China International Vanadium Flow Battery Forum 2025 Successfully Concluded

On December 11-12, 2025, the China International Vanadium Flow Battery Forum 2025 was successfully held in Hefei, Anhui Province. The forum was jointly organized by ASIACHEM Consulting, Shanghai Electric Energy Storage Technology Co., Ltd., and the Anhui New Energy Storage Industry Innovation Alliance, co-organized by the Anhui Association of Automation, and supported by Vanitec.

Forum Venue

This conference gathered experts and scholars from various fields of the vanadium redox flow battery (VRFB) industry chain. Focusing on the latest industry developments, participants discussed topics including global VRFB technology and applications, electrolyte preparation and cost control, stack technology and energy storage system optimization,

and the development and outlook of the VRFB industry. Experts fully exchanged views on technological breakthroughs, cost optimization, and industrial upgrading paths for VRFBs. Representatives from numerous enterprises and institutions across industry and academia attended, contributing insights for the industry's development.

Mr. Xia Lei, General Manager and Chief Industry Researcher of ASIACHEM Consulting, served as the forum host.

Xia Lei, General Manager and Chief Industry Researcher, ASIACHEM Consulting

Ms. Yang Linlin, General Manager and Chief Engineer of Shanghai Electric Energy Storage Technology Co., Ltd., delivered the opening speech as a representative of the co-organizer.

Yang Linlin, General Manager and Chief Engineer, Shanghai Electric Energy Storage Technology Co., Ltd.

Professor Zhang Huamin, Chief Researcher at the Dalian Institute of Chemical Physics, Chinese Academy of Sciences, presented a report titled "Development Status and Challenges of Flow Battery Energy Storage Technology." He introduced the types, characteristics, and current status of flow battery technologies, conducted an economic analysis of the full lifecycle of VRFBs, shared thoughts and methods for reducing flow battery costs, and discussed the industrialization status and challenges. He proposed three pathways to reduce the cost of flow battery energy storage systems: 1) Battery material technology innovation, including innovations in battery materials, stack structure, and improving electrolyte utilization; 2) Stack structure innovation, including developing high-power density (high rated current density) stacks with high electrolyte utilization, and stacks with high sealing and insulation

properties; 3) Business model innovation, leveraging the financial attributes of electrolytes and implementing electrolyte leasing.

Zhang Huamin, Chief Researcher, Dalian Institute of Chemical Physics, Chinese Academy of Sciences

Ms. Yu Huijuan, General Manager Assistant of Shanghai Electric Energy Storage Technology Co., Ltd., presented a report titled "Long-Duration Energy Storage Technology and Applications under the New Power System." She introduced energy storage technologies in the new power market and shared application cases from Shanghai Electric. With over a decade of dedication to VRFB technology, Shanghai Electric Energy Storage possesses capabilities in modular design, manufacturing, and delivery of series stacks, electrolytes, and systems. Currently, the company has an annual stack production capacity of 500MW and a system production capacity of 5.0GWh. Additionally, the company is actively developing new systems like vanadium-iron flow batteries, with

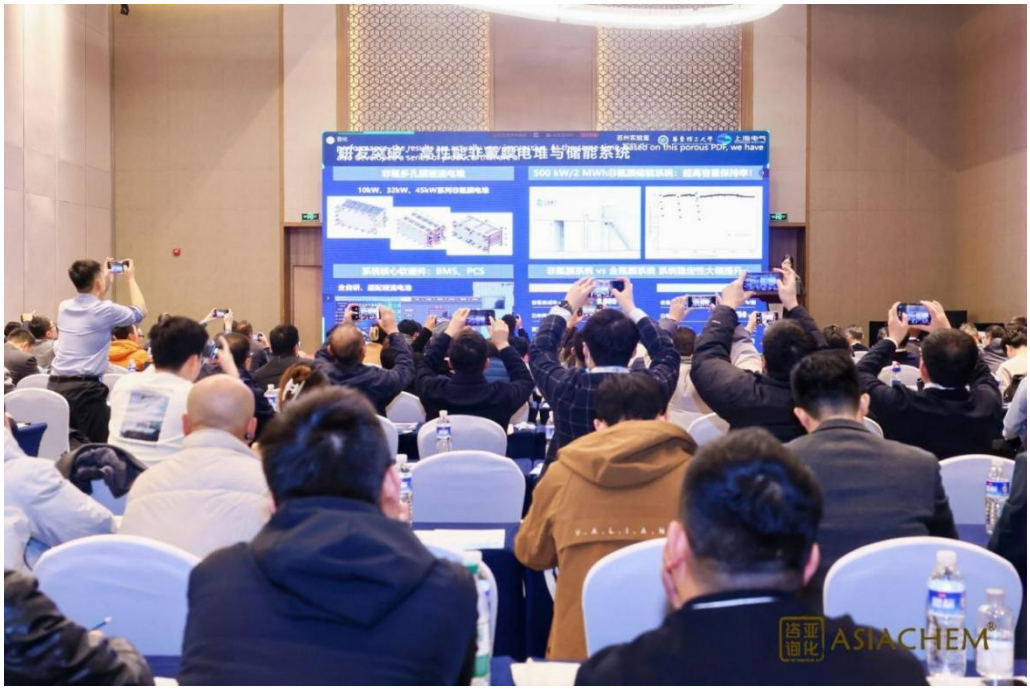
its self-developed vanadium-iron electrolyte achieving a 40% cost reduction.

