FY 2024 1st Quarter Energy Solutions Business Description

Friday, August 9, 2024 Musashi Energy Solutions Co., Ltd.

GO FAR BEYOND

Purpose





Mr. Mattias Jansson, Vice President of Power Solutions at flex

"Our collaboration with Musashi is central to developing **our innovative CESS solutions to sustainably support the complex power demands of AI data centers worldwide**," said Mattias Jansson, Vice President of Power Solutions at Flex.

"Together with Musashi, our technology and innovation portfolio plans enable Flex to provide hyperscale operators with advanced energy storage systems that enable them to address long-term energy transitions. Our CESS solutions are another proof point of how Flex is enabling customers to maximize AI server cluster computing performance and unlock data center capacity as AI applications drive unprecedented growth."



Creating a Sustainable Next-Generation Social System

CONTENT

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Mission

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DX Datacenter



GX Commercial Mobility



Optimizing the energy efficiency of next-generation social infrastructure

What is a hybrid supercapacitor?



High-power and long-life safe storage device

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HSC Market





Hybrid Super Capacitor

•Peak Cut

- •Back Up
- Power Bridge (assist/regeneration)



1.30 seconds or less 2. High power 3. Rapid charge/discharge 4. Long life

Marketing initiatives

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Market	FY2020	FY2021	FY2022	FY2023	
	СН	JP/EU	US	US/EU	
Application			<i>H HHRH HHH</i> <i>BHB HHHH</i> <i>HH HHHH</i> <i>HH HHH</i> <i>HH HHH</i> <i>HH HHH</i>		
	CV Auxiliary Power Tram Main Power	EV Auxiliary Power FC Tractor Auxiliary Power	Datacenter UPS ESS	Datacenter Peak Cut Commercial vehicle Powertrain	
Changes	Covid19	EU sales structure	North America sales Development structure	Generative AI Mitsubishi Electric	
flex。	Server Peak Cutting Applications Generation 1 HSC Research/Evaluation		AI Server Peak Cutting Applications Generation 3 HSC Research/Evaluation		

Tipping Point: US+ Data Center + Generative AI

HSC Solutions





Problems in AI data centers

See: POLCA: Power Oversubscription in LLM Cloud Providers

20

Time (s)

40

(b) 325W cap per GPU. (c) 1.1GHz SM clock.

LLM* large language model learning LLM large language model inference 1.1GHz --- No cap 325W cap Flan-T5 RoBERTa **GPT-NeoX** Normalized Power 0.0 Normalized Power 0.0 Normalized Power 0.0 Normalized Power 0.75 0.50 0.25 TDP

20

10

10

Time (s)

10

Time (s)

If the GPU performance is not controlled, peak power will be exceeded, leading to frequent system shutdowns. By limiting the power supply and frequency, GPU performance can be suppressed by up to 20-30%.

0

20

Time (s)

(a) No cap.

40

Eliminating losses caused by the cyclical peak power specific to generative AI

TDP

40

20

Time (s)

n





Time (s)

LLM* Large Language Models



"According to the many discussions he had with various colleagues, very few people were aware of this LLM-specific peak power phenomenon."

- Only the high technical level of Hyperscaler Company A and Company B was aware of this phenomenon and what it means for the large-scale deployment of AI training clusters.
- Peak power spike cycles are common to all AI LLM platforms, not just the AI LLM deployed by Hyperscaler Company A.
- This means that Company B, Company C, Company D, and others are experiencing the same phenomenon. The difference lies in the duration of the peak power and the time between peaks.peaks.

"As next-generation GPUs are deployed on a larger scale, this issue will become apparent and pronounced"

-The reason this issue is not well understood at present is that AI LLM training clusters are currently relatively small and occupy only a portion of the data center. -When peak power rises consistently and rapidly, it causes significant problems for the power supply from the utility company and all devices within the power path. -Peter mentioned that there was a UPS failure in Company E's AI training cluster, and tracing the cause pointed to the rapid rise and continuous cycling of power.





Peter Gross

Opinion Leader in Digital Infrastructure He has published numerous technical papers in the field, authored several patents, and frequently speaks at international events. 2010 Data Center Dynamics Award for Outstanding Contribution to Industry. IEEE Senior Member. 2020 Award for Outstanding Contribution to the Digital Infrastructure Community and inducted into the Infrastructure Mason Hall of Fame.

Needs: Innovative AI Power Supply Solutions

CESS AI Power Solution

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Category	Solutions	Competitive advantage	Customer Value * Based on in-house research				
			Reduction effect of power infrastructure investment	Energy cost reduction effect	Running cost Reduction effect	Asset efficiency Improvement effect	CO ₂ Reduction effect
■AI server	Peak Cut	kW/L Life Cycle Safety	10-20%	5-15%	10-15%	10-25%	5-20%



1.Power Supply System Optimization 2. Maximize GPU Performance

Musashi's way to win

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AI Power Supply - Best Solutions

Business Model





AI Server Key Device ⇒ **Defacto Standard**

AI Power Solution Roadmap



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Business Growth Roadmap



Creating Musashi's New Growth and Earning Power

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