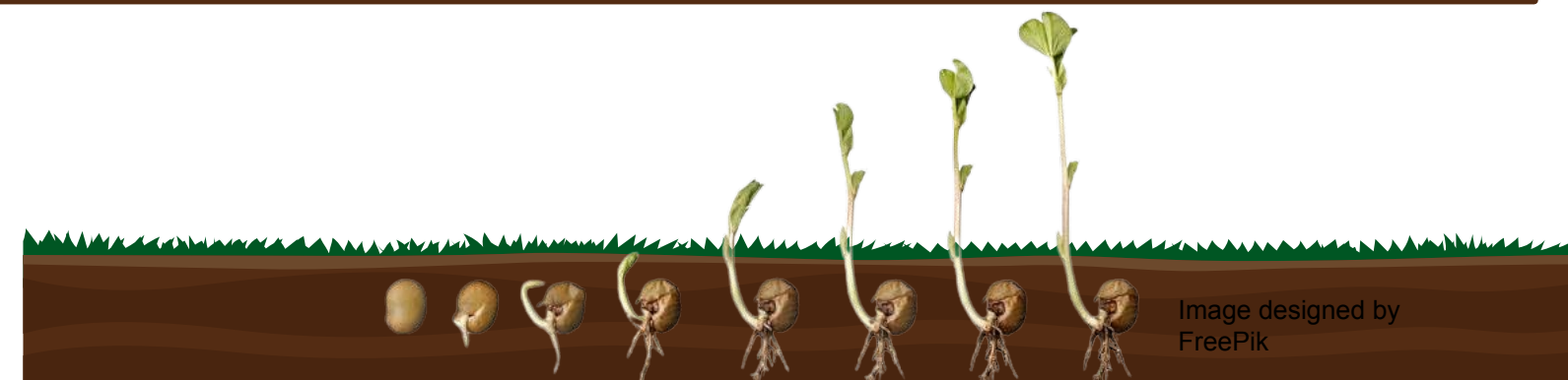


Vision

Sprout Safe provides farmers with a **controlled early-growth environment** to protect crops during the fragile germination stage and accelerate the start of the growing season. By sheltering seeds during germination, Sprout Safe enables higher yields, reduced crop loss, and an extended harvest season.



Impact

Grow more, waste less

Economic

Germinate **550 seeds** per cycle, extend the growing season by **two months**, and up to **\$2500** annual increase in revenue.