Yu Huijuan, General Manager Assistant, Shanghai Electric Energy Storage Technology Co., Ltd.

At the forum, Shanghai Electric Energy Storage Technology Co., Ltd. launched two core new products: a high-performance non-fluorinated membrane stack and an intelligent control system.

The high-performance non-fluorinated membrane stack, developed in collaboration with Suzhou Laboratory and East China University of Science and Technology, passed third-party product testing by Shanghai National Center of Testing and Inspection for Electric Cable and Wire Co., Ltd., achieving EE, CE, and VE of 82.8%, 99.0%, and 83.7% respectively at a rated power of 45kW. As the core power unit for commercial energy storage systems, this non-fluorinated porous membrane flow battery

stack breaks traditional technical bottlenecks, solving issues of membrane material incompatibility and capacity decay, achieving less than 1% decay over 8000 hours. Relying on domestic processes and raw materials, membrane cost is significantly reduced. It adapts to multiple technical routes and storage scenarios, providing a cost-effective solution for large-scale energy storage.



Shanghai Electric Energy Storage Technology Co., Ltd. Launches High-Performance Non-Fluorinated Membrane Stack

The Flow Battery Intelligent Management Control System (3S System) developed by Shanghai Electric Energy Storage Technology Co., Ltd. establishes a "decision-execution-perception" closed loop, ensuring the system operates optimally within safe boundaries. Using EMS as the intelligent brain for top-level strategy and overall optimization, PCS as the executor for efficient energy conversion, and BMS as the guardian for battery health, the 3S system enables intelligent, coordinated, and

integrated dispatch of various energy storage systems. This achieves optimal configuration for safety, economy, and efficiency, making it widely applicable across diverse energy storage scenarios.

Shanghai Electric Energy Storage Technology Co., Ltd. Launches Intelligent Control System Solution

Mr. Terry Perles, Vice Chairman of Vanitec and President of TTP Squared, Inc., presented a report titled "Outlook of the International Vanadium Redox Flow Battery Industry." He discussed global vanadium production and consumption, and market forecasts. He noted that the surge in vanadium demand for energy storage urgently requires expanded supply, but suppliers outside China struggle to survive due to vanadium prices being near 25-year lows. Approximately 30,000 tons of "excess" inventory needs to be depleted before prices can recover. A key issue is whether the vanadium supply system can respond quickly and cost-effectively to battery industry growth. As vanadium accounts for

about 50% of flow battery system costs, price fluctuations will critically impact market prospects.

Terry Perles, Vice Chairman, Vanitec; President, TTP Squared, Inc.

Mr. Tanaka Toshiro, Director of LE SYSTEM Co., Ltd., presented a report titled "Current Status of Japan's Grid-Scale Energy Storage Market and Commercial Opportunities for VRFB." He introduced Japan's grid-scale storage market, commercial opportunities for VRFBs in Japan, and company overview. He stated that Japan's electricity market has an urgent need for "power regulation capacity" provided by system storage facilities, with increasing operators participating. Meanwhile, policy measures to reduce operator entry risks are highly anticipated. The LTDA policy, focusing on "long-term assurance of decarbonized power supply" and "reducing operator entry risk," aligns perfectly with VRFB technical characteristics, suggesting significant potential for VRFB market expansion in Japan.

Tanaka Toshiro, Director, LE SYSTEM Co., Ltd.

