

## PolyFuel Announces Milestone Completion

(Wireless News Via Thomson Dialog NewsEdge) Portable fuel cell provider PolyFuel announced that it just completed the fourth milestone of a five-step, multi-year development plan intended to kick-start the commercial market for all-day runtime power supplies.

The endpoint of its roadmap is a working prototype designed to be integrated with a representative notebook PC, and which surpasses the performance of today's Lithium-ion batteries in terms of runtime versus size, and weight. The underlying technology would then be made available to PolyFuel's customers and partners as a reference design.

PolyFuel stated that what it has accomplished is to have fundamentally solved the water management problem that has plagued portable fuel cell developers for nearly a decade. All fuel cells create water as a byproduct of the electricity generation process. The trick is what to do with it.

For this achievement, PolyFuel engineered an entirely new membrane, a breakthrough "membrane electrode assembly" (MEA) design, and a new system design that not only reduces the amount of water byproduct produced during fuel cell operation, but recycles a significant portion of that water directly back through the membrane to the fuel side, where it is reused to generate more electricity.

PolyFuel said that the new membrane and MEA allows the water to be kept in perfect balance throughout the system. The result is a considerable simplification in the design of the fuel cell system, eliminating components, reducing overall size and weight, and lowering cost. These are significant, as the primary difficulty with fuel cells has been to make them small enough to be able to be integrated into the notebook PC itself.

PolyFuel recognized some time ago that despite the best efforts of fuel cell developers, certain problems were simply not being solved. Unfortunately, that state of affairs increasingly has contributed to lowered expectations for fuel cells in general, and as a high-performance replacement for batteries in particular.

In response, the company put together an aggressive internal program to work on not only the membrane challenges, which were PolyFuel's area of proven expertise, but also to solve the system-level problems, such as water management, fuel delivery, packaging, notebook integration, and so forth. PolyFuel sought and received a grant from the U.S. Department of Energy to support and expedite the program.

According to Jim Balcom, president and CEO of PolyFuel, the five milestones of the program are as follows:

- Develop a conceptual design for a complete fuel cell system that can outperform Lithium-ion batteries, and identify the membrane and MEA requirements to support this.
- Engineer a membrane that has a high level of water permeability but a low level of methanol diffusivity – usually mutually-exclusive attributes.
- Design an MEA that can recycle much of the water that is created in the fuel cell back to and through the newly engineered membrane.
- Demonstrate the "proof of concept" by operating a fuel cell incorporating the newly-engineered membrane and MEA in perfect water balance using the conceptual system design target operating conditions.
- Incorporate that cell into a functioning notebook PC power module and demonstrate it powering a commercially-available notebook computer.

Of these milestones, PolyFuel has now met the first four of the five. In particular, multiple “proof of concept” fuel cells incorporating the new membrane, MEA and other newly-engineered system components have been running for hundreds of hours under PolyFuel’s dramatically-simplified system design and target operating conditions.

With these results, PolyFuel noted, it has reached a key milestone in its goal of creating a fully-referenceable design that it believes will re-energize portable fuel cell development programs around the world. Additionally, they should prove once and for all that a fuel-cell-based power module can have the size and performance consumers will require and desire for their increasingly power-hungry notebook computers.