

Tri-Brid Final Report

The tri-brid project is functionally complete. The Bio-diesel motor generator set, consisting of a 3.5 horsepower Yanmar diesel engine and a 200 amp automotive alternator with external diode set, produces over 20 amps of 42 volt power to charge the batteries. The Sharp solar panel array produces up to 4 amps of power to charge the batteries. The solar array is protected from damage in an aluminum framed lexan enclosure. More power could be produced by not using the lexan shielding. Since this vehicle is primarily being used for demonstration purposes it was felt that the protection was more valuable than the extra energy that could be extracted. The vehicle draws about 25 amps of current when operating on level ground. The range of the vehicle is now essentially unlimited as it can run on the power generated by the solar array and the bio-diesel charging unit. The range on batteries alone is approximately 12-15 miles.

The original resistive throttle system of the 1991 Club Car golf cart was replaced by a solid state electronic motor controller and throttle pot box. The vehicle was disassembled and power washed. It was discovered that the welds on one of the frame elements were broken. The aluminum frame crossbar was re-welded to the main chassis.

The vehicle body was replaced with a new Midnight Blue ABS body kit. Brake lights, turn signals and headlights were added to make the vehicle road worthy. Display lighting was added to illuminate the interior of the vehicle for indoor display. Perimeter lights were added to improve the visibility of the vehicle when on the road or in parades.

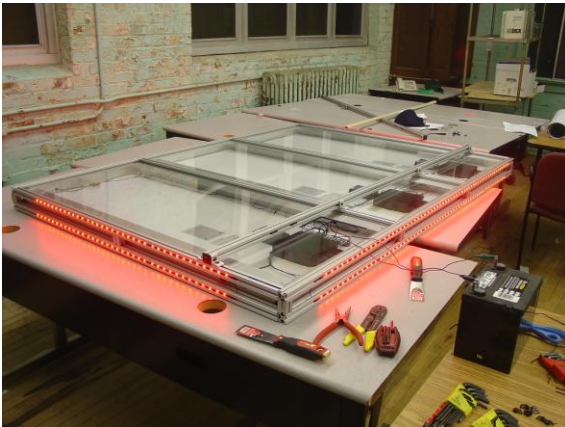
Instrumentation was added that shows the voltage and amperage output by the solar array. A battery manager meter shows the approximate level of charge remaining as well as the net amp-hours of power that have entered or left the battery pack.

Students experimented with producing bio-diesel fuel. They were successful in performing the transesterification reaction with virgin cotton seed and canola oils. Waste vegetable oil reactions will be performed during the next school year.

The vehicle was introduced to the public in its present finished state at the Oregon Fest May 16th 2010. The vehicle was on display with students explaining its operation to passersby. The vehicle was also driven in the Oregon Fest parade that afternoon. Plans are underway to display the vehicle in several more neighborhood festivals and parades this summer and at the Frog Town Fair "Green Product" exposition at the Erie Street Market in August.

Parts and supplies for this project were provided by a grant from the University of Toledo - University Transportation Center in the amount of \$9997.41. The UT-UTC grant funds were subject to matching additional funds. The additional funds and their source are documented in the table below.

Items	Funding Source	Value
Used electric Golf Cart	Bay View Retiree Golf Course	\$1,500.00
Throttle Control	BP A Plus for Energy Grant	\$250.00
Motor controller	BP A Plus for Energy Grant	\$500.00
Methanol/Chemicals	Toledo Public Schools	\$200.00
Laboratory Glassware	Toledo Public Schools	\$450.00
Diesel Engine	BP A Plus for Energy Grant	\$1,500.00
Voltage Regulator	BP A Plus for Energy Grant	\$200.00
Staff Stipends	Toledo Public Schools	\$4,680.00
48 volt alternator	BP A Plus for Energy Grant	\$2,500.00
80/20 Framing and hardware	BP A Plus for Energy Grant	\$1,000.00
total		\$12,780.00





Respectfully submitted 5/29/2010

Gladwyn Richardson