Ms. Liu Shengnan, CEO of Chengde Xinxin Vanadium Titanium Energy Storage Technology Co., Ltd., presented a report titled "Progress on Overseas Exports of VRFB." She discussed the overseas energy storage market size and opportunities for China's energy storage industry globally. She believes China's energy storage industry holds advantages for global expansion in technology, supply chain, and application scenarios. However, companies face challenges in market selection, team building, localized operations, and brand building. A systematic approach combining industrial advantages and market strategy is needed to advance global expansion while addressing external challenges like standardization, tariffs, and competition. The company possesses an annual production line for 33,000 m^3 of high-purity vanadium electrolyte and 300,000 m^2 of VRFB-specific proton exchange membranes. It has manufacturing technologies for stack series of 15kW, 20kW, 45kW, 75kW, and 100kW, along with proprietary technologies for core material

preparation, stack structure, and assembly, plus demonstration experience in system integration, PV coupling, and smart grids.

Liu Shengnan, CEO, Chengde Xinxin Vanadium Titanium Energy Storage Technology Co., Ltd.

Professor Maria Skyllas-Kazacos, inventor of VRFB technology from the University of New South Wales, Australia, joined via video link to share developments in Australia's VRFB sector. VRFBs are seen as an ideal lithium battery alternative for long-duration storage, and Australia holds the world's richest vanadium resources, primarily in Western Australia and Queensland. Multiple electrolyte production projects are already operational locally, with an increasingly complete industrial layout. For example, Australian Vanadium Limited in WA started a 35 MWh/year electrolyte plant in 2024, and Vecco Group in Queensland built a 30 MWh/year production line in Townsville in 2023.

Professor Maria from UNSW Shares Australia's VRFB Development via Video Link

Professor Maria then participated fully in a panel discussion titled "Outlook of the International VRFB Industry" via video link. The panel brought together authoritative guests from industry, academia, and research, including: Professor Zhang Huamin (DICP, CAS), Ms. Yang Linlin (Shanghai Electric Energy Storage), Ms. Liu Shengnan (Chengde Xinxin Vanadium Titanium), Mr. Tanaka Toshiro (LE SYSTEM), and Mr. Terry Perles (Vanitec/TTP Squared). Experts engaged in in-depth and constructive exchanges on technological development, market challenges, and industrial cooperation.

Panel Discussion

Mr. Li Bin, Deputy General Manager of Anhui Conch Ronghua Energy Storage Technology Co., Ltd., presented a report titled "New Momentum under Carbon Neutrality: VRFB Technology Development and Industrial & Commercial Applications." He introduced energy storage and its application scenarios, market and policy landscape, VRFB technology, and company/products. He summarized major technical bottlenecks and improvement directions for flow batteries: key components like membranes rely on imports and are costly; carbon felt electrodes lack sufficient activity; bipolar plates face conductivity vs. brittleness trade-offs; electrolyte energy density is low; electrolyte pumps have poor corrosion resistance; system integration lacks standardization. Improvement directions include R&D for non-fluorinated membranes, optimized electrode structures, development of gradient composite materials, enhanced electrolyte performance, and promoting system standardization and modularization. Conch Ronghua's VRFB Energy

Storage Technology Industrial Park in Wuhu has an annual production capacity of 300MW/1GWh.

Li Bin, Deputy General Manager, Anhui Conch Ronghua Energy Storage Technology Co., Ltd.

