

# Ford Uses Taxi Fleets to Test Hybrid Cars

by Gerald Scott  
News Dept.

Ford Motor Co. gave a briefing on its latest hybrid vehicle achievements and more progress is being made than one might first think.

Held at the Ford Research and Innovation Center (RIC), the briefing described the achievements of the Ford Fusion Hybrid, which is now in service in various taxi fleets around the country.

Ford said that its hybrid taxi fleet has logged more than 80 million miles in California alone during the past decade – more than quadruple the number of miles logged by the Toyota Prius lineup, by the way.

Yet, among the nearly 43 million battery cells Ford has tested or seen put to work in customer vehicles, only five problems or “issues” have been documented thus far.

This impressive quality record has surprised taxi operators who expected to experience more issues as the led the adoption of Ford’s patented hybrid technology.

The Fusion Hybrid, which a leading consumer magazine rated “America’s most reliable sedan of any hybrid or conventional model,” also has taken hold with customers who give it a 91 percent “overall vehicle quality” score compared to 80 and 71 percent for the Toyota Camry and Nissan Altima hybrids, respectively.

“Ford’s battery technology is so strong, the odds of experiencing an issue with one of our hybrid battery cells is around 8.5 million to 1 – about the same odds as a person being struck by lightning, twice” said Chuck Gray, chief engineer, Global Core Engineering, Hybrid and Electric Vehicles at the Dearborn automaker.

A Detroit native, Gray graduated with a B.S. in Mechanical Engineering from GM/Kettering and with a master of science degree in the same discipline from the University of Michigan - Dearborn. He has been at Ford for nearly 20 years, only recently moving from traditional gasoline powertrains over to electrified vehicles.

“Ford understands that for new technology, reliability can be a concern for customers, so we work extra hard to deliver a trouble-free product,” Gray said.

It seems that customers are noticing the strong performance, too.

In fact, the Fusion Hybrid is delivering a 75 percent conquest rate, bringing more buyers to the brand than any other such Ford vehicle on the market today.

The durability and longevity of batteries – which Ford has been developing and testing since the 1980s – is essential as the company expands its electrification plan, building on its long term goals with five new electrified vehicles arriving in North America by 2012 and Europe by 2013.

“Our customers have put hundreds of millions of miles on our hybrids with virtually no powertrain issues, which

## Book on Hybrid Powertrains Offered by SAE

WARRENDALE, Pa. – With more than 20 different hybrid cars available from most major automakers, hybrid vehicles are a crucial and growing market segment.

Additionally, with several high-profile plug-in hybrids coming out now or within the next year, innovation and development of hybrid vehicles is continuing at an ever-growing pace.

Consumers continue to focus more on miles per gallon as well as vehicle performance and practicality. In this market, impeccable engineering and precision design is essential to commercial success.

The book from SAE International, “Hybrid Powered Vehicles,” written by John German, promises to provide executives and decision-makers with the necessary information for making the best choices pertaining to hybrid vehicle engineering.

The book can be pre-ordered now through the SAE International website.



PHOTOS: GERALD SCOTT

Ford engineer Patrick Maguire, right, explains the inner workings of a Fusion Hybrid taxi cab battery system to visitors at Ford’s hybrid taxi fleet demo at the Ford Innovation and Research Center (RIC) in Dearborn.

is a testament to the quality of our batteries,” Gray added.

“We have checked the battery life simulations with test data and with real-world customer vehicle data, and now we’re applying that knowledge to make the customer experience in our future products even better.”

Meanwhile, the Fusion Hybrid hit the streets in 2009 with a leading 41 mpg city rating, 10 mpg more than the Toyota Camry Hybrid.

Since then, the car has quite literally wowed customers from coast to coast – leading to a hybrid-best customer satisfaction rate of 88 percent compared to 80 percent for Prius from 2009 to 2011, according to GQRS data.

Gray said that Ford currently designs its hybrid electric vehicles with a high-voltage, nickel-metal-hydride battery. The current product represents second-generation battery design that is 23 percent lighter than the first generation.



