Computing Without Boundaries: San Diego Supercomputer Center Replaces Lead Acid Batteries With Sustainable Alternative

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Founded in 1985, the San Diego Supercomputer Center (SDSC) is an international leader in high-performance and data-intensive computing. It hosts the research computing loads for the local University of California San Diego campus, other UC campuses, and several research collaborators.

These customers rely on various backup power options including a backup generator, a lead-acid battery coupled with an inverter (known as Uninterruptible Power Supply or UPS), or street power. The UPS provided most of the power for the supercomputer's backup generator, allowing 15 minutes of coverage - long enough for the generator to switch on in an outage.

As SDSC grew, it added more customers who desired backup power. However, due to California's emissions constraints, SDSC could not add more diesel-based generators to expand its capacity. SDSC began evaluating potential alternative solutions, exploring many lithium options. Only Urban Electric Power's zinc manganese-dioxide battery presented a unique solution, offering a safe option that can go indoors and be a drop-in replacement with the existing lead-acid inverter. Coupling the battery with the existing inverter creates an instantaneous UPS that can last for 2 hours without the need for a generator. Urban Electric Power's ZnMn cells also meet their stringent safety requirements and offer dramatically lower emissions and a longer backup power duration, all at a lower cost than lead-acid or lithium alternatives.

SDSC is the World's First Enterprise Application of this Innovative Rechargeable Battery Technology

UEP's batteries use zinc manganese-dioxide cells, much like common household batteries. In addition to being safe to produce, handle, and recycle, these batteries are rechargeable for up to 10 years and cost less than half of comparable lithium-ion batteries. The technology has been UL-certified as fire-safe because it is not subject to the thermal runaway risk of lithium-ion batteries.

Contact us. **ALCHEMY INDUSTRIAL** | 6501 Navigation Blvd., Suite# E1 | Houston, TX 77011 | 832 699 7078 | mk@alchemyindustrial.com

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So far, 20,000 pounds of lead acid batteries at SDSC have already been replaced by UEP's higher performing batteries, providing 8x battery backup power (15 min in lead to 2 hours in zinc). When challenged, the system responded within milliseconds to effectively meet the building power requirements. A phase 2 installation is currently underway, taking the place of an additional lead-acid UPS system as it reaches its end of life and adding another 500kW/1,000kWh (2 hours) backup to displace the existing lead backup system.

8X BATTERY BACKUP POWER
15 min in lead to 2 hours in zinc

SYSTEM RESPONSE TIME
within milliseconds to effectively meet the building power requirements

PHASE 2 INSTALLATION
adds another 500kW/1,000kWh (2 hours) backup to displace the existing lead backup system

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The Proof is in the Power.

Transforming the SDSC Data Center's Model for Resiliency

Reducing Emissions
UEP's ZnMn batteries produce zero emissions compared to diesel generators.

Increasing Power Backup Time
Lead-acid batteries provided 15 minutes of power backup time; UEP's solution offers 2 hours.

Saving Money
UEP's rechargeable alkaline batteries cost less than half of comparable lithium-ion batteries.

2HR DISCHARGE		
DIESEL GENERATORS	ALCHEMY UEP BATTERY SYSTEM *Phase 1*	ALCHEMY UEP BATTERY SYSTEM *Phase 2*
EMMISIONS **1.2k – 1.9k** kg CO2/wh	EMMISIONS **0** kg CO2/wh	EMMISIONS **0** kg CO2/wh
DISPLACED EMMISION RANGE –	DISPLACED EMMISION RANGE **1.2k – 1.9k** kg CO2/wh	DISPLACED EMMISION RANGE **2.4k – 3.8k** kg CO2/wh

URBAN ELECTRIC POWER

ZnMn Batteries Drive Value

Alchemy has partnered with Urban Electric Power (UEP) to bring patented ZnMn battery technology to the C&I market

US-centric Supply Chain
Technology is made in the USA, reducing scope 2 emissions and lowering supply chain risks. Qualifies for several incentives in the Inflation Reduction Act.

Sustainable
Battery chemistry has a lower carbon footprint than lithium, lead, or bromine. Zinc and Manganese are abundant – 140 times more zinc than lithium is mined in the world today. 100% recyclable, leveraging existing recycling supply chains for end-of-life cells.

Safe
Battery chemistry is inherently thermally stable, fire safe and fully non-toxic, exhibiting no thermal runaway – the safest battery technology option.

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