

# Case Study



## Design Assessment & Strategic Redesign

**We Care Solar**, a California non-profit, approached Zebulon Solutions in need of help with a redesign of their existing Solar Suitcase. The Solar Suitcase had evolved organically over several years as new features were added, or technology changes required implementation modifications. The present design, although functional, needed optimization to increase features and lower manufacturing costs. We were asked to review the present Solar Suitcase and requirements list; provide a design concept that was optimized for the feature set, assembly, and new target LiFePo battery chemistry; build a bench prototype of the new design for evaluation; and estimate the manufacturing cost of the new design at several volumes.

### Requirements Definition

Our first task was to help define the requirements for future generations of the Solar Suitcase. There were many tradeoffs—meeting all the needs of all potential users could easily drive up costs for everyone. These requirements included both existing and new features.

### Redesign Support

Occasionally, some of our customers are lucky enough

to have a product lacking the need of a full head-to-toe redesign. Luckily for We Care Solar, they were one of those customers. Zebulon Solutions identified several areas of the Solar Suitcase that could be simplified without requiring a full redesign and could be incorporated within the present assembly. The collaboration resulted in an iterative cycle of modelling use cases; estimating key performance metrics of run time and charge time based on various Solar Suitcase configurations; and locating as many off-the-shelf solutions to address the technical challenges posed by the requirements.

### Prototyping

Zebulon Solutions designed and built prototypes of the new electronics for testing out the new features at the subsystem and system level. This included both hardware and firmware. We also provided We Care Solar with additional prototype electronics for them to evaluate in-house, around which to design new mechanical components.

### Cost Estimation

All of these tasks interacted with one of the key deliverables—putting together a manufacturing cost model that covered the various options and also various potential annual volumes.

### APPLICATION:

We Care Solar designs portable, cost-effective Solar Suitcases that power critical lighting, mobile communication devices and medical devices in low resource areas without reliable electricity.

### INDUSTRY:

Energy

### CUSTOMER NEEDS:

- Requirements Definition
- Redesign Support
- Prototyping
- Cost Estimation

### OUTCOME:

*A detailed design assessment led to a strategic redesign to reduce manufacturing costs & improve functionality*

