

BEM's EXECUTIVE SUMMARY
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OUR IMMEDIATE MARKET FOCUS:

Until we discover the proverbial fuel that is unlimited, affordable and environmentally friendly, Best Electric Machine (**BEM**) portfolio of patented electric infrastructure technologies believes “electric system efficiency and performance” is key to our clean and sustainable energy future in accordance with our mission, “Real Innovation for Our Clean, Efficient, and Sustainable Energy Future!” For example, regardless of vehicle type, such as the typical internal combustion engine (**ICE**) vehicle or the electric vehicle (**EV**), a fully regenerative electromagnetic drivetrain with self-contained, software-controlled, ultra-high vectored peak torque (e.g., direct drive) electric motor/generator systems (**EMS**) without permanent-magnet (**PM**) will transfer propulsion power with much more efficiency, performance, and reliability than what is possible with today's mechanical drivetrain comprising the maintenance, complexity, lubrication, friction, and wear of mechanical gears, differentials, clutches, and brakes. But anecdotally considered the highest performing EMS, virtually all of today's EVs incorporate the componentized, low torque, high speed, rare-earth PM (**RE-PM**) EMS with at least the compounding size, loss, cost, and wear of a speed-reduction gearbox (i.e., mechanical drivetrain) for adequate acceleration or regenerative deceleration torque but more importantly, to reduce the amount of RE-PM material that is [monopolized by a global adversary seeking world dominance with dire environmental, exploited labor, and geopolitical consequences!](#)

BEM REIMAGINED EV PROPULSION:

BEM's flagship product, called SYNCHRO-SYM, is the only novel *symmetric* EMS circuit and control technology with an “active rotor” (**S-EMS**) that was theoretically studied but never practically realized until the “integral” Klatt invention of stability enabling brushless and sensor-less real-time emulation control (**BRTEC**)! Without realizing BRTEC due to the limits of technology, the S-EMS theoretical study necessarily morphed into the practical study for today's *asymmetric* EMS circuit and control technology (**A-EMS**) by deoptimizing the S-EMS symmetry with the asymmetry of a “passive rotor” of either permanent magnets (as only practical with the high energy product of RE-PMs), slip-induction windings, reluctance saliencies, or DC field windings and a less stringent, estimating control “component,” such as field-oriented control (FOC) or direct torque control (DTC)!

By hypothesizing the enabling BRTEC to brushlessly and stably place a second power contributing active winding set on the rotor within the same A-EMS package footprint with the single, universally essential stator active winding set, EMS theorist always considered the S-EMS to be the pinnacle in EMS performance. Therefore with the BRTEC invention, SYNCHRO-SYM was already verified to provide a) twice the nominal power, b) half the cost, loss, size, and amount of copper and steel, and c) octuple the peak torque per unit of power rating with the same A-EMS package footprint and design specification by [over a century of classic EMS study, research, and publication](#), which was only successfully completed by BEM's own invention, R+D, CONOPS, BEM-CAD, engineering, multiple stages of prototyping, and patents! In addition, BEM strategically leveraged the only EMS 3D Printer, called MOTORPRINTER, to uniquely provide a just-in-time (**JIT**) additive manufacturing method for axial-flux SYNCHRO-SYM prototyping and scalable production with readily-available, optimally premanufactured layering materials, including electromagnetically superior amorphous or nanocrystalline metal ribbon that otherwise, was impractical for EMS application!

TACTICAL MARKET OBSERVATION:

Clearly demonstrating the overwhelming EV market desire for better EMS performance/price and high peak torque potential, seemingly every month a so-called “new or invented” A-EMS is creatively marketed with 50% better performance/price than another by ignoring the uneven differences in legacy packaging techniques and design specifications, which in accordance with physics, must show similar results if equally applied! Also, while ignoring the probable loss of at least engineering IP, the ubiquitous RE-PM A-EMS is likely manufactured offshore to be cost competitive by unethically exploiting labor and to leverage CCP favored status for coveted RE-PM availability!

As the absolute pinnacle in EMS performance/price, ultrahigh peak torque potential, and no RE-PMs, coupled with the only conveniently scalable JIT 3D printer manufacturing method, BEM’s initial focus for the turnkey SYNCHRO-SYM is the 20KW to 250KW componentized propulsion A-EMS market for boutique EV manufacturers (e.g., Hypercars) and EV OEMs (e.g., Toyota), which is projected to be at least \$100B (circa 2031) by significantly under estimating the A-EMS, which includes controller and gears, to be 3% of the total EV cost! Emphasizing performance/price over branding or standards, most OEMs would prefer a RE-PM free A-EMS to ethically distance themselves from the harmful geopolitics of RE-PMs but only if the performance/price was at least similar! Any EMS manufacturer with better performance/price and higher peak torque than the RE-PM A-EMS, as only possible with SYNCHRO-SYM, would be a uniquely formidable challenger in at least the EV propulsion market without also considering the higher peak torque potential enables the coveted fully electromagnetic drivetrain and frictionless electromagnetic braking with suitable cooling and power dense ballast!

OUR VALIDATION AND COMMERCIALIZATION PLAN:

By overwhelmingly endorsing the CCP monopolized and creatively marketed RE-PM A-EMS, today’s EV manufacturers are too mistakenly vested in the RE-PM A-EMS to grasp BEM’s extensive prototyping and more importantly, BEM-CAD analysis that correctly shows SYNCHRO-SYM’s unique low cost, ultrahigh performance/price and peak torque advantages by simultaneously designing competing RE-PM and Induction A-EMS contestants with exactly the same packaging, design specifications, physics, and potential performance, and cost anomalies, such as unrealized inflationary costs. Seemingly believing “everything that can be invented has been invented,” EV manufacturers are instead, only concerned with RE-PM A-EMS delivery, cost, and integration schedule. In consideration, BEM needs additional investment to quickly finish its “validation effort” to reengineer the original prototype designs with state-of-the-art components for customer (Beta) testing, and “commercialization effort” to fabricate MOTORPRINTERS for the inhouse manufacture of customer samples and scaling production! Also, BEM’s validation and commercialization effort pre-establishes in-house capability for quick delivery and customized sustainment support and provides enticing beta testing results for priceless word-of-mouth marketing to performance/price centric customers, instead of the typical, expensive creative marketing for another A-EMS!

With the enactment of long overdue fair-trade policies and ethics, coupled with a) significantly better EMS performance/price and ultrahigh torque in the same A-EMS package footprint, b) no RE_PM, c) JIT additive manufacturing, and d) protected IP, it’s time to partner in BEM’s validation and commercialization effort to clearly make the turnkey SYNCHRO-SYM the EMS choice of the global plethora of EV manufacturers, including those with CCP affiliation for *ethical* cost-competitiveness!