

## Remove, Reduce, and Reuse Facility Heat for Big Cost Savings



Recirculating Growth Chamber

Gold Seal SF  
Cultivator

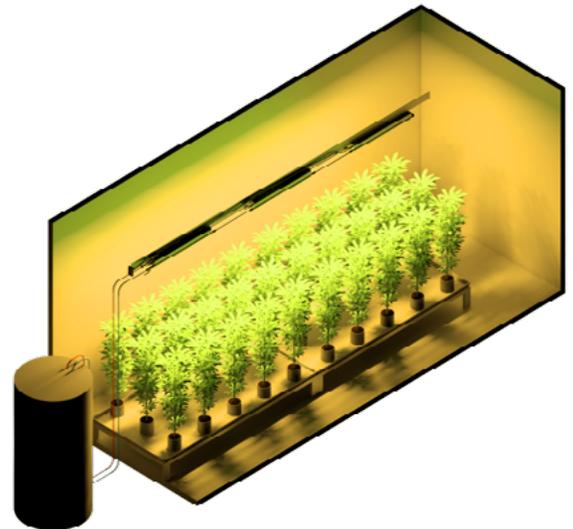
Red Congolese  
Cultivar

“With the Agnetix liquid cooling and heat recovery system, I don’t have to run heating at night or cooling during the day.”

-Aaron Flynn, Co-Founder Gold Seal SF

# GOLD SEAL

This San Francisco growth chamber is a test case for PG&E and SF Energy Watch programs for incentives and financing around energy efficiency in agriculture. Gold Seal installed three Agnetix A3DD fixtures to showcase the Agnetix system as the premier example of energy efficiency in Controlled Environment Agriculture. Gold Seal’s cultivation team leads SF and California in application of advanced horticulture technology.



Growth Chamber - 20 ft x 8 ft x 9.5 ft

CANOPY	64 ft <sup>2</sup> (6 m <sup>2</sup> )
PPFD	1500 PAR $\mu\text{mol m}^{-2}$
DLI	65 PAR $\text{mol m}^{-2} \text{d}^{-1}$

# The Project Requirements and Basis of Design



The results of Gold Seal’s first complete grow cycle under Agnetix high- intensity LED lighting were impressive. The room was allowed to run 5°-10°F hotter than the non-LED growth chambers to achieve transpiration rates needed. Mighty Box Industries and the Agnetix Team are working to assist Gold Seal with designs for upcoming large scale Agnetix deployments.

