

## ADVANCED ENERGY CONVERSION WINS NASA TECH BRIEFS DESIGN AWARD



**Advanced Energy Conversion**  
*Putting Power to Work*

### *Integrated Motor/Pump Wins Grand Prize*

**MALTA, NY – April 4, 2007** – Advanced Energy Conversion, LLC (AEC) announced today that its integrated motor/pump has been selected from over 1000 entries to win the Grand Prize in the Emhart-NASA Tech Briefs “Design the Future” contest. The prize, a 2007 Toyota Prius hybrid, will be awarded at a ceremony in New York City on April 23.

In conventional electrically driven pumps, the pump and motor are each contained within their own housing and connected through a shaft. The AEC integrated pump provides for the dual use of parts by integrating the rotor of the electric motor with the impeller of the pump in a common housing. In addition, substantially improved fluid handling performance is achieved from the controllable flow capability inherent in the pump design. The tight coupling between the motor and the pump will facilitate substantial changes in how fluid handling systems are implemented.

The patented AEC integrated motor/pump design includes the following elements:

- A power dense electric motor that is efficient and capable of controlled operation over a wide speed range
- Substantially improved thermal performance of the electric motor due to direct liquid cooling of the windings
- Reduced physical size by combining the motor and the pump in a single housing
- Reduced motor size. By putting the windings in close contact with the fluid, the heat in the windings is efficiently removed thereby reducing the physical size of the motor, bringing it into line with the size of the pump.
- Reduced part count by virtue of component integration
- Improved reliability
- Reduced manufacturing cost

As can be seen, this innovative design uses 30-40% fewer parts and is more compact, more efficient, and less expensive than traditional designs.

Additional benefits can also be realized in specific applications. For example, in vehicle cooling systems:

- Radiator size can be reduced through better thermal performance from the controlled flow pump

- Parasitic energy losses are reduced by the elimination of the coolant system drive belts
- Smaller bearings can be used with reduced wear through the elimination of side loads for the electrically driven pump relative to belt-driven pumps

Initial funding for the integrated motor/pump was provided in part by the New York State Energy Research and Development Authority (NYSERDA) and the United States Department of Energy.

AEC is now in discussions with several companies interested in taking advantage of the integrated motor/pump's features for a wide variety of applications, ranging from vehicle cooling systems, to swimming pool circulating pumps and HVAC systems. AEC is also exploring use of this technology as an integrated turbine/generator for capturing energy that would otherwise be wasted in industrial processes, wastewater systems, and public water supplies.

#### **About Advanced Energy Conversion**

Advanced Energy Conversion, LLC (AEC) is an engineering company with expertise in developing systems solutions using power electronics, embedded controls, and mechatronics. Founded in 1997, AEC grew out of the electric power engineering program at Rensselaer Polytechnic Institute, Troy, NY. AEC finds solutions to market-based problems by improving energy efficiency, reducing emissions, and increasing functionality.

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