



Automated Solar Panel Cleaning System

Sierra Nevada Brewing Company



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PROJECT OVERVIEW

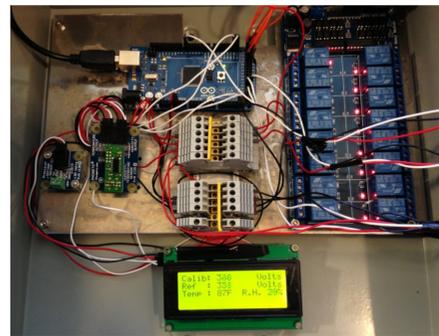
The purpose of this project was to design an automated solar panel cleaning system that would increase the overall efficiency of Sierra Nevada's solar installation.

PROJECT REQUIREMENTS

- Maintain 90% of the current maximum power output.
- The system must pay for itself within 7 years.
- The system must withstand local weather extremes.
- The system must be completely autonomous.
- The system must be aesthetically pleasing.
- The system must be at least energy neutral.

THE PROBLEM

Sierra Nevada's Solar panels are barraged by particulate matter on a daily basis. The dirty panels are not able to produce as much power as clean panels. Sierra Nevada strives to be as efficient as possible to save energy and money.



HOW IT WORKS

The design is comprised of an automated irrigation system that delivers water to the solar panels. A control system monitors panel efficiency and environmental factors, and cleans when the convergence criteria are met.



BENEFITS OF THE SYSTEM

- Increased panel efficiency
- Expandable to the remaining solar arrays
- Low maintenance
- Easily serviceable
- Fully autonomous

PARTS SELECTION

Due to the high level of sun exposure, UV resistance was a key factor in part selection. UVR PVC was the chosen material that met all of the requirements.

Secondary selection criteria was the cost and related reliability/effectiveness. This was necessary to ensure that the project would meet the 7-year payback period.

TEST RESULTS

Our initial testing shows that:

- Panel cleanliness is greatly improved over long periods of time.
- The system is able to withstand local weather extremes of -12°C to 47°C.
- The system is completely autonomous.



CURRENT METHOD

Sierra Nevada currently employs a team to manually clean the panels which is costly and the panels become dirty within a matter of weeks.



PROJECT OUTLOOK

The automated cleaning system will increase overall panel efficiency and eliminate the need for costly manual labor. The current design will permit seamless, future expandability.

