

PORTALS
By LEE GOMES

Batteries in Gadgets Can't Support All The Gee-Whiz Adds

July 18, 2007

That new phone or music player or notebook computer of yours: You like it so much you wish you could play with it all day. If only its battery would let you.

Most consumers now realize what engineers have known for ages: Batteries aren't keeping up with the rest of electronics. Unfortunately, say the experts, not only are things unlikely to change anytime soon, they may get worse before they get better. Thanks to shrinking computer chips, the consumer-electronics industry has gotten to the point where it is adding features to products much more quickly than the battery industry can accommodate.

The famous Moore's Law has computer chips doubling in capacity every two years or so. The progress for batteries is more in the neighborhood of 10% a year, says Lawrence H. Dubois, who heads up physical-sciences research at SRI International, the Menlo Park, Calif., research outfit. Improvements, he said, tend to be incremental, even "mundane," like figuring out a thinner container for batteries and thus saving space.

Not surprising, device manufacturers regard every advance in batteries as something of a gift from heaven. "With even 20% more efficiency, you could make the phone slimmer or the display bigger and brighter," said Muzib Khan, a Samsung vice president working with mobile phones. "It opens up more opportunities."

The problem is that the basic design of batteries hasn't changed -- and really can't. One part gives up electrons for energy, one part accepts them and a third part keeps the two separated. Researchers scout for new materials that will provide the most chemical energy in the least weight and space; lithium-ion batteries, used in consumer electronics for the past 10 years, is the best anyone has come up with.

Because they have to work with the periodic table that nature gave them, "there are just so many ways of putting materials together," said Robert G. Visser, who heads up the business unit at 3M that supplies raw ingredients to lithium-ion battery makers. The big manufacturers include Sony, Panasonic, LG and Sanyo.

With progress so slow, consumer-electronics companies say that energy awareness is pervasive in the design process, as they bring out new, portable gadgets.

After Apple announced its new iPhone in January, for example, its engineers went to work looking for places in the device's software that could be tweaked to cut back battery usage, said Greg Joswiak, an Apple vice president who handles iPhone marketing. The result was a boost in the talk time of the device.

From the beginning, said Mr. Joswiak, design decisions were made with the battery in mind. Apple picked the video-playing software programs known as codecs because they used the least power. The company was criticized for not including a pop-out battery with the iPhone, but Apple replied that the doors and latches for a replaceable battery would have taken up too much room.

Though breakthroughs in performance may not be in the cards, battery makers and their scores of suppliers are working on smaller advances. For example, efforts are under way to engineer lithium batteries so they generate less heat. Excessive heat build-up led to the battery fires that forced Sony's massive and expensive battery recall last year.

The next big advance in gadget power was supposed to have been provided by fuel cells. This technology, though, is proving very difficult to bring to market.

Fuel cells contain a reservoir of a fuel source, akin to a gas tank in a car. While hydrogen gas is often mentioned for use in automotive fuel cells, liquid methanol is considered ideal for smaller consumer devices. When the fuel source is depleted, you recharge by simply filling it up again, much like you'd refill a reusable cigarette lighter.

With boosters claiming that a fuel source like methanol has 10 times the energy potential of lithium ion, fuel cells have received an enormous amount of attention. But the result, says John Taylor, of the National Renewable Energy Laboratory in Golden, Colo., has been "overzealous selling of the concept, one that is unconnected to the reality of the technology."

Mr. Taylor said fuel cells are proving much more difficult to manufacture than had first been envisioned, largely because they are complex devices, containing small, precise parts, such as pumps.

Considering all the fuel-cell hype, the most respected fuel-cell companies are careful not to oversell what they are doing. For example, PolyFuel, of Mountain View, Calif., a spinoff of SRI, has a methanol fuel cell that it expects to be in the market in the next year or two. President Jim Balcom says the first iterations of the product will provide the same energy as lithium ion, but with half the weight and slightly less space.

Mr. Balcom says he doesn't expect fuel cells to replace lithium ion any time soon, but rather to remain a niche technology aimed at customers willing to pay slightly more for longer usage time.

With their constantly improving performance and declining prices, computer electronics have long seemed as close as the world could come to a free lunch. Batteries remind us the rest of the world isn't like that.

- Email me at Lee.Gomes@wsj.com.