Ford’s Chuck Gray, center, chief engineer, Global Core Engineering, Hybrid and Electric Vehicles, discussed the success of Ford’s hybrid taxi fleet in California, which has recorded more than 80 million miles of road travel.

To achieve higher fuel efficiency, Ford’s Powersplit technology system uses two motors and a simple planetary gearset to create an electrically controlled, continuously variable transmission

that allows the use of the most efficient operating points of the engines and motors.

To date, Ford’s Powersplit technology has received more than 200 patents.

# GM and ABB Together Work on Battery ‘Life’

RALEIGH, N.C. – The expected growth in vehicle electrification poses a challenge: What will happen to the battery systems after they reach the end of their useful life in the vehicle?

Earlier this year, General Motors signed a definitive agreement with ABB Group to identify joint research and development projects that would reuse Chevrolet Volt battery systems, which will have up to 70 percent of life remaining after their automotive use is exhausted.

Recent research conducted by GM predicts that secondary use of 33 Volt batteries will have enough storage capacity to power up to 50 homes for about four hours during a power outage.

Last week, GM and ABB demonstrated an energy storage system that combines a proven electric vehicle battery technology and a proven grid-tied electric power inverter. The two companies are building a prototype that could lead to Volt battery packs storing energy, including renewable wind and solar energy, and feeding it back to the grid.

The system could store electricity from the grid during times of low usage to be used during periods of peak demand, saving customers and utilities money. The battery packs could also be used as back-up power sources during outages and brownouts.

“GM’s battery leadership position doesn’t stop at the road – it extends throughout the life of the battery, including ways we can benefit society and the environment,” said Micky Bly, GM executive director – Global Electrical Systems, Electrification and Infotainment.

“As we grow our battery systems expertise, we need to assure we’re optimizing the development of our battery systems with secondary use in mind from the start.

“Partnerships with organizations such as ABB provide

real-world applications that prove what we’re doing is real, not fiction,” Bly said.

Using Volt battery cells, the ABB and GM team is building a prototype system for 25-kilowatt/50-kWh applications, about the same power consumption of five U.S. homes or small retail and industrial facilities.

ABB has determined its existing power quality filter (PQF) inverter can be used to charge and discharge the Volt battery pack to take full advantage of the system and enable utilities to reduce the cost of peak load conditions.

The system can also reduce utilities’ needs for power control, protection and additional monitoring equipment.

The team will soon test the system for back-up power applications.

“Our tests so far have shown the viability of the GM-ABB solution in the laboratory and they have provided valuable experience to overcome the technical challenges,” said Pablo Rosenfeld, ABB’s program manager for Distributed Energy Storage Medium Voltage Power Products.

“We are making plans now for the next major step – testing a larger prototype on an actual electric distribution system.”

As part of sharpening its focus on reuse and recycling, GM has appointed Pablo Valencia to the new position of senior manager for Battery Lifecycle Management.

Valencia and his team will focus on assuring battery systems used in future Chevrolet, Buick, GMC and Cadillac vehicles provide environmental and societal benefits beyond their use in the vehicle.

Single-source responsibility assures the design of future battery systems is compatible with reuse and recycling applications.

Much of GM’s EV battery work takes place at the Tech Center in Warren and a research lab in New York state.

Lately, the battle for the EV



Cutline Pablo Valencia, GM’s Senior Manager for Battery Lifecycle Management, describes the prototype developed by GM and ABB to prepare the battery system used in the Chevrolet Volt for potential secondary use applications at the ABB R&D office in Raleigh, NC.

market in the U.S. has centered as much on the fuel cells and batteries as it has on the vehicles themselves.

Domestic OEMs have taken to heart the old saw about not just trading this nation’s dependence on foreign oil for a future dependence on outsourced battery-making countries such as China, Japan and South Korea.

One of the biggest changes in the past 10 years as far as EV production in the U.S. goes is that the OEMs, such as GM, and their immediate suppliers, such as ABB, have been much more proactive in shaping their own futures through research and development on EV car battery life cycles.

