

Bass Connections in Energy: Duke Electric Vehicle Team



BASS
CONNECTIONS

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PROJECT SUMMARY: Designing and constructing a hyper-efficient, electric vehicle, and developing a sustainable business plan to bring the vehicle to market

PROJECT OBJECTIVES

- Explore usage of carbon fiber and other materials for improvements in electric vehicle (EV) efficiency
- Minimize environmental impact in design and manufacturing processes
- Construct sustainable business model for introducing autonomous version of vehicle to consumer market

Methods

- Car design using SOLIDWORKS
- Life Cycle Analysis (LCA) and cost assessment with Quantis 2.0 Suite; IMPACT 2002 standards
- Indicators include human health, ecosystem quality, climate change, resources, water withdrawal

Aim 1: Vehicle Design

- Staggered seating, two-passenger EV
- Achieve efficiency through lightweight carbon fiber monocoque design
- Optimized for aerodynamic efficiency



The life-cycle assessment provides a complete environmental impact for the car from production through the disposal stage.

Aim 2: Impact Assessment

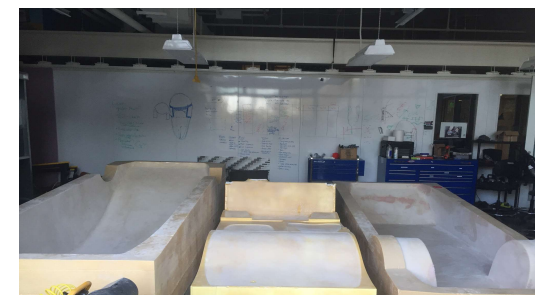
- Perform LCA to measure full environmental impacts of vehicle life

Aim 3: Business Model

- Assume full autonomization of our constructed EV
- Imagined scenario of introducing service into Austin, Texas

Expectations

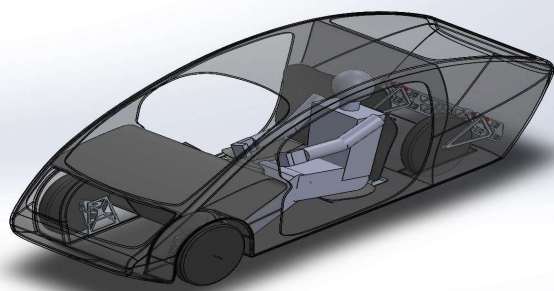
- Prototype will be more energy efficient than the average electric car currently on the market in the United States
- Current CF+honeycomb combination will hold up during basic driving and braking conditions
- Create a realistic go-to-market plan for the prototype



Above are the molds that will be used to create the carbon fiber body of the vehicle.

Insights

- Our team is made up of students from across disciplines and it was this interdisciplinary approach that helped to work through obstacles that would have been difficult with only one framework for problem solving
- This project allowed us to gain experiences we would not have otherwise had in a traditional classroom setting



The vehicle was designed with Solidworks software to provide superior aerodynamics to improve the vehicle's efficiency.