

## RECENT INNOVATION IN ELECTRICAL ENGINEERING

### NEW ELECTRIC MOTOR COULD BOOST EFFICIENCY OF EVS, SCOOTERS, AND WIND TURBINES



**HUNSTABLE ELECTRIC TURBINE**

Makers of electric vehicles, e-bikes, or electric scooters—and the owners who love them—tend to focus on batteries, and how much better their vehicles become as batteries shrink in weight, size, and cost. But electric motors are the often-overlooked aspect of that equation. Electric machines could revolutionize automobiles, wind turbines, and air conditioners as well as robotics, drones, and micromobility vehicles.

The Hunstable Electric Turbine, or HET has been invented recently. This can generate two to five times the torque of existing motors or generators, in the same-size package. Torque is the amount of work that a motor or engine produces, typically measured on a per-revolution basis.

HET is defined as a 3D circumferential flux, four-rotor permanent magnet motor. Unlike typical designs, the synchronous DC motors have no superfluous end windings, so 100 percent of their copper material goes into energy conversion. A typical motor's copper content could be reduced by 30 percent, while generating equivalent torque. This is a superb advantage! So, for a given torque level, the HET consumes significantly less energy than competing designs.

It is also shown that the motors could increase driving range by more than 10 percent; or, this commercially means that, HET allows those cars to carry relatively smaller battery packs to deliver equivalent range. The HET itself is spectacularly efficient, generating up to a claimed 150 newton meters (Nm) of torque at just 3,000 revolutions per minute (rpm).

The motors generate such robust torque that, in most applications, no gearbox reduction is necessary. The system incorporates a purely electronic transmission, which reduces energy losses and, at production scale, could trim at least 45 kilograms (100 pounds) from vehicle weight. Complexity and costs for engineering and manufacturing drop along with it.

Many electrified vehicles must also integrate a DC-to-DC converter, which boosts or chops voltage to varying levels—to enable a full range of driving speeds under various loads. But because the HET can generate such robust torque at lower rpms, it could also eliminate the boost converter that's found on every car. No converters in EV- what a boon! Thus, the motors could deliver a domino effect that's another holy grail of transportation engineers: A smaller, more efficient motor with no geared reduction or DC/DC converter would allow for smaller and lighter batteries, simplified and less-costly controls, and lighter suspensions and other chassis components that underpin those systems.

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COURTESY:

1. <https://spectrum.ieee.org/cars-that-think/transportation/advanced-cars/new-electric-motor-could-boost-efficiency-of-evs-scooters-and-wind-turbines>.