CASE STUDY

ECM evaluates the impact of PCB Stator Technology in electric vehicles

Overview

ECM's PCB stator technology has been identified by international e-mobility companies as having unique, advantageous characteristics to support the growing demand for longer range ebikes. These companies require drive solutions with increased power density. To test the impact of PCB stator technology, ECM collaborated with a German e-vehicle company to design and prototype two unique mid-drive solutions for their next generation ebike

Benefits

ECM's PCB stator platform and PrintStator's design capabilities add considerable value toebike systems. The superior power density andhigh efficiency of ECM solutions allow for an extended battery life and range for integrated systems. Less mass means ebikes will have capacity for additional battery modules, further extending their range. An ultra thin form factor and compact envelope allow these motors to integrate seamlessly as mid-drive motors without interfering with passenger comfort or other mechanical components. Further, ECM's robust design contributes to increased passenger safety. Fully encapsulated motor windings prevent insulation failure and the totally enclosed case design allows our solution to be durable under extreme conditions. ECM's motors are acoustically quiet, enhancing the ride experience.

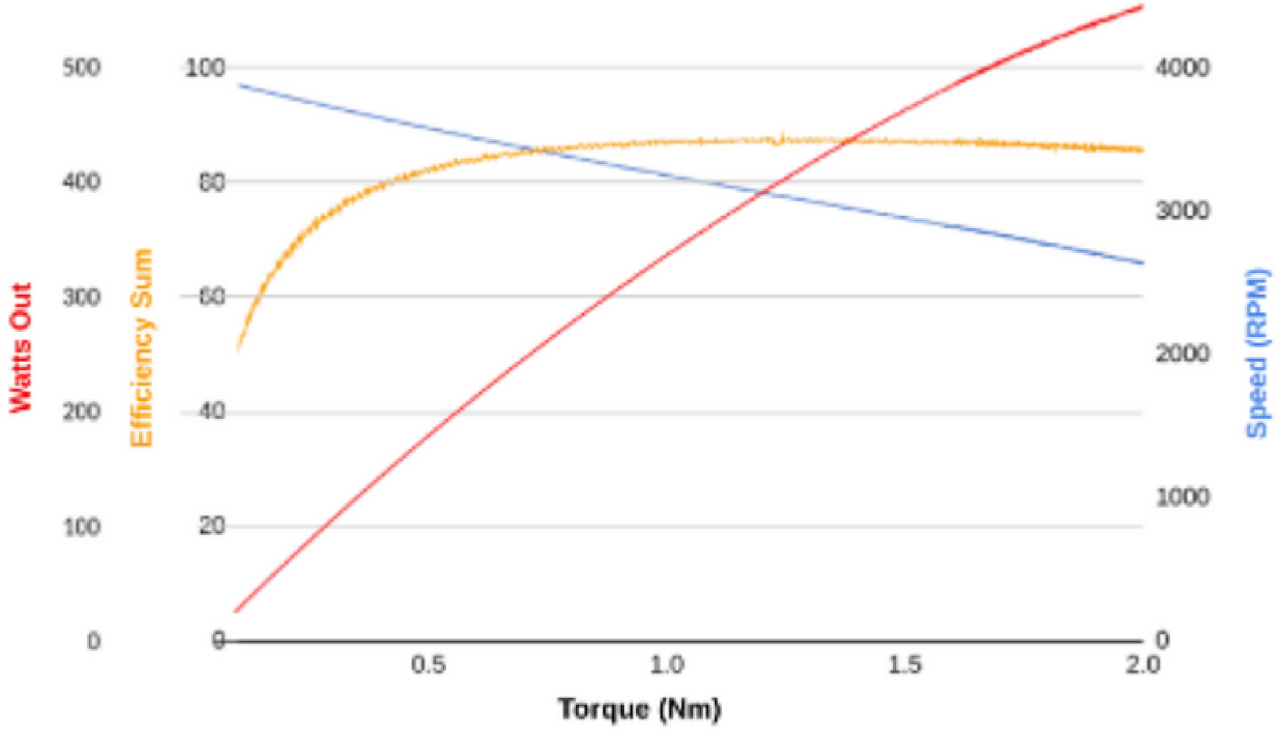
Results

ECM designed and prototyped two mid-drive solutions integrated with PCB Stator technology; the first for increased power density and the second for efficient power consumption. The first mid-drive provided twice the peak power output as the legacy drive without increasing motor volume or mass. ECM's motor was only 1.91" thick, weighed 1.5kg, and produced 1kW of peak power compared to the bike's legacy 500W peak motor.

ECM's second mid-drive solution, with a peak power of 550W, utilized the same magnet mass as the 1kw drive. Magtrol tests on this 1.85" thick, 2kg prototype revealed the motor's high efficiency across a large range of operating points. Remaining above 85% efficient from 230W to 550W, this mid-drive offers efficient power consumption while accelerating. ECM is currently collaborating with this company in an effort to incorporate these benefits into larger electric vehicles.

"The compact design enables not only excellent handling but also easy, elegant integration into bike frames or LEVs and E cargo bikes – no problem either, thanks to the huge power reserves and a modular concept for different performance classes."

Representative,
German EV Company



Next Steps

ECM is expanding its catalog of solutions beyond ebikes and integrating PCB stator technology into a variety of e-mobility applications including electric cars, wheelchairs and scooters. High power density, increased durability, reduced weight, and a slim form factor are a few of the many benefits when a motor solution is built with an ECM PCB stator, making the technology valuable for almost any application.

To discuss the benefits of ECM's PCB stator technology within your product line, please email us at info@pcbstator.com or visit pcbstator.com/design-your-own to learn more about our 5-step integration process.

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