

Marine Fuel Cell Demonstration

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Off-The-Shelf Fuel Cell Technology

Marine Demonstration

Fuel Cell Technology

What's What

- Phosphoric Acid (PAFC)
- Molten Carbonate (MCFC)
- Solid Oxide (SOFC)
- Proton Exchange
 Membrane (PEM)





Fuel Cells Pros

- Few Moving Parts
- High Efficiency
- Low M & R: Do While Operating
- Chemical Process = No Emissions
- Unattended Operation



Fuel Cell Cons

- Not A Stiff Generating Source
 - Minimal fault clearing current
 - Limited step load capability
 - Limited ability to handle transients
 - Minimal load unbalance capability
 - No over load capacity
 - Can't Black Start



Solution

Sure Power System

- Fuel Cell Power Plant
- Dual Source Rotary Motor Generator
- Flywheel

Can Fuel Cells Function Properly and Reliably in a Marine Environment?

T/V Kings Pointer Demonstration







Issues

- Seaworthiness
- •Operation and Maintenance
- Fuel Supply

The Next Step

Diesel Fuel Reformer **Demonstration** *McDermott* Technology, Inc. Naval Distillate **Reforming for Navy** Ship-Service **Applications**

Pathway To A Commercially Viable Marine Fuel Cell Power Systems

- Reduce footprint
- Improve Efficiency
- Reduce Cost



Sure Power High Availability System Powering the Internet

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