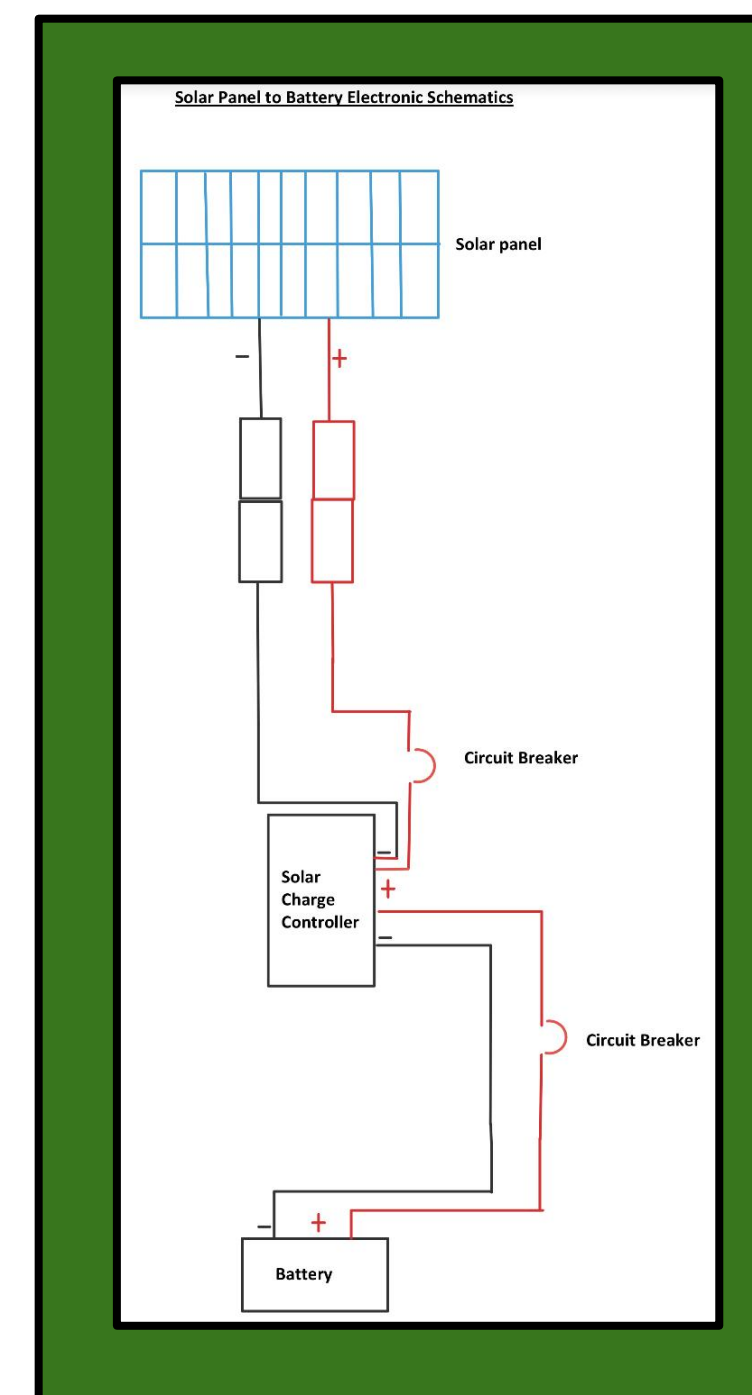
Social

Provide immigrant communities with access to culturally significant crops.

Environmental:

Runs on **100% renewable energy**, designed to reduce material waste, and promotes locally grown and sourced vegetables.

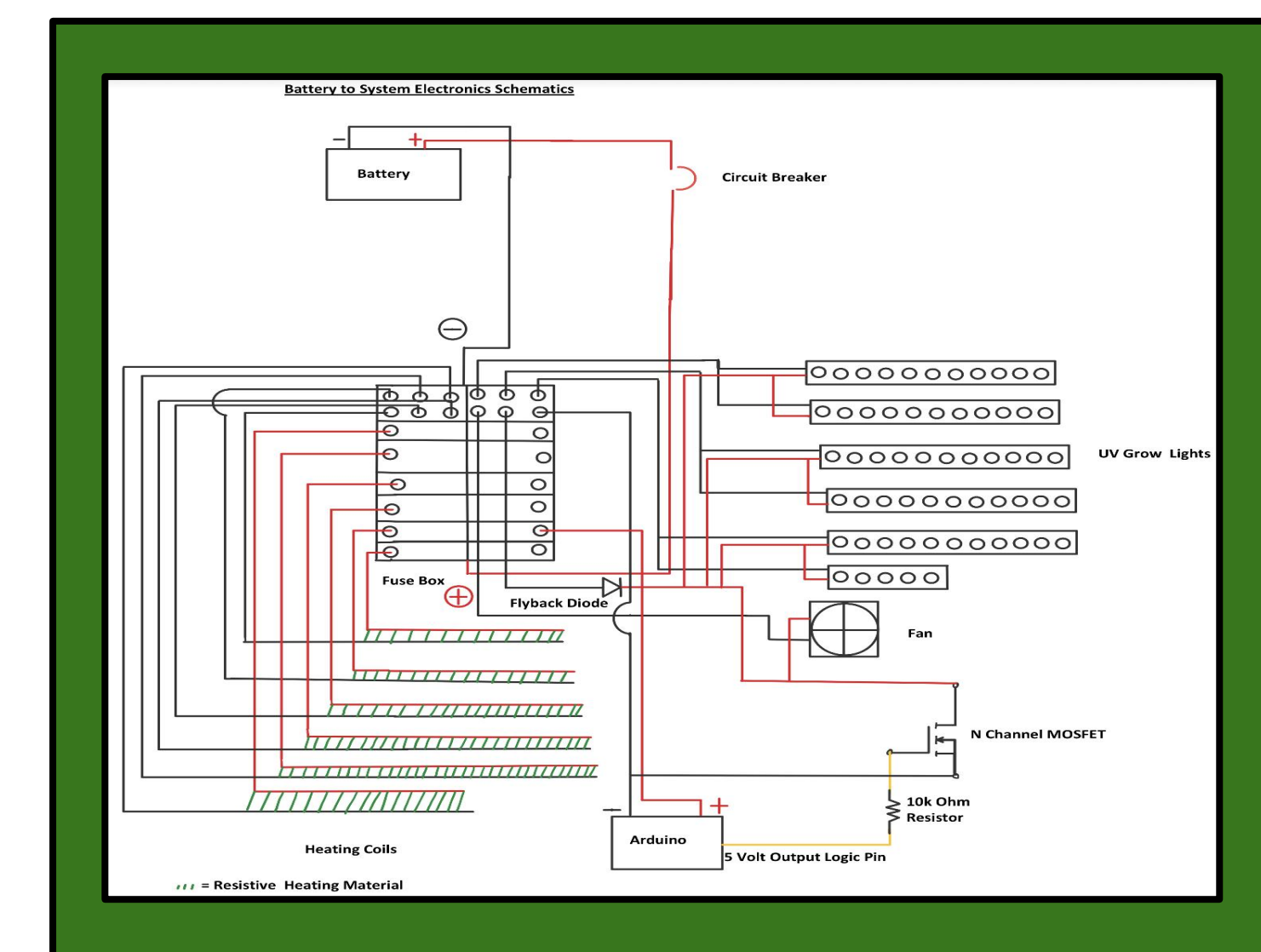
Partnered with:



