PCS-SEL ENERGY BATTERY REPLACEMENT SYSTEM

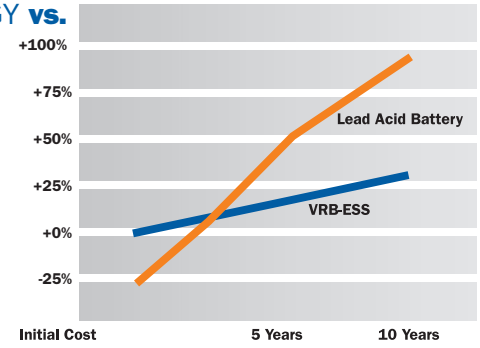
The 5-kW PCS-SEL Energy Storage System is an environmentally friendly, long-life, virtually maintenance-free storage system designed to replace conventional lead acid battery systems. The PCS-SEL addresses the problems of traditional lead acid battery systems such as short lifetimes, maintenance requirements, and recycling costs.

The standard 5-kW PCS-SEL Energy Storage System can be extended to provide longer storage durations at very low incremental costs through the addition of electrolyte, meeting utility backup requirements of 24 hours or longer.

The PCS-SEL Energy Storage System provides multiple simultaneous DC outputs without electronic conversion for telecommunication applications and can also be integrated with AC systems with the addition of an inverter.

Applications: Remote Area Power Systems/wind/diesel/solar combinations, cellular radio towers, utility systems.

PCS-SEL ENERGY vs. Traditional Lead Acid Batteries



Cost/Benefit Comparison

	VRB-ESS	Lead Acid
Current Output	5kW (112A) x 4 hours	112A x 4 hours
Output Voltage Range (VDC)	42-56	42-60
Approx. Dimensions (W x D x H, in.)	34 x 86 x 80	32 x 30 x 90
Approx. Weight (Full, lbs.)	7,000	2600
Thermal (Stg/Opg, ˚F)	32-100/32-100	32-100/32-100
Approx. DC-DC Efficiency, round trip	75%	45%*
Performance vs. Temp.	Flat response over temp. range	IEEE/ANSI and manufacturers derating
Containment	Double containment of electrolyte storage	Cabinet drip tray
Lifetime (discharge cycles)	10,000+	1500
Depth of Discharge	From full to 20% state of charge	From full to 80% state of charge**
Recharge Time	4 hours (optional 1:1 charge/discharge ratio)	20 hours (5:1 charge/discharge ratio)
Speed of response	1 ms	1 ms
Overload capability	2x nominal rating	1.25x nominal rating
Maintenance	Annual inspection if desired	At least 4 times per year

* "A Study of Lead-Acid Battery Efficiency Near Top-of-Charge and the Impact on PV System Design," John W. Stevens and Garth P. Corey, Sandia National Laboratories, 1996 IEEE Photovoltaic Specialists Conference

** deeper discharges reduce life exponentially

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