

Senior Design Project Description

Company Name	EPRI	Date Submitted	May 4, 2017
Project Title	A Better Approach to Vegetation Management at Utility-Scale PV Plants (Phase 2) (EPRI_MAIN2)	Planned Semester	Fall 2017

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	3
Computer		Systems	
Other ()			

Project Overview:

One of the larger costs associated with operations and maintenance (O&M) of utility-scale PV plants is vegetation management. In temperate climates, some weeds can grow 10+ inches per week. If not maintained on a regular basis, the weeds can shade PV modules, which reduces energy production and can cause hot spots in the module (a potential fire hazard). There is, oftentimes, insufficient O&M budget for proper vegetation control. Plant maintenance providers have tried a litany of conventional and unconventional approaches with inconsistent success over the relatively large footprint of PV plants (a 100 MW plant requires nearly 1 square mile). For instance, regular mowing often shoots rocks into modules breaking them (exacerbating the O&M budget further) and sheep and goats are picky plant eaters.

Initial Project Requirements:

The objective is to develop a vegetation control technology that overcomes shortcomings of existing methods. It must:

- 1) be more cost effective than current techniques;
- 2) mow all areas of a PV plant, including under the modules and racking;
- 3) be quickly and easily sited at a plant (cannot permanently integrate into the plant itself);
- 4) not damage the PV site and equipment;
- 5) be reliable, autonomous, and dispatchable; and
- 6) not modify the environment / native habitat (e.g., cannot introduce foreign plants or scorch the earth).



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Expected Deliverables/Results:

Work will expand upon a 2016 senior design project that built and demonstrated an autonomous robot for vegetation management. Specifically, a self-sufficient charging station for the robot is needed. The charging station would collect energy, store it, then discharge once the robot docks. (For example, using PV modules, batteries, and control hardware / software.) Furthermore, the existing robot requires modifications to integrate with the docking station.

Disposition of Deliverables at the End of the Project:

Hardware to be delivered to Mike Bolen at EPRI

List here any specific skills, requirements, knowledge needed or suggested (If none please state none): None