

# JSPE

## “Small-Scale Hybrid Power Systems”

Joint Service Power Expo  
5 May 2011

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# OUTLINE

- Definition of a Renewable Energy Power System
- Principles of System Design
- Continuous vs. Stored Power Models
- Elements of a Hybrid System
- CRADA Project w/ PM-MEP



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# Definition

A system comprised of one or more renewable energy inputs, associated power management, storage and distribution components, and the interface to users' applications.



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# Principles of System Design

- Scale
- Modularity or Open Architecture
- Power Management Focus
- Efficient Applications



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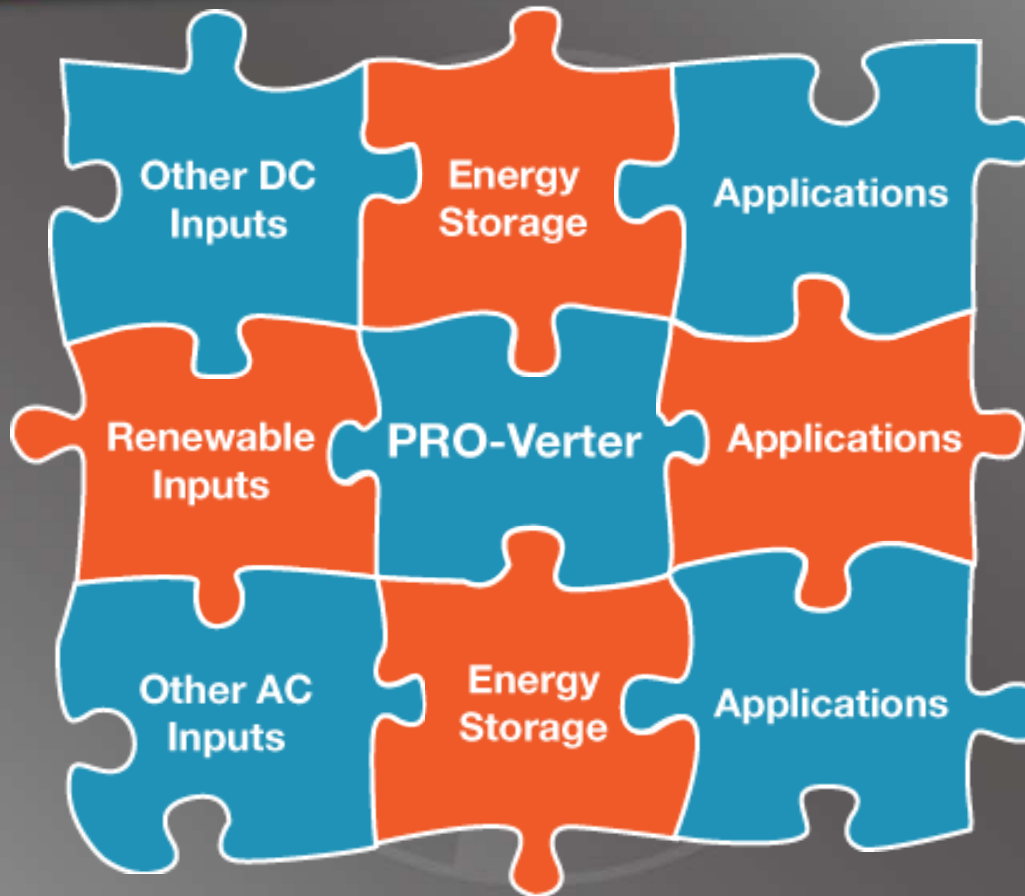
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# Scale

- FOB vs. COP
- Production
- Power Management Capacity
- Power Distribution Mode



# Open Architecture



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# Power Management Focus

- Solar Charge Controls
- Integrated Multiple Inputs to Energy Storage
- Inverter/Charger Capabilities
- Programmable User Interfaces
- Power Distribution Modes



