

## **BATTERIES: The 12-Volt System is Out of Energy**

Virtually every major automotive advancement has had its detractors and probably always will, but one thing most automotive engineers will agree upon today is that the 12-volt battery has run out of energy, or at least is about to as automakers begin to install more electronic safety and comfort features in cars and attempt to squeeze more fuel economy from the power plant. That is, however, where the agreement ends and there is considerable debate over what system will replace the 12-volt battery.

Talk to members of the Battery Council International, an organization representing U.S. lead-acid battery manufacturers and recyclers. Many of its member companies are researching significantly more powerful battery systems that are also efficient, affordable, safe and that can be recycled and are environmentally friendly.

There are a number of considerations that have to be taken into account, such as higher voltage is likely to mean more cells and more space and possibly more weight, the last thing an automotive engineer wants to entertain. Accommodating the battery becomes a problem and there are some serious safety concerns, all of which is leading to consideration of various options.

One option being considered is an evolutionary process that initially uses a two-battery system pairing a 12-volt with a 36-volt battery with a DC to DC converter that would allow the voltage to be stepped down for those devices still operating on a 12-volt system. If you're old enough to remember, British automakers fought the move from 6-volt to 12-volt systems in the early 1960s and for some time installed two six volt batteries connected in series in their sports cars, usually behind the seats. The system managed to double battery weight, maintenance and problems.

Another option being examined today is a 42-volt system with a single 36-volt battery that will take loads off the engine, making it more fuel efficient. Both options include advanced lead-acid batteries based on the same chemistry that starts and powers our cars today.

According to the BCI, the most viable configuration for a 42-volt system is a valve regulation lead-acid design with enhanced performance and extended life

cycle. The valve regulated lead-acid battery is a sealed, leak-proof, long-life battery that does not produce gas, so it doesn't need to be confined in an upright position under the hood, thus widening the options of where it can be positioned within the vehicle.

There are, however, other chemistries being examined, including lithium and nickel metal hydride. Each has its advantages and disadvantages, but lead-acid batteries, for now anyway, appear to have the cost and environmental advantages. Lead batteries are the most affordable and they are the most recycled consumer product, having a recycling rate of more than 90%.

As mentioned elsewhere in today's Automotive NewsWire, all of these technologies are being discussed this week in Novi, Michigan at the Workshop on Power Electronics in Transportation. The workshop is sponsored by the Institute of Electrical and Electronic Engineers, the Power Electronics Society, and the IEEE Michigan Section.