# THINK Global Electrics to Continue With New Owner

OSLO, Norway – THINK Global AS, a leading manufacturer of pure electric cars, has been purchased by an international technology entrepreneur.

A court-appointed trustee selected Boris G. Zingarevich, whose investment operations are based in St. Petersburg, Russia, as the winning bidder following a bankruptcy proceeding initiated by the Norwegian carmaker last month.

In addition, Zingarevich has signed a memorandum of understanding with American advanced lithium-ion battery maker Ener1, Inc., and Finnish automobile engineering and manufacturing concern Valmet Automotive, Inc., to cooperate in relaunching THINK.

“Having achieved the position of one of the world’s most highly regarded electric vehicle products, the THINK brand is a valuable asset that deserves to continue its key role in the global shift to electrification,” said Zingarevich.

“With the potential of working with the leading American automotive lithium-ion battery maker and Europe’s top automobile engineering and manufacturing company, I believe we could have exactly the right combination and value chain to ensure that the brand will be increasingly competitive in the worldwide electric vehicle market.”

The assets of wholly owned subsidiaries THINK North America and THINK UK, which have remained going concerns during the bankruptcy proceeding for THINK Global, were also acquired in the transaction. Financial advisory services were provided by LATUM, a specialized investment banking and services company.

Ener1 and Valmet were the senior secured creditors of THINK when the company filed for bankruptcy after failing to raise adequate capital to continue financing operations.

Ener1 and Valmet are negotiating stakes in the new com-

pany on the basis of a debt restructuring. Zingarevich has been a major investor in Ener1 since 2002 and provided bridge funding for THINK while the company attempted a reorganization before filing for bankruptcy.

The name of the new company that will market THINK brand products is Electric Mobility Solutions AS, registered in Norway.

A new sales and service structure for THINK will be announced soon. The production restart, with a refined version of the THINK City, is scheduled to begin in the first quarter of 2012.

Over its 20-year history, THINK achieved the status of the leading dedicated electric vehicle maker in the world.

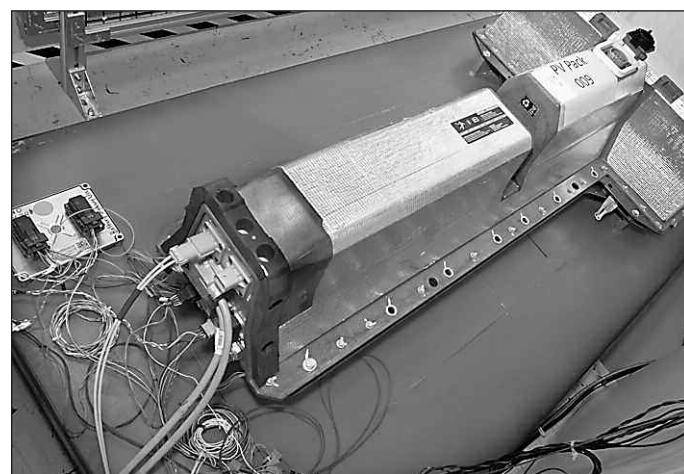
The THINK City has accumulated more than 48 million km of road experience in the several countries where it has been marketed. The current model has a range of 160 km on a single charge.

Zingarevich is an international serial entrepreneur with investments spanning a wide range of new and traditional industries in a number of countries. He has been the principal investor since 2002 in the leading American automotive lithium-ion battery manufacturer Ener1, Inc., on whose board of directors he sits.

Zingarevich is a founder and strategic shareholder in Ilim Group, a joint venture with the American company International Paper and the largest timber products company in Russia.

Meanwhile, THINK’s comings and goings are part of the continuing shakeout in the EV industry as OEM players, suppliers and utilities all jockey for market position and access to customers.

In the U.S., Nissan with its Leaf and GM with its Chevy Volt are seen as hybrid vehicle leaders, with Ford right behind as Ford has announced it will have electrified vehicles in the U.S. and Euro marketplaces soon.



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