## 64 ft<sup>2</sup> (6 m<sup>2</sup>) Canopy

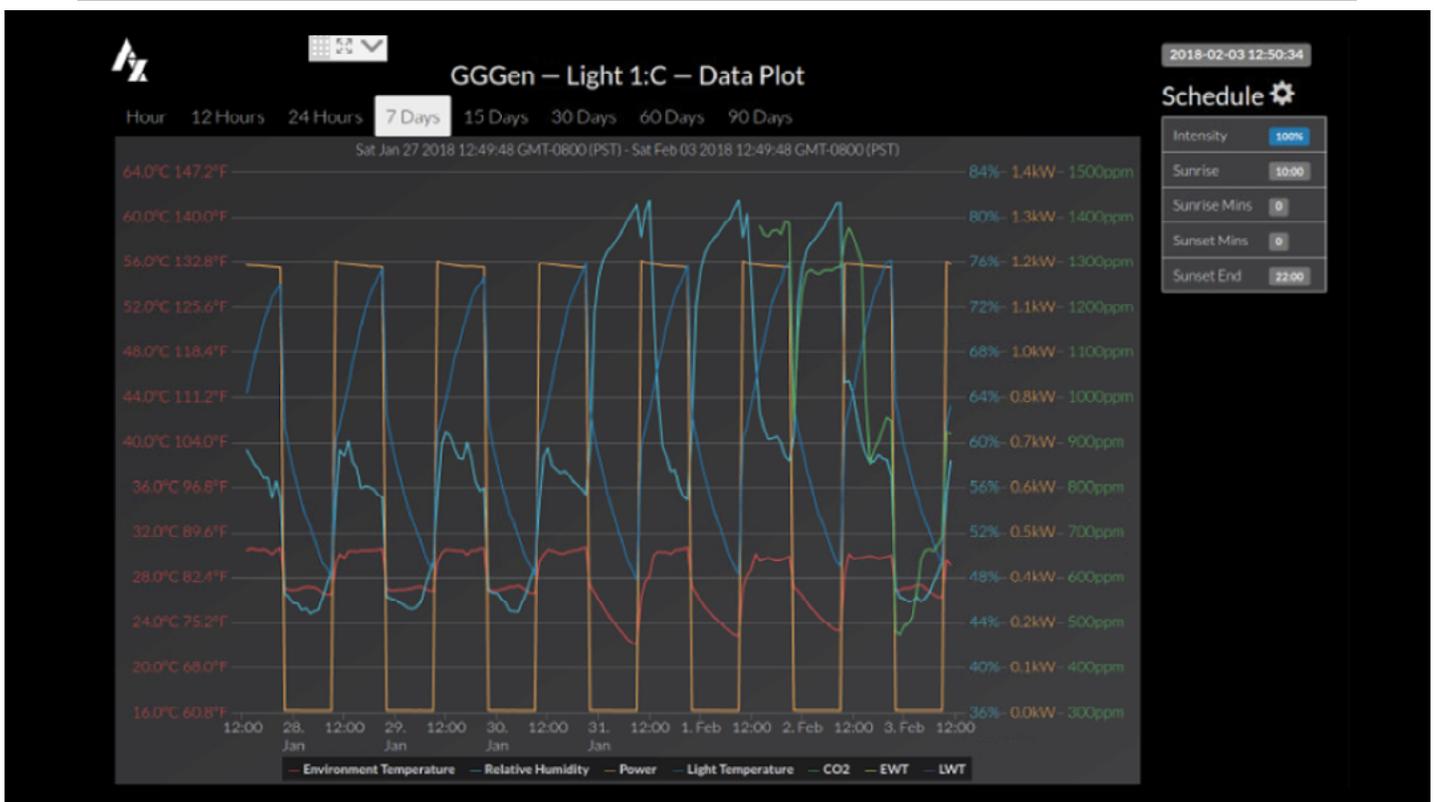
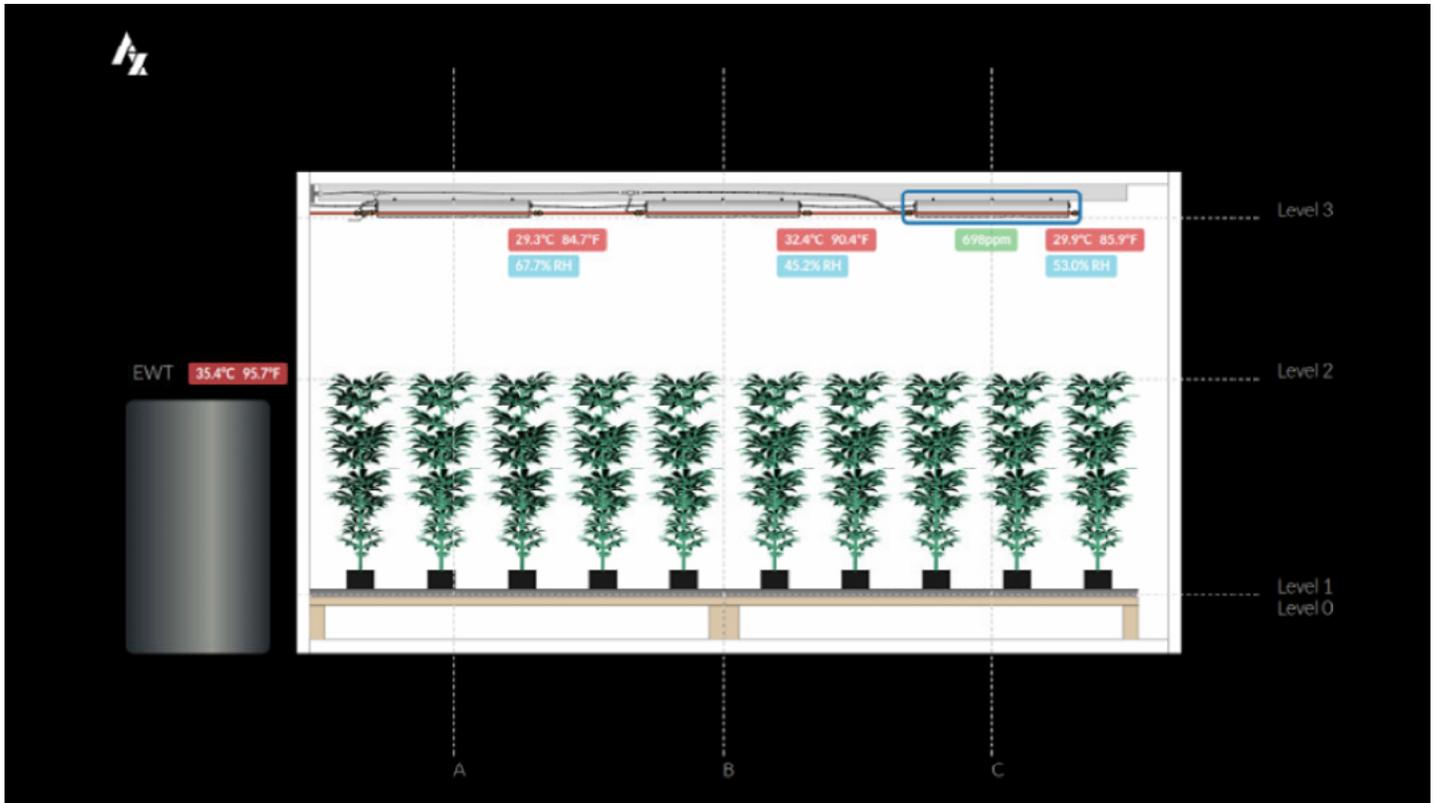
	EQUIPMENT	TYPE	WATTS
ILLUMINATION	Lights	3 - A3DD	3600
	PPFD	800-1500	
LIGHTING LOOP	Tank	200gal	
	Pump	Submersible	50
	Flow	1.5 gpm	
HEATING LOOP	Fan	8"	200
	Hydronic Coil	Ice Box 8"	
	Secondary Pump	In-line	250
COOLING LOOP	NONE		