Final Design

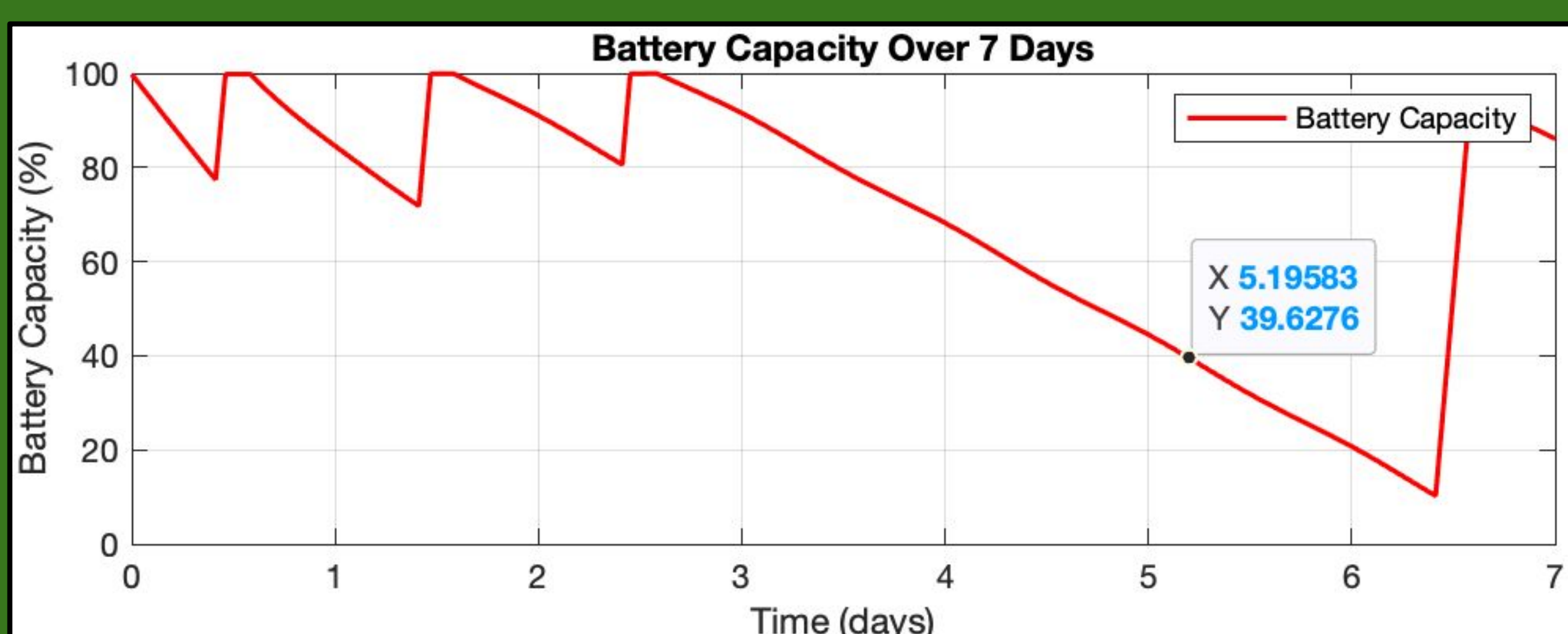
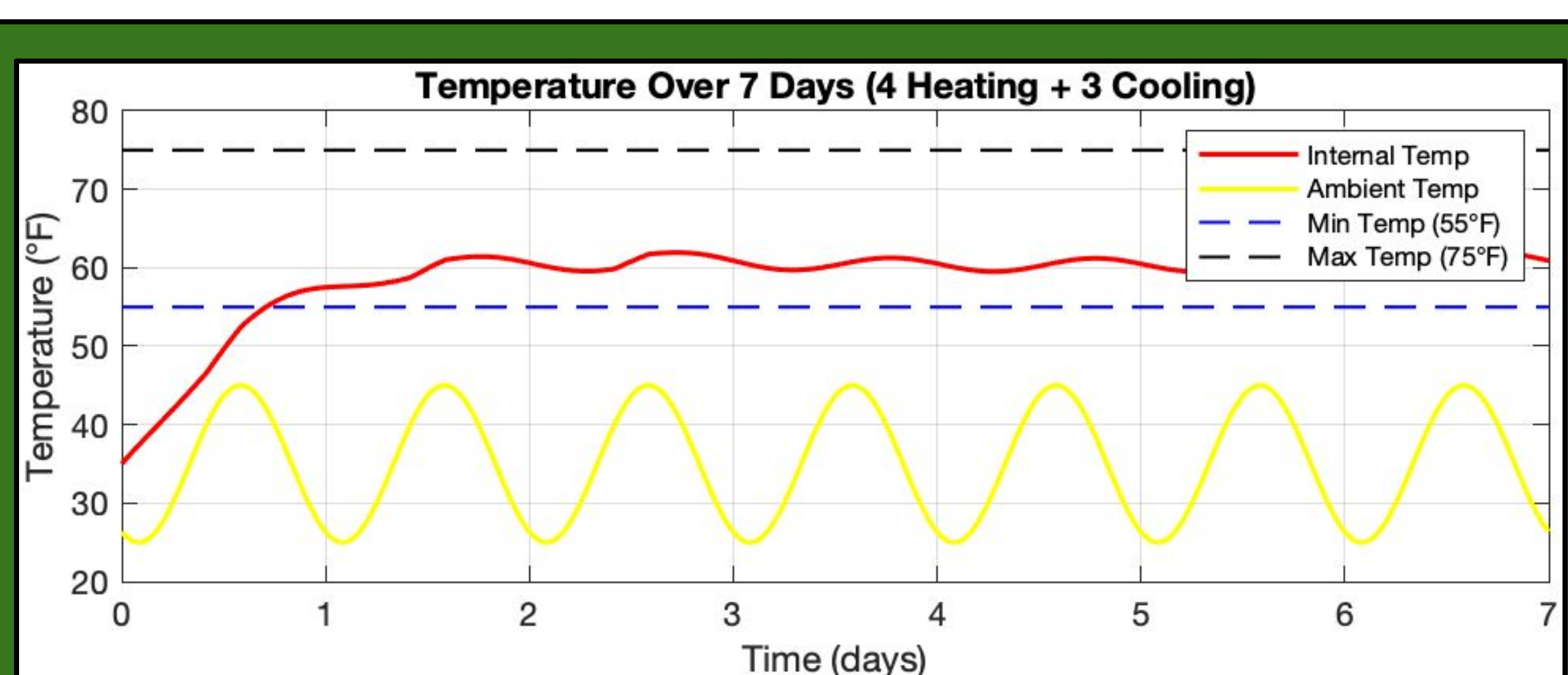


Sponsored by:



Simulations

Can operate for 117 hours without sun!



Governing equations

Convection:

$$q_{conv} = hA(T_s - T_{\infty})$$

Conduction:

$$q_{cond} = -kA\left(\frac{dx}{dT}\right)$$

Radiation:

$$q_{rad} = \epsilon\sigma A(T_s^4 - T_{\infty}^4)$$

Solar absorptance:

$$q_{solar} = \epsilon GA$$

Results

Internal temp: **60 - 63°F**

Ambient temp: **25 - 45°F**

Daily heat loss: **281.6 Wh**

Daily solar input: **1100 Wh**

Key features

Insulated Walls

Reusing fridges gives Sprout Safe a structure with more insulation than the walls in your house!

Ideal germination environment

A perfect combination of heating cables, LED strips, and fans creates the ideal environment for seeds to germinate.

Smart control circuit

Using an automated system, we are able to control the LED output to mimic natural sunlight.

High Energy collection

Sprout Safe is fully independent and harnesses solar energy.

Energy storage

We use a large lithium ion battery to reliably collect, store, and use electricity in our system.

Durable materials

Sprout Safe has a tight seal that is waterproof and a tough exterior can withstand the wind, protecting it from the climate.