

Savings on Rare Earth Metals

Cummins Generator Technologies has teamed up with Sevcon, the electric vehicle-control systems company and Newcastle University's Centre for Advanced Electrical Drives to develop a 'green' traction motor for future hybrid and full-electric vehicles (EVs) that will use environmentally-sustainable steel components in place of rare-earth metal equivalents. The tripartite consortium reports that the first fruits of the "High Torque Density Switched Reluctance Drive System for Low Carbon Vehicles" project could enter volume production in as little as four years.

The pressure on supplies of rare-earth metals, coupled with rising demand for this technology means the race is on to find an alternative. Moreover, extracting these rare minerals can be incredibly destructive to the environment. So to pursue electric and hybrid vehicles as a truly 'greener' option they are not only looking at the fuel but also the materials used to develop the various components.

Newcastle University, Sevcon and Cummins are in an excellent position to deliver this world class technology, as leaders in the development of new electric motor technologies, the supply of the electronics which drive the new electric vehicles and the manufacture of engines for many of the world's commercial vehicles.

Unlike current EV motors (which rely on rare-earth metals such as Neodymium and Dysprosium in their construction) the new 'green' motor will feature magnets made from steel, a raw material that's not only widely available, but also significantly-less expensive to produce – a key factor as the demand for hybrid and electric vehicles grows. Equally important, by using steel, in place of rare earth metal magnets in the new electric motor, the consortium will address growing environmental concerns over how rare earth metals are currently mined and refined. The green electric motor will also feature new control system technology that will see conventional Insulated Gate Bipolar Transistor (IGBT) inverters replaced by a "high temperature alternative."



Dr. Peter Barras, Sevcon's Vice President of Engineering, reports: "This is an exciting, cutting-edge project in a market sector with great potential. We're already very active in the low carbon vehicle sector and the performance capabilities of our advance technology motor controllers are ideal for this sort of application. We're delighted to be bringing our automotive drive-train engineering expertise to this project."

The tri-partite consortium has received a major financial boost in the form of a £518,000 grant from UK's Technology Strategy Board following its success in the 'Highly Innovative Strategic Technologies in Low Carbon Vehicles' competition for collaborative research and development funding.

Cummins Generator Technologies is committed to developing innovative cost-effective products for their customers. The rising price of magnets can have a significant impact on the cost of electric machines and the award provides an excellent platform to develop a new generation of electric motors to meet the challenges.

The development of a green traction motor comes as the market for electric cars and commercial vehicles is expected to grow five-fold over the next decade from less than 2 million EVs sold in 2010 to an estimated 49 million by 2020. However, experts predict future growth will be hampered unless alternatives can be found for the rare-earth metal magnets used in existing electric motors.