## Average Temperature, RH and CO2

	DAY	NIGHT
LEVEL 3 TEMP (°F)	85	77
LEVEL 3 RH (°F)	52	43
LEVEL 3 CO2 (PPM)	700	500
TANK TEMP (°F)	110	77

# The HMI System

The Agnetix Human Machine Interface (HMI) is the lighting system's controller and scheduler for daily automation of the light fixtures. The HMI also provides real-time monitoring of the environment's temperature and humidity.



## Thermal Recovery System

The hydronic lighting loop has a submersible pump in the bottom of the 200 gallon tank which pumps water continuously through the lights. This lighting loop water removes heat from the room and stores the heat energy in the tank while the lights are on.

This system can also add heat to the growth chamber using a pump and fan coil on a secondary heating loop. When the pump and fan coil are energized as determined by a day/night thermostat control, heat is added to the room as needed. This heat typically comes on in early morning and at night. In this way no cooling or heating is required beyond the system pictured here.

A modulating bypass valve allows further heating of the growth chamber by bypassing the heat storage tank.

This growth chamber is in San Francisco and is the test chamber for a number of energy efficient programs and incentives sponsored by the SF Department of Energy, Energy Watch, and PG&E.



## Summary

The Agnetix system helps Gold Seal to save money by reducing, reusing and recycling the facility's heat energy. By controlling this heat energy and reducing BTUs, Gold Seal achieves a stable thermal environment with immediate cost savings.