Auto X Prize Competition Validation

Argonne was the last stop for competitors in the 2010 Progressive Insurance Automotive X Prize Competition. The contest challenged teams worldwide to construct vehicles that could achieve over 100 MPGe (miles per gallon or gasoline equivalent energy). Vehicles in the competition comprised a variety of configurations ranging from number of wheels (2 to 4), powertrains (hybrid, plug-in hybrid, battery electric, and combustion), and variety of fuels (biodiesel, diesel, E85 gasoline, natural gas, and fuel/electric combinations). Researchers at Argonne evaluated the finalists' vehicles to see if they met the competition's performance and efficiency targets.

The Challenge

To devise a test procedure for validating the energy efficiency of a diverse group of vehicles that included hybrid electric, plug-in hybrid electric, battery electric, and gasoline-powered vehicles. The tests had to be accurate, repeatable, and not favor one powertrain scheme over another.

Electric cars at smart grid charging stations outside Argonne's Advanced Powertrain Research Facility (APRF).

The Solution

Researchers in Argonne's Transportation Technology R&D Center:

- Created robust procedures and redundant instrumentation that ensured no data would be lost and that data collected was accurate
- Invented a way to safely tie down 2- and 3-wheeled cars onto the dynamometer
- Created a safe battery charging procedure for early prototype vehicles

The Results

As well as evaluating the competition vehicles, Argonne learned:

- How battery charger efficiency can offer significant advantages in the overall savings profile of electric vehicles
- How to acquire coast-down matching data with electric motors
- How drivers influence electric vehicle regeneration strategies

In addition, a large amount of unbiased data on advanced vehicle technologies was collected and will be made available for public use.

"The results of the X Prize competition comprise a gold mine of technical data that define this moment in the evolution of transportation technologies and allow comparisons between them," **said principal project engineer Glenn Keller.**

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