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# Efficient Appliances



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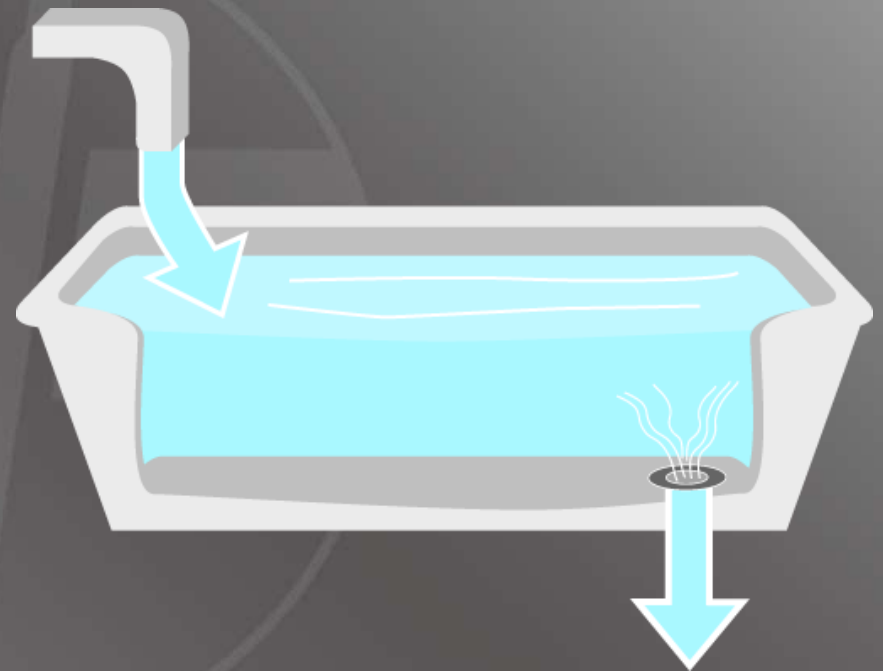


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# Continuous Power Operations

- Cultural Challenge
- Balancing Inputs and Outputs
- Calculating and Using Power “Budgets”
- Hybrid Systems Bridge the Gap
- Efficiency Trends



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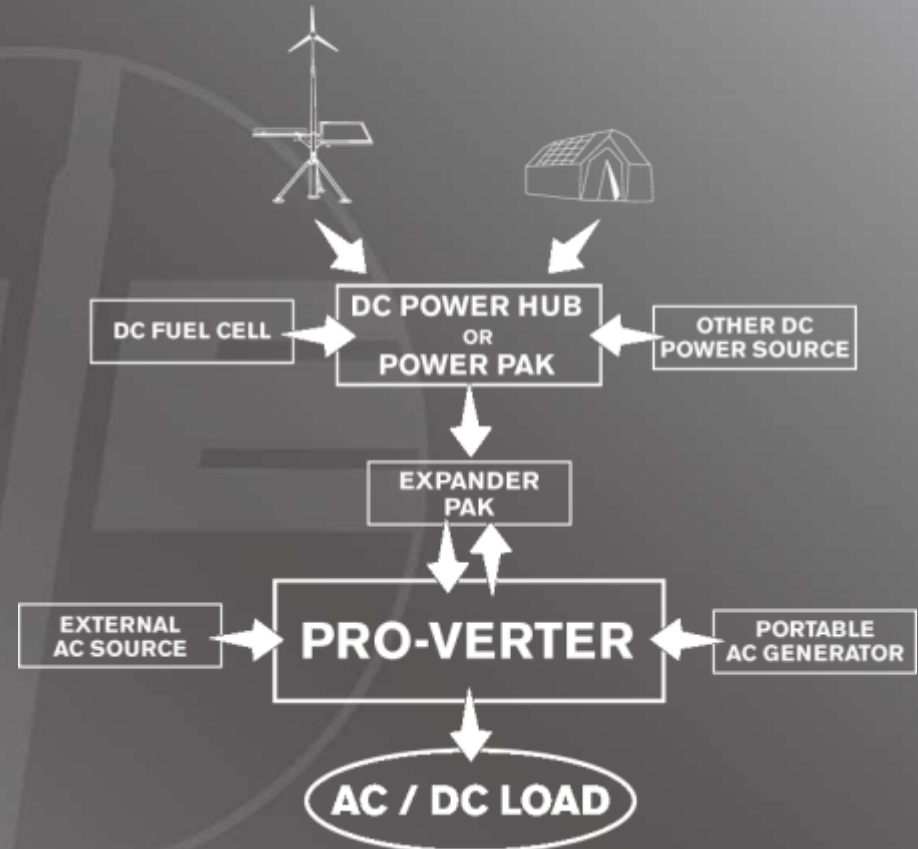
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# Hybrid System Elements

