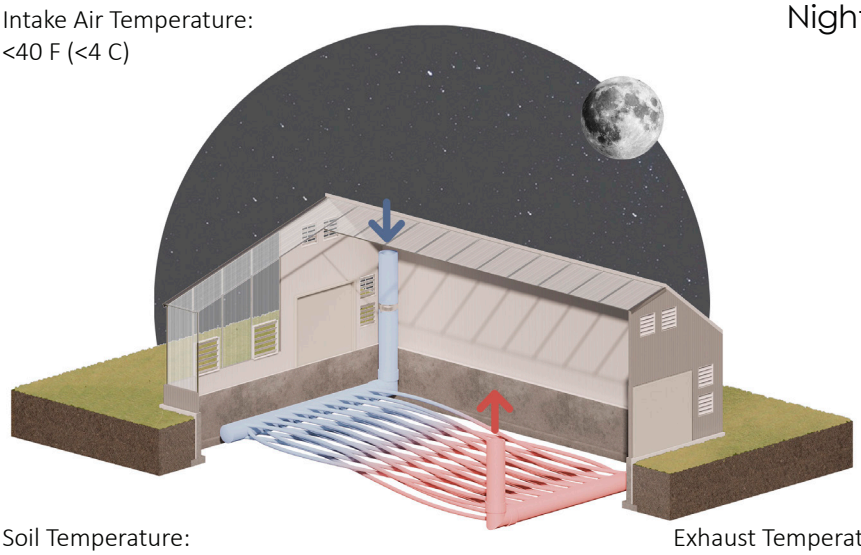


Soil Temperature:
40-70 F (4-21 C)

Exhaust Air Temperature:
40-70 F (4-21 C)

Night

Intake Air Temperature:
<40 F (<4 C)



Soil Temperature:
40-70 F (4-21 C)

Exhaust Temperature:
40-70 F (4-21 C)

*Typical temperatures, depends on your operation, can widely vary

THE POWER OF THE SOIL

ENERGY-EFFICIENT, YEAR-ROUND CLIMATE CONTROL

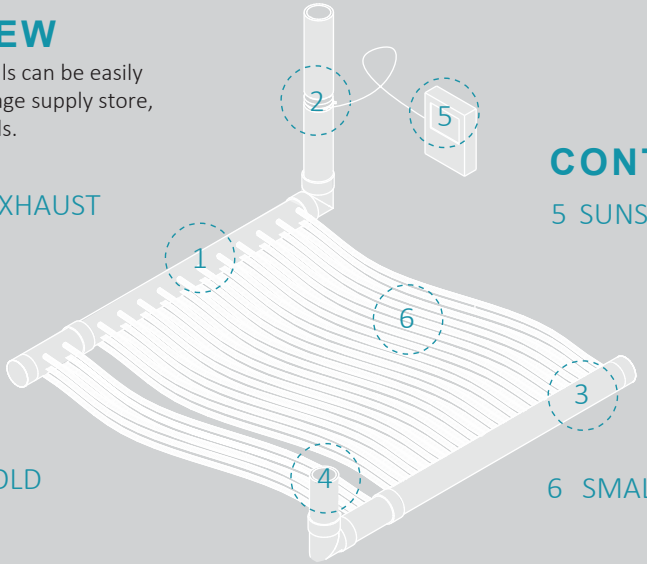
SYSTEM OVERVIEW

The systems are designed so materials can be easily sourced at your local pipe and drainage supply store, with the exceptions of fans & controls.

1 INTAKE & 4 EXHAUST PIPES

2 INLINE FAN

3 PIPE MANIFOLD



CONTROLS

5 SUNSENSE ™

THERMOSTATS

6 SMALL PIPES

*Ceres SunSense™ control system sold seperately

COMPONENTS

1. INTAKE PIPE: A large pipe takes air from the peak of greenhouse to underground pipe network.
2. INLINE FAN: Custom sized fans circulate air underground.
3. PIPE MANIFOLD: A customized pipe layout moves air at a target rate for maximum heat transfer.
4. EXHAUST PIPE: An additional large pipe exhausts air back into greenhouse to control temperature.
5. *CONTROLS: Automated controls operate inline fans based on indoor conditions.
6. SMALL PIPES: Moves air from inlet to outlet manifold pipe through an array of small pipes.

CUSTOMIZED DESIGN

Ceres customizes your GAHT® sytem design based on your climate, soil type, growing goals, and greenhouse size. Each GAHT® system is optimized for your site's unique conditions, and sized for easy installation in your greenhouse.

MONITORING AND OPTIMIZATION

GAHT® system can be controlled by our SunSense™ controller* or a weather monitoring system paired with thermostats and tracks GAHT® system performance and indoor conditions. Ceres offers personalized recommendations to ensure the GAHT® system operates at peak performance, year-round.

INSTALLATION INSTRUCTIONS

Ceres GAHT® Installation Instructions allow growers / contractors to install a GAHT® without trial and error. Instructions detail each step of the installation process and include a materials list.

A COMPLETE SOLUTION