Executive Summary — Rev. 1.0

Best Electric Machine (BEM) is commercializing a practical maintenance-free, brushless active-rotor electric motor-generator system (S-EMS) architecture together with an integrated engineering design and programmable manufacturing platform intended to redefine the performance, manufacturability, and strategic resilience of rare-earth-free electric propulsion systems. Unlike conventional passive-rotor EMS architectures, BEM's platform enables both the stator and rotor to independently contribute working electromagnetic power.

Commercial Opportunity

Best Electric Machine (BEM) is commercializing what it believes is the next architectural progression in electric motor-generator system (EMS) architecture. In BEM terminology, electric-machine systems are classified according to two fundamental electromagnetic circuit and control architectures: asymmetric passive-rotor (A-EMS) and symmetric active-rotor (S-EMS). While the industry has invested hundreds of millions of dollars improving mature passive-rotor architectures, BEM pursues the same strategic objectives—higher performance, lower cost, rare-earth reduction, domestic manufacturing, vertical integration, and supply-chain resilience—but through its unique rare-earth-free, maintenance-free, brushless active-rotor EMS architecture made possible by **BRTEC™**, a brushless and sensorless real-time emulation control method that employs a new magnetic-sharing™, solid-state transformer (SST) power conversion technique, and an integrated commercialization platform. BEM is not commercializing a single motor-generator system. It is commercializing an integrated technology platform.

The BEM Platform

BEM's commercialization platform integrates four technologies: SYNCHRO-SYM™ active-rotor architecture, Maintenance-free, Brushless and Sensorless Real-Time Emulation Control (BRTEC™), BEM-CAD™ active-rotor architecture synthesis, optimization, and computer-aided design platform, and the MOTORPRINTER™ portable, low-waste, ultra-low-tool-wear, programmable axial-flux integral-frame-wound-core manufacturing platform.

Together SYNCHRO-SYM™ and MOTORPRINTER™ are intended to commercialize both a differentiated propulsion technology and an immediately deployable domestic manufacturing platform capable of rapidly producing rare-earth-free electric propulsion systems at commercial scale.

Why It Is Different

Conventional passive-rotor EMS architectures rely on only the active stator to contribute working electromagnetic power. BEM's active-rotor architecture enables both the active rotor and active stator to independently contribute working electromagnetic power. By enabling both the rotor and stator to independently contribute working electromagnetic power, SYNCHRO-

SYM™ is intended to more than double the achievable rated power under comparable package and design constraints while eliminating dependency on rare-earth permanent magnets with geopolitical, environmental, and supply-chain consequences

Why Now

Electrification across transportation, aerospace, marine, industrial, and defense markets has elevated dependence on rare-earth permanent magnets from a supply-chain concern to a strategic sustainment, industrial resilience, and geopolitical issue of critical importance. At the same time, advances in controls, packaging, magnetics, power electronics, together with BEM's advances in design automation and additive manufacturing, make commercialization of our rare-earth-free, maintenance-free brushless axial-flux active-rotor architecture commercially practical.

Commercialization Plan

Unlike conventional programs that separately fund technology development and manufacturing deployment, BEM's $7-$10 million commercialization plan integrates the SYNCHRO-SYM™ architecture, BRTEC™ control, BEM-CAD™ design platform, and MOTORPRINTER™ portable, low waste, programmable manufacturing platform. The program is intended to complete production-ready axial-flux SYNCHRO-SYM™ systems while establishing a scalable, programmable domestic manufacturing capability with an initial capacity of approximately 2,000 units per year.

Technical Foundation

The commercialization program is supported by decades of theoretical analysis, laboratory validation, multiple prototype generations, patents, technical publications, independent third-party commercial validation, and accumulated active-rotor architecture knowledge.

What BEM Seeks

BEM represents an opportunity to invest in an integrated electric-machine technology and manufacturing platform rather than another electric-machine product company.

BEM is seeking OEM partners, strategic investors, manufacturing collaborators, technical validation organizations, and pilot customers interested in commercializing the next active-rotor EMS architecture.

For strategic investment, OEM partnerships, manufacturing collaborations, technical discussions, or BOE Work Packages, please contact:

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