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Huge promise, but a slow-go for the foreseeable future

By Brian Dunn Published: Oct 15 2008

The plug-in hybrid electric vehicle (PHEV) market stands poised to take off, but don't expect it to be an overnight sensation, according to analysts following developments in the industry.
"It's definitely going to be a very big market, but not as quick to materialize as some people think," according to Bradley Berman, who operates a consumer information Web site (www.hybridcars.com) in Oakland, Calif. "There is no lithium-ion battery on the market right now, so it will roll out slowly. And all the manufacturers have problems as they overpromise and underperform."

The leaders in developing lithium-ion batteries-the gold standard because they are needed for advanced power systems-are Japanese companies, including Moriguchi-based Sanyo Electric Co. Ltd. and Panasonic (Matsushita Electric Industrial Co. Ltd.), who are supplying Toyota Motor Corp., Honda Motor Co. Ltd. and Ford Motor Co.

While there are small original equipment manufacturers (OEMs) trying to play the game, the bigger automakers will control the market, Berman said. "It's very difficult for smaller companies to make a major breakthrough due to the capital investment required, including stringent crash testing and roadworthiness requirements."

And the technology is changing as well. "Nickel batteries are what most hybrids are using today, but lithium-ion has twice the energy and power density than nickel and four times more than lead batteries, so battery technology is moving towards lithium," said David Cole, head of the Center for Automotive Research in Ann Arbor, Mich.

Automakers are looking to offset the weight of heavy hybrid batteries, which can weigh several hundred pounds, but dabbling with metals and other technologies for today's vehicles isn't where the action is, one analyst said.

The real issue becomes whether or not there will be enough lithium to go around, and for some the answer appears to be a resounding "no."

Forget the battle for market share between steel, aluminum and iron-the real crunch might come when lithium-ion batteries hit mass-market production, according to Phil Gott, director of automotive consulting at Global Insight Inc., Waltham, Mass. "You're already having people screaming that we're going to run out (of lithium) by 2020 if the hybrid market keeps going the way it is," he said.

General Motors Corp., for example, aims to have its much-hyped Chevrolet Volt with a lithium-ion battery in showrooms as soon as 2010.

The problem is, because lithium hasn't been in great demand in the past, only easy-to-get and inexpensive lithium resources have been exploited, Gott said. The situation is similar to the 1920s, when people were loudly fretting about running out of oil. "That was because we hadn't gone out looking," he said. "If you start putting several hundred lithium cells in sever al million vehicles a year, you change the math."

Cole agreed that the problem isn't so much the weight of the battery, but projected early costs of production. "The obstacle to overcome is to get batteries produced at a high volume and at a reasonable cost, because a lithium battery costs more to produce than a traditional lead battery, although the basic mechanics of a plug-in vehicle are simpler than traditional vehicles," he said. Oil companies are closely monitoring the development of PHEVs, but probably won't get involved in the manufacturing end of the business, Cole said. "They'll likely invest in the technology to make sure they're not left out of the game."

For the foreseeable future, PHEVs will remain a niche market, even if all negatives are dealt with quickly, Kim Korth, president of IRN Inc., Grand Rapids, Mich., said. "But the more they make breakthroughs, the more concerned oil companies become about higher gas prices threatening their market."

Increased demand also might increase the incentive to search for more lithium, but some of the biggest potential reserves are in countries like Bolivia, which are less than enthusiastic about doing business with Western democracies, Gott said.

As for the current generation of hybrids, they will have smaller engines, use more copper wiring and generally employ nickel-metal hydride batteries-but that's old news, he said. "That's pretty obvious stuff. Any vehicle that's electric in any way, shape or form is pretty much hampered by a battery that's way too heavy and doesn't have enough power, so automakers will all be going to lithium as soon as they possibly can."

Even big vehicles like Chrysler LLC's Aspen and Dodge Durango sport utility vehicles, currently available as hybrids, could become all-electric if reliable lithium-ion battery technology were developed, Gott said. The same is probably true for a host of cars and trucks. "That's where the news is."

But getting back to the present, how might nickel prices be affected by all those nickel-metal hydride batteries in today's hybrids? Those batteries are only an intermediary step, Gott said, so even if nickel prices were to be an issue, they wouldn't be one for long.

And those plug-in hybrids that are or will come equipped with lithium-ion batteries also will use cobalt or manganese and perhaps other metal compounds as well, said Mike Omotoso, senior manager of global powertrain at J.D. Power & Associates, Westlake Village, Calif. "The trick is to find the right mixture to reduce the chance of a fire. Cobalt is risky from what I understand," he said. "A lot of it is proprietary information though, so we don't know what everyone is doing."
Michael Cowden, New York, contributed to this story.

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