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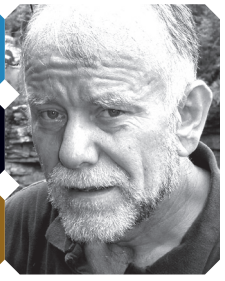

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Far More Than a Fad

THE BENEFITS OF VEHICLE ELECTRIFICATION AND HYBRIDIZATION WILL INCREASINGLY EXTEND THEIR REACH

ONE OF THE GREATEST ISSUES THAT WILL HAVE TO BE continually addressed by off-highway vehicle manufacturers is how to deal with ever-tightening emissions standards and rising fuel costs. Governments around the world have plans in place that will continue to drive emissions down through 2015 and beyond, and CO_2 will be the next big target. We can expect the regulatory trend toward reducing fuel emissions to continue, further advancing electrification. Most recently, in 2007, the U.S. Supreme Court authorized the EPA to regulate CO_2 emissions.

Notwithstanding the current questions surrounding climate change, pollution and the bio-fuel debate, there has been enormous momentum generated for "change," not only by the green lobby, but by a majority of the developed nations. This is forcing this second electric revolution to dig deeper than simply producing a few more hybrid cars and buses. The next obvious target is heavy-duty vehicles, as the more intermittent the duty cycle is, the more beneficial electrification becomes! Expect to see hybrids in many forms in every vehicle type.

For the "more electric" vehicle to be ubiquitous and the revolution to be complete, the current weak link — the battery (or energy storage) — must be addressed. New battery chemistries, coupled with production demand, will drive prices down while the rising cost of fuel and the price placed on carbon emissions will increasingly emphasize the better value proposition of electrification in all its forms. We already see a trend toward plug-in hybrid electric vehicles (PHEV) and, when readily available, advanced energy storage can be coupled with various forms of hybrid logic (e.g. range extender gensets, plug-in chargers). We will witness the infrastructure rapidly gearing up to support it, just like in Mr. Edison's time with his "lightbulb."

The challenge right now is to make vehicles go further or work longer on more stored electric energy, while continually dialing back fuel consumption. Each year more demands are being placed on the power supply within all vehicles from iPods and computers to power tools. The vehicle of tomorrow will not simply be a mode of transport or a workhorse, it will also be a mobile power station that may be able to share its excess energy with an intelligent grid using vehicle-to-grid (V2G) technologies.

The benefits of electrification are really universal. OEMs should be recognized and rewarded for bringing such advances to the market. As we get to the end of the current decade, it will be the norm that big internal combustion engines will be downsized, cleaned up and power-boosted by PMAC motor generators. Hybridization and vehicle electrification in all its forms will be commonplace. Every engine manufacturer and OEM will have product road maps that take us toward the extinction of the internal combustion engine and dc power trains.

Phil Collins holds a degree in mechanical engineering from the Army School of Engineering in Bordon, Hants, UK. He has 27 years experience working with off-highway vehicles, including everything from main battle tanks to marine tenders, operation to repair and everything in between.

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