

# PTC Awards Entry

## GenCore® GenNext Fuel Cell System

Submittor:

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Team Members:

**John Ruiz and the GenCore Product Team**

Company:

**PLUG POWER L L C**

Country:

**United States**

Category:

**High-Tech Electronics**

PTC Product(s):

**Windchill ProjectLink**

**Windchill PDMLink**

**Pro/ENGINEER**

**Pro/INTRALINK**

**Pro/ENGINEER Mechanical**



GenCore® fuel cell systems are high-performance solutions for the critical backup power needs of wireless and wireline providers. Our on-site energy system is based on the proton exchange membrane (PEM) fuel cell. A fuel cell is an electrochemical energy conversion device, similar to a battery in that it provides continuous DC power, which converts the chemical energy from a fuel directly into electricity and heat. When operated directly on hydrogen, the fuel cell produces this energy with clean water as the only by-product. Unlike a battery, which is limited to the stored energy within, a fuel cell is capable of generating power as long as fuel is supplied. Although hydrogen is the primary fuel source for fuel cells, the process of fuel reforming allows for the extraction of hydrogen from more widely available fuels such as natural gas and propane or any other hydrogen containing fuel.

Through the use of Pro/ENGINEER's large assembly management tools, we were able to develop a system with improved df(x). This translates into a 50% decrease in mechanical assembly time of the fuel cell from the previous version or from 6.5 hours down to 3.25 hours. We can attribute this to larger and simpler subassemblies built outside the enclosure and then installed as opposed to building components and subs inside the enclosure.

The innovation is in how we supply power to our customers. Our flexible platform-based product architecture delivers backup that's scalable to the customers needs. Our markets include the telecommunications and cable broadband industries including use as an outside plant uninterruptible power supply (UPS). Unlike traditional technologies, which can be unpredictable and maintenance dependent, GenCore® systems deliver the reliable backup power you need over the widest range of operating environments-with reduced operating costs and zero emissions. Proprietary fuel cell stack design delivers efficient, clean, quiet DC power. Integrated cell voltage monitoring provides continuous feedback for optimal fuel cell performance. GenCore® systems offer either -48Vdc or +24Vdc power conditioning to meet the needs of wireless and wireline providers. Presently, critical remote wireline and wireless equipment are supported through a power interruption by Valve Regulated Lead Acid (VRLA) batteries. Though offering a low first cost, VRLA systems can be unpredictable, hazardous, and expensive to maintain. Plug Power GenCore® systems are expected to offer an alternative solution, providing high reliability, lower life-cycle cost, and efficient operation. By utilizing PEM technology GenCore® is free of the need for costly and hazardous batter replacements. This also gives the GenCore® a reliable known run time that can be extended through fuel bottle replacement.