

On April 28, 2016, the Fuels Institute hosted its 2nd Annual University Case Competition (sponsored by Gilbarco Veeder Root North America).

The competition is one of the premier annual events hosted by the Fuels Institute. It provides the nation's brightest undergraduate and graduate students an opportunity to use strategic thinking, innovative problem-solving and their imagination to create their vision of an ideal future transportation sector. Teams were asked to outline how their vision could become a reality within the next 30 years, based on the current infrastructure in the United States. Here are brief summaries of the top six Case Competition submissions. To review the full submissions, please download the full report at [fuelsinstitute.org](http://fuelsinstitute.org).

### First Place:

#### Natural Gas and Electricity: Bridging America's Transportation

University of California, Berkeley

Negah Nafisi, Alana Siegner, Mercedes Taylor

To create a future transportation sector that is increasingly efficient and results in fewer greenhouse gas emissions, this proposal has two specific aims: the conversion of heavy-duty vehicles from their current fuel (predominantly diesel) to adsorbed natural gas (ANG), and the passenger vehicle sector's transition to electric power provided by a cleaner grid.

An immediate transition to ANG by heavy-duty vehicles and a gradual shift to electricity and public transit by individual consumers will guarantee an economically viable transportation sector for future generations and prevent a desperate, unplanned fuel shift later on. Equally important, these transitions will bring much-needed reductions in greenhouse gas emissions and yield a transportation sector that is sustainable far beyond the challenge's 30-year time frame, poised for further innovation and improvement as better technology becomes available.

### Second Place:

#### The Smart E-Highway

Duke University

Kate Buczek, Michael DeNoia, Eleanor Johnstone, Hoël Wiesner

To respond to the core challenges of pollution, congestion, safety and environmental risks associated with transportation, this proposal transitions from personal combustion-powered vehicles toward grid powered transportation, as well as relinquishing manual vehicle control to more sophisticated and calculated driving methods. The proposal reimagines a portion of California's highway as a pilot system of electric highways (E-Highways) that can dynamically charge autonomous, electric vehicles (EVs).

The E-Highways leverage advances in battery storage and car electronics with emerging techniques for wirelessly charging moving vehicles and cutting edge vehicle automation to create a cleaner, safer roadway for American drivers. Shifting away from a gas tax to an amount-of-travel tax and travel-lane incentives for E-Highway users realizes cost savings within 20 years and cuts future emissions in half. Starting with a pilot project, the E-Highways eventually will criss-cross the land, offering American drivers a fast, clean, safe way to travel.

### Third Place:

#### Eidolon: Your Autonomous Chauffeur

Morgan State University

Odnmorayo Abujana, Kianté Bush, Jeffrey Scruggs

There are three key transportation concepts that will continue to grow and become widely implemented within our time range: ridesharing, electric-powered vehicles and autonomous technology. These concepts are combined to create a transportation system for the future, called "Eidolon." Instead of creating an entirely new infrastructure, the concept simply changes the culture of driving by essentially removing the driver as a variable.

As a premier ridesharing corporation, Eidolon will provide a flexible mode of transit for rural, urban and suburban communities. Operating with only EVs will improve the environment by dramatically decreasing emission levels while also tackling the issue of fuel consumption. Lastly, autonomous technology is forecasted to greatly diminish traffic congestion, increase highway capacity, augment human productivity, enhance overall mobility and prevent thousands of accidents by removing the variable of human error.



## Runners Up:

### In-Motion Wireless Power Transfer for Connected Electric Vehicles (CEVs)

#### Clemson University

Josh Doran, Sababa Islam, McKenzie Keehan, Sakib Mahmud Khan, Mizanur Rahman, Yuheng Du

This proposal will develop an in-motion wireless power transfer (IWPT) facility for the electric vehicle (EV). In this model, EVs will run on shared wireless charging lanes that will supplement fixed static wireless charging stations. IWPT facilities, which can increase EV driving range up to 62 to 300 miles, will help eliminate range anxiety associated with EVs.

Incorporating EV connectivity will make the IWPT system successful. Connected EVs (CEVs) will consist of both connected electric buses (CEBs) for mass transit and connected electric light-duty vehicles (CELVs), which include personal cars, pickups, small vans, etc. Smart phone application of wireless power transfer will help the smooth operation of the proposed IWPT system, where vehicle owners can initially communicate with energy suppliers about the energy requirement via cellular network.

### About the Fuels Institute Case Competition

The goal was to invite some of the country's brightest student minds to present their ideas for the future of the fuels and vehicle industry to the leaders in the industry. The fuels and vehicles industries are facing a rapidly changing policy and technology environment, presenting perhaps the first real opportunity since early in the 1900s for dramatic industry reinvention. The competition invites new ideas to the table and an opportunity for students to network directly with industry leaders. The competition is annual and if your university would like to participate, we invite you to join us by contacting the Institute directly at [dwoods@fuelsinstitute.org](mailto:dwoods@fuelsinstitute.org).

### About Fuels Institute

The Fuels Institute, founded by NACS in 2013, is a non-profit research-oriented think tank led by a diverse Board of Directors and driven by a Board of Advisors. We are dedicated to evaluating the market issues related to vehicles and the fuels that power them. The Institute incorporates the perspective of interested stakeholders by commissioning and publishing comprehensive, fact-based research projects. These stakeholders include but are not limited to fuel retailers, fuel producers and refiners, alternative and renewable fuel producers, automobile manufacturers, environmental advocates, consumer organizations, academics, government entities and other stakeholders with expertise in the fuels and automotive industries.

## Sustainable Shared Mobility

#### Clemson University International Center for Automotive Research

Piyush Agarwal, Shreyansh Gaur, Harrit Diwan, Siddhant Jain, Taushif Vohra, Nandan Vora

This proposes an integrated, decentralized transportation model capable of catering to the specialized needs and demands of urban, suburban and rural sectors. The model is based on current technology and infrastructure, along with certain feasible future innovations, such as highly efficient, pure electric pods and autonomous driving capability. It envisions a distributed mobility network that reduces congestion, cuts travel time and provides maximum flexibility and convenience to the users.

The program makes maximum possible use of the current infrastructure while also taking into account future technological advancements as well as environmental concerns. With the shifting consumer focus from goods to services, the proposed subscription model will act as a form of loose ownership that will satisfy the needs of both existing consumers as well as coming generations.

## Automation and Efficiency: Driverless Vehicles and the Hyperloop

#### University of Colorado at Boulder

Alexandre Dubernard, Katherine Mcquie, Chris Quinn, Adrian Smith, Andrew Weidner

There are two main concepts emerging that will drive the future of transportation: self-driving vehicles and the Hyperloop, which is currently being tested by several companies and universities.

The proposed transportation system will become much more integrated and simplified in the next 30 years. The Hyperloop will connect large international air terminals with urban city centers. From the city center one can take an automated vehicle to wherever he/she lives—be it a suburban or rural setting. There will be no need to own a vehicle and no need for insurance. Individuals will spend less on transportation, and traffic congestion will be lessened leaving them with more free time.

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