

Electric Car Propulsion System

MecE 460
Capstone Design Project
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Objective

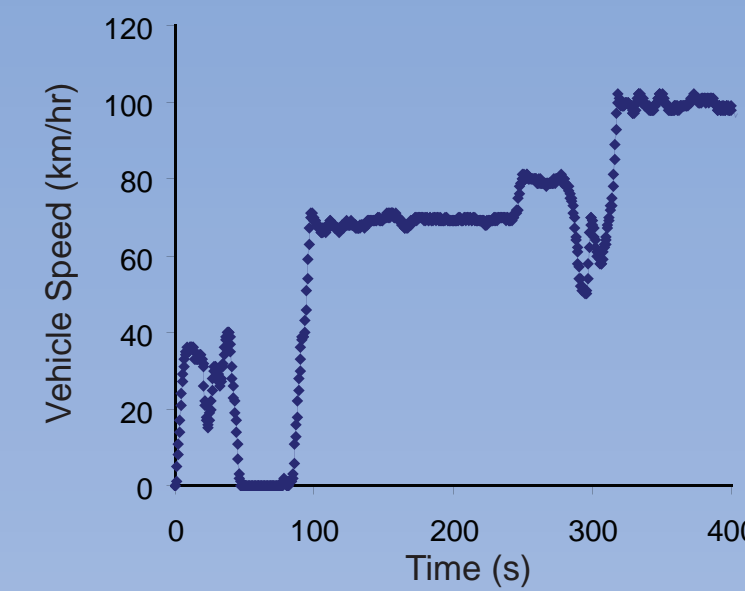
Design an electric propulsion system to convert an existing Lamborghini Diablo replica car from internal combustion to electric while achieving performance comparable to a 2001 Lamborghini Diablo 6.0 VT.

Acceleration

A dynamic analysis incorporating aerodynamic drag, rolling resistance, and tractive force was used to determine the 0-100km/hr acceleration time. A 6% error in the model was estimated using published empirical data.

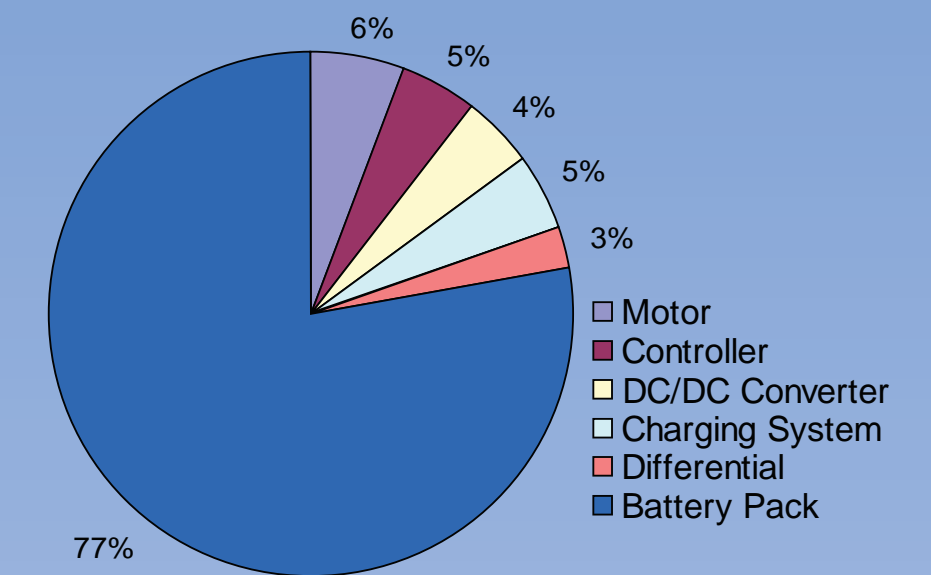
Range

An empirical driving profile was created to increase the accuracy of range calculations by using a data logger.



Cost Distribution

Total cost of propulsion system: \$100,000



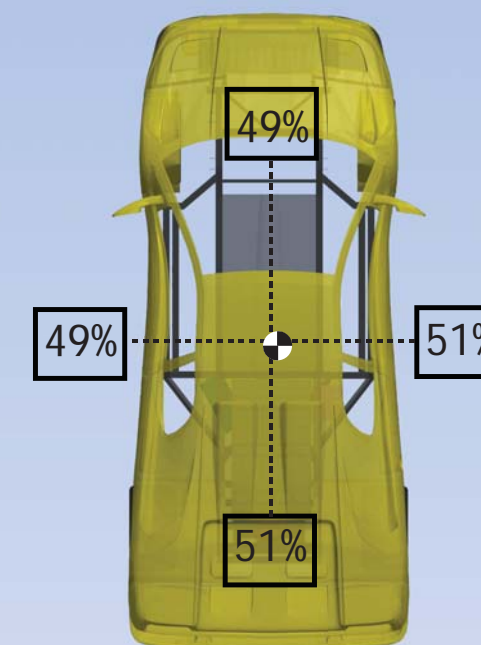
LamboEV Comparison

LamboEV replica car vs. 2001 Lamborghini Diablo 6.0VT

	LamboEV	Diablo 6.0 VT
Motor	dual 9" electric	V-12 ICE
Transmission	direct drive	5-speed manual
Curb weight	3200lb	3750 lb
Weight Distribution, F/R	49/51%	41/59%
0-100km/hr time	4.8s	4.3s
Top Speed	200km/hr	330km/hr
EPA City Range	320km	420km
EPA Highway Range	280km	550km
Fill Up Cost (CAD 31/3/08)	\$4	\$120

Weight Distribution

Total propulsion system weight of 450kg.
Resulting weight distribution:



Differential

A Dana 44 differential from a 1982 Corvette provides a 3.08:1 gear reduction. A splined coupler connects the motor directly to the differential.

Motors

Modified dual Impulse 9" DC brushed motors provide 900 Nm of torque @ 0 rpm.

Charger

Brusa NLG511-SA portable charger provides a charge time of 10 hours on a 240V 30A line.

A Café Electric Zilla motor controller provides speed control and allows for switching current direction for forward and reverse drive.

Controller

60 Ah Lithium Technology cells provide up to 1500A at 180V. Batteries are placed in the front and rear of the vehicle and are monitored by a battery management system.

Batteries

From Edmonton . . .

. . . to Calgary

315 km RANGE
(at 80km/hr)

30% Gradeability

Acceleration: 0 -> 100 $\frac{\text{km}}{\text{hr}}$ in 4.8 seconds



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