

Cost Breakdown For Each Solution

BatteryMD

BatteryMD services: includes replacement of existing battery pack with refurbished battery pack, and complete diagnostic test of the vehicle	\$3928.56
Round trip transportation: Door-to-door shipping of an inoperable vehicle from Miami, FL to Sacramento, CA	\$1800.00
TOTAL	\$5728.56

For this option, the shipping price will vary depending on origination. As previously stated, the work is not under warranty by BatteryMD. Therefore, all costs listed will be incurred each time the pack fails.

Optima design

Mig welder with wire and argon bottle- available from several local and online suppliers, such as weldingsupply.com	\$600.00
Batteries-26 Optima d31a available at Sears for \$189 each	\$4914.00
Sheet metal for lower portion of the case-2 sheets (60"x120" 1018 steel 1/8" thick) from Far West Steel in Seattle	\$346.25
Fiber-glassing-several marine repair companies in the Seattle area are capable of fiber-glassing the lower portion of the case and manufacturing the upper portion. This price reflects the average of the rough estimates received.	\$3000.00
TOTAL	\$8860.25

For this option, the costs during replacement will be limited to the batteries. The cost of the controller and wiring are not included, as that portion of the design is still incomplete.

Annual Operating Costs

The refurbished battery pack from BatteryMD is guaranteed to provide 30 miles of travel per charge. The estimated travel provided from the Optima design is 60 miles per charge. A complete charge of the battery pack requires 23 kWh of electricity.

Based on an average vehicle usage of 10000 miles per year, the BatteryMD would use approximately 7,667 kWh/year and the Optima design would use approximately 3833 kWh/year.

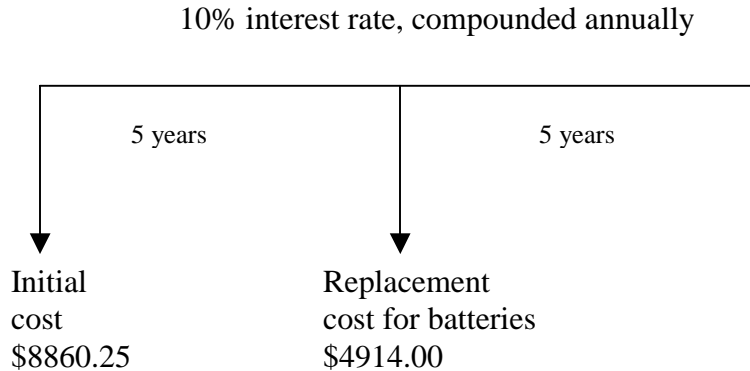
In Seattle, the current electricity rates for a residential location inside Seattle are \$0.0853/kWh for any electricity used past the first 10 kWh/day. Therefore, the average annual operating cost for the BatteryMD pack would be \$654, while the Optima design would have an average annual cost of \$327.

The life expectancy for the vehicle is assumed to be 10 years from now. Based on this assumption, the Optima would have a 50% savings in annual operating costs.

Cash Flow Diagrams

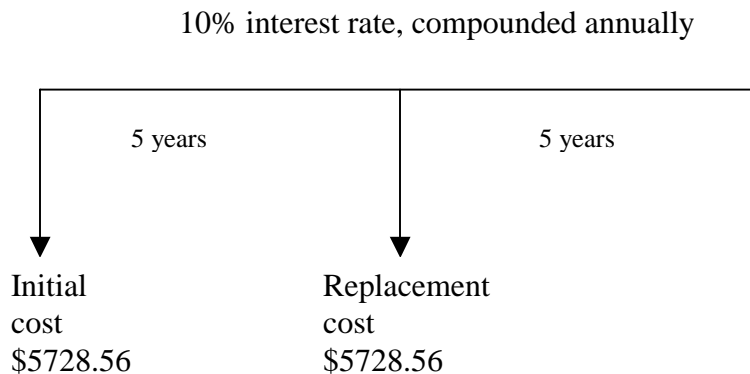
The following cash flow diagrams were constructed to compare the economic benefits of each design. The interest rate was assumed as 10%, and the life of the vehicle is assumed to be 10 years. The analysis is performed assuming that the Optima design requires battery replacement every 5 years. The BatteryMD option is analyzed assuming it requires replacement annually or every 5 years. At the end of the 10 year life, the car will be decommissioned. Since the type of battery pack is not relevant to the disposal cost, the disposal cost will be the same for each vehicle. Additionally, replacement of the batteries in the Optima design incurs no disposal cost because the batteries can be taken to a local Sears automotive center for free recycling. Therefore, disposal costs are not considered in this analysis. The battery cost is assumed to be constant over the next ten years. The BatteryMD cost, including shipping, is assumed to increase 5% per year.

Optima Design



Therefore, the present value for the cost of this option is \$11,911.46.

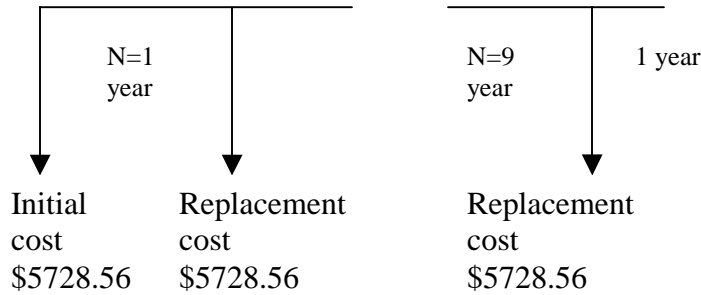
BatteryMD Option, 5 year replacement



Therefore, the present value for the cost of this option is \$9285.54.

BatteryMD Option, 1 year replacement

10% interest rate, compounded annually



The present value for this option is \$38,719.47.

The point of intersection between the BatteryMD option and the Optima design occurs when the BatteryMD design lasts approximately 4.4 years between replacements. However, the BatteryMD would still have a slightly higher cost due to the increase annual operating cost. There is no way to obtain reliable data for the life of the BatteryMD option; however, it is reasonable to assume that the longevity of the battery pack will not reach 4 years. The Optima batteries utilized are advertised as having an operational life of at least 5 years.

Because we were unable to actually build the case and install working batteries, it was not possible to successfully complete a business plan. For this, we did an economic analysis to determine the costs.