

## HYBRID BOOSTER DRIVE™ Vehicle Propulsion Technology

### The Opportunity

Researchers at Bowling Green State University's ("BGSU") Electric Vehicle Institute (EVI) have developed and refined the **Hybrid Booster Drive™** or **HBD™**.

Its ultracapacitor-based energy storage provides significant improvements in total fuel economy (up to 30%) and excels in vehicle applications requiring numerous starts and stops at speeds less than 40 miles per hour.

### Competitive Advantage

HBD™ technology provides clear, competitive advantages relative to other hybrid systems:

- **Retrofittability** -- Ideal for legacy fleets, the HBD can be easily adapted to existing systems powered by diesel, gasoline, or other fuels.
- **Flexibility** – System software enables fine-tuning and customizing to adapt to a specific route and its driver; helps to maximize fuel efficiency.
- **Adaptability** – May be deployed in a fleet of vehicles including vans, shuttle buses, refuse trucks & other heavy-duty applications.
- **Simplicity** – The HBD system consists of only three major components & fewer additional parts than competitive systems.

### Stage of Development

The HBD™ technology has been extensively engineered, developed and successfully installed in a fully operational, Euro-style 27-passenger shuttle bus.

A sophisticated and highly-refined supervisory control module enables adaptive response and superior customization in any intended use.

### BGSU's Electric Vehicle Institute (EVI)

Bowling Green's EVI develops and promotes advanced electric propulsion technology. To learn more, see: [www.bgsuevi.com](http://www.bgsuevi.com).



### Intellectual Property

Available for license are four issued, broadly-claimed US patents and additional filings that protect the HBD™ intellectual property.

Substantial know-how includes system configuration engineering plans and schematics of the various hardware components. Details of the electric motor, ultracapacitors, mechanical interface to the drive line, system controllers, and electronic interface with the system software are also offered in the opportunity.

"Hybrid Electric Vehicle" IP filings include:

- US Patent No. **7,252,165**
- US Patent No. **7,004,273** **CLICK HERE**
- US Patent No. **6,651,759**
- US Patent No. **6,484,830**
- US Patent Application No. **11/373,952**: "System software for the parallel hybrid vehicle optimal storage system", Filed March 13, 2006.

**BGSU is offering to license the HBD™ technology and will provide assistance to qualified organizations to ensure successful commercialization.**

**Contact:** Mike Allan, Vice President  
Tel: 216-881-8526  
email: [mfallan@firstprincipals.com](mailto:mfallan@firstprincipals.com)  
Website: <http://www.firstprincipals.com>