- Renewable Energy Inputs
- Conventional Energy Inputs
- Other Inputs
- Power Management
- Energy Storage
- AC Power Distribution
- DC Power Distribution
- Applications



Small Scale Microgrid

# CRADA with PM-MEP

Objective: To develop a comprehensive, user-friendly technical solution that enables a conventional fuel-powered US Army tactical generator set to operate...with a connected renewable energy (solar and wind) powered generator(s) in ***a seamless, automated fashion*** for the purposes of ***reducing fuel consumption and run time of the conventional generator.***



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# Key Components

- Renewable Energy Systems
- Energy Storage
- 3kW TQG MEP-831A
- Modification Kit
- PRO-Verter 3000 APM AGS



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# PRO-VERTER 3000 APM AGS



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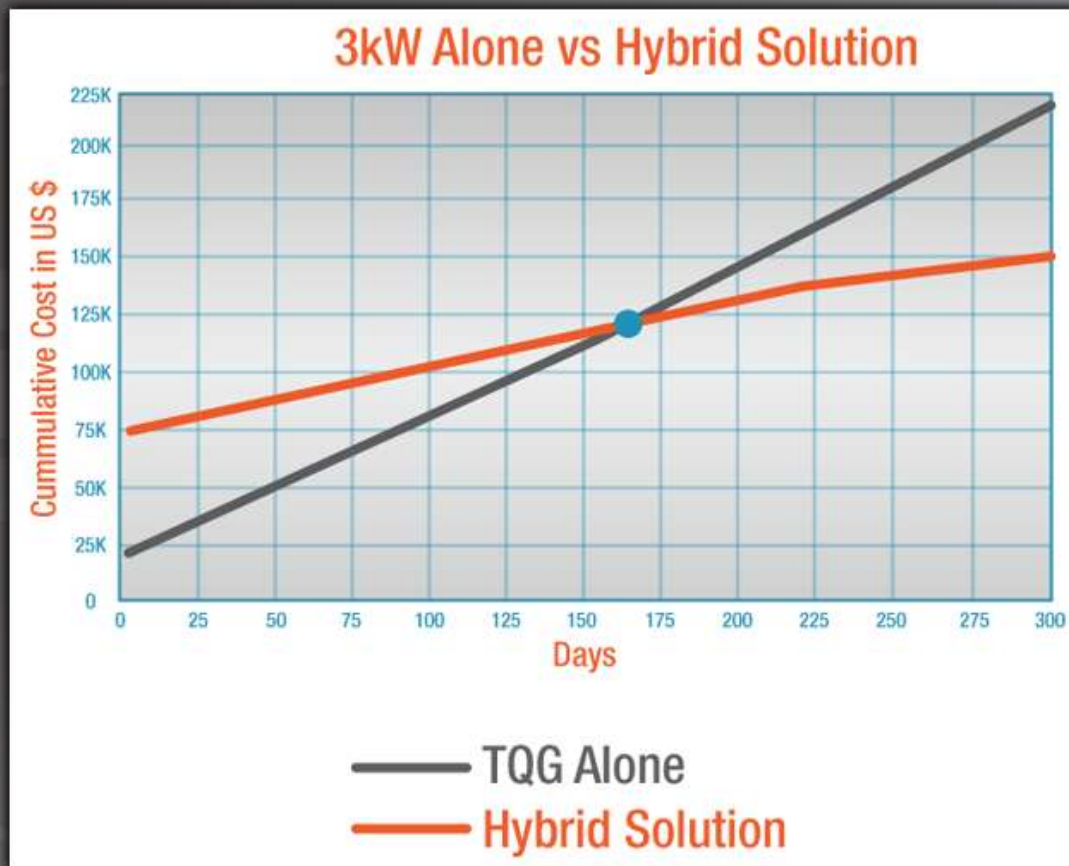
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# Return on Investment

- Run-time Reductions
  - 50-60%
- Fuel Savings
- Maintenance
- ROI Period



# Conclusion

- Hybrid System Contributions
- Microgrids Available to Small/Remote Units



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# Q & A



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GSA Schedule Contract # GS-07F-0079V



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