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Electric Atmosphere at Electric Vehicle Symposium

By **John Voelcker**

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EVS-23, Pasadena (2–5 December)

Anaheim, Calif.—What a difference a year makes! ?

When a U.S. congressman speaks from the floor of the House and a representative from a global auto-maker gets hissed at during an electric-vehicle (EV) conference, you know something's up. The International Electric Vehicle Symposium and Exposition, held here in early December, brought home how much has changed in the world of electric cars since the previous electric-vehicle symposium (EVS) in Yokohama, Japan, just 14 months ago. ?

The congressman was U.S. Representative Jay Inslee (D-Washington), who spoke about a bill in the House that would eliminate oil-industry tax benefits as one way to encourage the development of electric vehicles. (He was also touting the new book he coauthored with Bracken Hendricks, *Apollo's Fire: Igniting America's Clean Energy Economy*.) ?

The offending comment came from Dan Bonawitz, vice president of corporate planning and logistics at American Honda, who said, "We do not believe that [lithium-ion batteries] are ready for real-world deployment in high-discharge applications" during a well-attended plenary session. The statement drew actual—though muted—hissing. ?

The tenor of the conference clearly indicated that most people didn't share Bonawitz's pessimistic view. So much has changed in a year that electric-drive vehicles from major auto-makers no longer seem to be a question of *if*—the questions now are when and how they will come to market. To find out, every EVS attendee juggled the plenary sessions, workshops, auditorium presentations, lunches, dinners, receptions—and of course his or her mobile phone—with hallway chats, side conversations, and eavesdropping on everyone from car-makers and battery companies to research institutions and regulatory bodies. ?

If one statement could sum up EVS-23, it'd be this one, overheard in the hallways: "It's all about the plug-ins, stupid!" To understand how far things have come, consider that, a year ago, the Chevrolet Volt was unknown. The idea that General Motors intended to build and sell a four-seat car with a 64-km (40-mile)

electric range would have been stunning. But a month later, at the North American International Auto Show in January in Detroit, the company announced that very vehicle.?

And consider how the demand for plug-in hybrid conversions has exploded far beyond the supply. A handful of customers pay small engineering shops US \$10 000 or more for the ability to plug a Toyota Prius into the grid—extending its all-electric range from a mile to as many as 10. A year ago, this idea seemed far in the future. ?

Now, people are so excited about plug-ins, that they're already planning for vehicles that don't yet exist. "I'm ready to change the building code to require electric plugs throughout parking garages," grumbled the City of Vancouver's Brian Beck a project manager for the city of Vancouver, Ont., Canada, "but auto-makers tell me I can't get their plug-in prototypes, so I have to look toward private conversion companies just so we can test plug-ins in our fleet."?

And yet, today, there are still fewer than 100 plug-in hybrids in the world.?

The challenges of making electric-drive vehicles a reality are enormous. There have always been true believers, but when five major auto-makers come into the EVS with large, expensive displays on the exhibit floor—Ford, General Motors, Honda, Mercedes-Benz and Toyota—something real is clearly happening.?

Even if Honda has doubts about current battery technology, the FCX Clarity fuel-cell vehicle they introduced at the [LA Auto Show](#) already uses a lithium-ion battery in conjunction with its fuel cell. Honda's Bonawitz pointed out that the FCX Clarity is "the first use of lithium-ion batteries" in a vehicle that will actually hit the road.?

Honda plans to lease the FCX Clarity for \$600 a month, starting next summer, to selected customers in Southern California. "That means," said one bystander, "that Honda's picking up the other \$600 000 on each vehicle." Which is as good a way as any to summarize the cost challenges of fuel-cell vehicles—even before looking at the infrastructure challenges. ?

If Honda's already using lithium-ion batteries, do they really doubt that they're ready for prime time? Battery-makers don't think so but didn't want to go on the record. Just like any other auto-maker, they said, Honda has talked to the companies that make large-format lithium-ion batteries that could be used in automotive applications. ?

Toyota, meanwhile, has clearly changed its tune on plug-in hybrids. The company expressed polite skepticism on the topic as recently as six months ago. But as part of the opening plenary, Koei Saga, the senior general manager in the company's hybrid-vehicle system engineering division, said clearly, "We think a plug-in hybrid electric vehicle is the most practical approach for normal-size passenger cars." On Sunday and Monday the company offered drives in its own Prius plug-in conversion (adding a second nickel-metal-hydride battery pack to the standard one, for an all-electric range of 11 to 16 km, or 7 to 10 miles). ?

No one's yet handicapping the many battery options, which include several distinct chemistries for lithium-ion. (For information on A123 Systems Inc.'s lithium nanophosphate cells, see "[Lithium Batteries Take to the Road.](#)") But most attendees marveled at the broad array of electric vehicles already offered for sale, from three- and four-wheeled low-speed vehicles to medium-duty urban delivery trucks. These aren't garage conversions; they're real-world products from large companies sold at authorized dealers. In fact, said Efrain Ornelas of Pacific Gas & Electric Co., of San Francisco, in a well-attended lecture, it's actually medium- and heavy-duty commercial vehicles that may offer the most convincing near-term case for the benefits of plug-in hybrids.?

The hazy promise of vehicle-to-grid technology permeated the conference, though few agreed on exactly what it means. Some went directly to the notion that utilities could use smart grid technology and intelligent meters to move energy in and out of millions of grid-connected electric vehicles. They could be recharged at night, when excess capacity is readily available, and owners could agree to sell a small portion of their battery energy back to the utilities to let them meet the peak of their demand curve.?

Others cautioned that such a vision might be two decades away. First, smart meters must be in place. Second, automakers and utilities must meet, learn to

speaking each other's language, and agree on communications protocols for the information to be exchanged—and where and how metering and battery control actually happen. ?

But assuming the Chevrolet Volt launches as promised in 2010 or 2011, several conferees speculated on how GM would hang onto its early-mover advantage in lithium-ion batteries. A high-ranked executive smiled wolfishly when asked how GM would prevent battery vendors (A123, say) from selling cells to other auto-makers. His answer? They can sell power batteries (for hybrids) all day long, but GM gets a lock on energy batteries (for long-range electric-drive vehicles). ?

At this pace, it's tempting to wonder whether GM or Toyota will have announced actual on-sale dates for electric vehicles by the time of the next EVS. It's to be held in Stavanger, Norway, in May 2009; book your flights and hotel rooms now!?

About the Author

John Voelcker has written about automotive technology and other topics for 20 years. He covered software and microprocessor design for *IEEE Spectrum* from 1985 to 1990.