

## Solar Powered Ventilation and Education at the Student Farm's Greenhouse



An integral part of the UCD food system, the UC Davis Student Farm not only provides certified organic, local produce to Dining Services, the CoHo, and a CSA, but also provides donations to the Pantry, and Fruit and Veggie Up!, programs which serve the members of our campus community who are food insecure. In addition, roughly 500 students come through the Student Farm each year for internships, tours, and through courses.

The Market Garden's greenhouse is essential for producing the vegetables grown at the farm, but the current greenhouse fan provides inadequate cooling to the greenhouse. The project seeks to install a solar panel, battery, DC exhaust fan and shutter and further involves testing the air flow and temperature changes before and after the installation.

While this project takes place in Davis CA, the off-grid technology of solar PV and battery systems along with the skills of wiring and equipment installation are not only transferable but are often essential within the context of developing world projects.

Through the implementation of renewable energy technologies, this project improves the overall sustainability of the Student Farm by augmenting the cooling capacity of the greenhouse without increasing grid energy use. Furthermore, this project provides an opportunity to educate students about the intersection of sustainable energy and agriculture.

The greenhouse is essential for producing the vegetables grown at the farm, but the current greenhouse fan provides inadequate cooling to the greenhouse. We seek to enhance the cooling capacity of the greenhouse by installing a shutter intake as well as a solar powered exhaust fan with a solar photovoltaic array and battery system. Furthermore, we seek to test the effect of the added exhaust fan both in terms of airflow in Cubic Feet/Minute (CFM) and by measuring

temperature gradients inside and outside the greenhouse before and after the installation.

**Installation/Monitoring & Evaluation**

1. Install shutter intake with thermostat and motor (E. end of Greenhouse)
2. Mount Solar array on top of greenhouse and install battery and exhaust fan with wiring (W. end of Greenhouse)
3. Design and implement a methodology to Monitor CFM and temperature changes due to new installation

**Public education/outreach/awareness**

1. Video installation process/create accessible educational video demonstrating the purpose and outcomes of the installation (45sec-1min final product)
2. Document Greenhouse Gas emissions from fan of comparable size
3. Submit final report

**Partner/Contact:** Raoul Adamchak - Market Garden/CSA Coordinator, Student Farm, Agricultural Sustainability Institute

**Country/Community/Location:** Market Garden branch of the Student Farm, Davis CA