

## UNC Charlotte – Lee College of Engineering Senior Design Program

### Senior Design Project Description

<b>Company Name</b>	<i>Doosan Portable Power</i>	<b>Date Submitted</b>	<i>2019-11-21</i>
<b>Project Title</b>	<i>Design of a Battery Powered Solar Light Tower</i> <b>(DOOSAN_TOWER)</b>	<b>Planned Starting Semester</b>	Spring 2020

### Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	3	Electrical	2
Computer		Systems	
Other ( )			

### Company and Project Overview:

Doosan is a global manufacturer and service provider. Headquartered in Seoul, South Korea, Doosan competes and thrives both at home and abroad.

Doosan Portable Power, part of Doosan Bobcat, Inc. is the portable power equipment arm of Doosan, responsible for the design and manufacture of portable generators, air compressors, and light towers. Design, sales, support and manufacturing are all located in Statesville, NC. The global Doosan Bobcat engineering team is responsible for product development and sustainment of portable power and compact construction equipment products across the globe.

This project is to develop a solar / battery alternative hybrid powertrain for our light tower product model line – the LCV.



### **Current Production Doosan LCV6 Light Tower**

#### **Project Requirements:**

A current production LCV6 machine package, light mast, and LED light fixtures will be supplied (without the existing diesel powertrain) to be mated to a system design by the project team. This system should include a battery pack, solar panel array, and battery / charge management system to allow the unit to operate with or without access to grid electrical power for battery re-charging.

The design team should select the most suitable battery chemistry for the application, size the battery appropriately for the machine customer use cases, and provide a charging / battery management system to support the battery pack. The design team should also size a solar panel array for system re-charge and determine a mounting arrangement for the array, given the machine is a portable unit.

#### **Expected Deliverables/Results:**

- Battery chemistry, sizing, and charging method designed
- Solar panel array size and mounting designed
- System design to mate battery bank and solar panel array for functional light delivery
- Proof of concept prototype demonstrating functional battery storage, solar charging, and light operation on a modified Doosan LCV6 light tower.

#### **Disposition of Deliverables at the End of the Project:**

Provide to Doosan at the end of the Expo

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

- Understanding of stored energy hazards for safe prototyping of battery system
- Electrical engineering fundamentals
- Mechanical engineering structures and CAD design skills