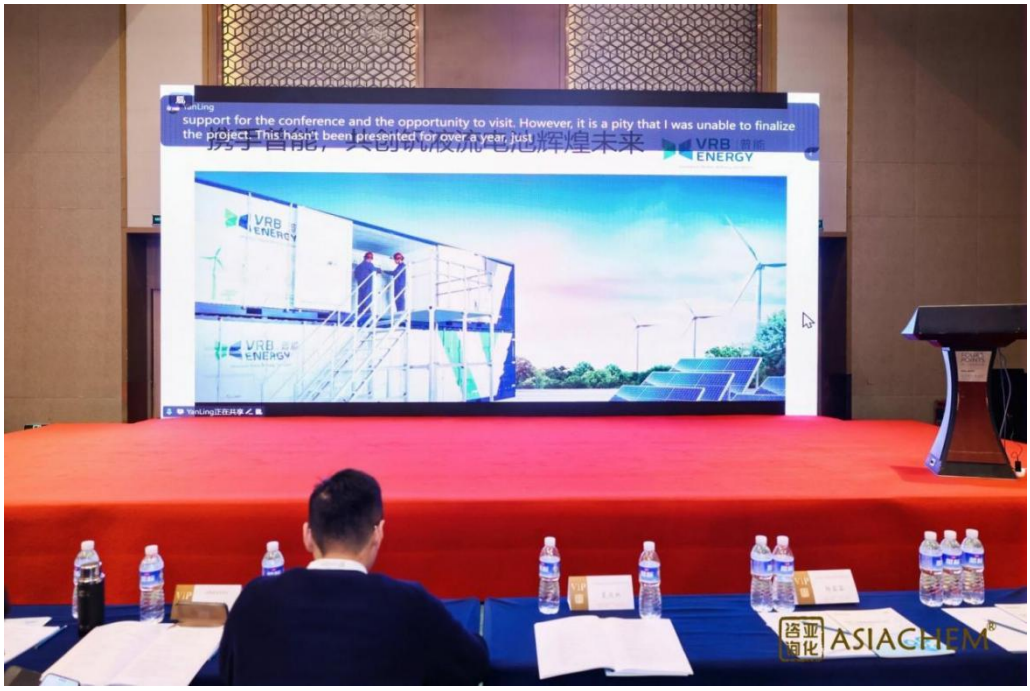
Mr. Zhang Jiale, General Manager of Shanxi Green Energy Storage Technology Co., Ltd., presented a report titled "Exploration and Practice of Commercial Cost Reduction Paths for VRFBs." He discussed opportunities and challenges in long-duration storage, technical bottlenecks and cost reduction paths, and company overview. He identified three main future directions for VRFB technology: 1) Material innovation, such as reducing electrolyte cost and developing low-cost ion exchange membranes; 2) System optimization, such as utilizing hybrid storage (lithium + flow) for a "1+1>2" effect; 3) Intelligent management, such as AI predictive maintenance to enhance system efficiency. Green Energy Storage has built three fully automated proton exchange

membrane production lines with an annual capacity exceeding 1.4 million square meters. The company has completed installation and debugging of a fully automated stack production line with an annual capacity of 450MW.

Zhang Jiale, General Manager, Shanxi Green Energy Storage Technology Co., Ltd.

Mr. Zhao Yanling, Deputy General Manager of Beijing Prudent Energy Technology Co., Ltd., presented a report titled "Join Hands with Prudent to Create a Brilliant Future for VRFBs." He introduced the company's development history and main products. The company's self-developed third-generation megawatt-level VRFB energy storage system (Gen3 VRB MW ESS°) passed authoritative testing and UL 1973 international safety certification, making it the only product with dual domestic and international certification in China. With a global footprint, the company has delivered 70 energy storage projects across 12 countries, totaling nearly 500 MWh and operating over 1 million hours. It has established a

1 GW stack production line, a 750 MW system integration line, and a 3 GWh electrolyte factory, with an annual delivery capacity of 750 MW/3 GWh. He emphasized that industry development requires both improving battery performance and reducing cost through materials and processes, and ensuring long-term reliability, maintenance efficiency, and system stability from the user's perspective.



Zhao Yanling, Deputy General Manager, Beijing Prudent Energy Technology Co., Ltd., Shares Report via Video Link

Mr. Yang Dawei, Chairman and General Manager of Suzhou Thinkre New Material Co., Ltd., presented a report titled "Industrialization Pain Points and Thinkre's Solutions for Ion Exchange Membranes in Flow Batteries." He discussed industry background, products and applications, capacity and planning, R&D and innovation. The company has a perfluorosulfonic acid resin base in Fujian and dual proton exchange membrane bases in Huaian and Suzhou, with planned capacity of 5 million square meters. It

has built seven mass production lines; a 150-ton/year resin and 1.5 million sqm/year membrane line is fully operational. By December 2026, resin capacity will increase to 500 tons/year, supplying membranes for approximately 7-8 GW/year of flow batteries. In response to Europe's PFAS ban, Thinkre has adopted new polymerization processes and green formulations.

Yang Dawei, Chairman and General Manager, Suzhou Thinkre New Material Co., Ltd.

Anhui Chaohu Economic Development Zone presented its investment environment. It introduced the zone's overview, leading industries, and investment advantages. As one of Hefei's four directly administered development zones and a core area for Hefei's eastern development and the Hefei-Wuhu industrial corridor, Chaohu EDZ focuses on flow battery energy storage, power batteries, PV cells, and modules in the new energy sector. It has initially built a complete industry chain covering cathode materials, separators, structural components, and cells,

attracting leading enterprises like Shanghai Electric, YOUNGY Co., Ltd., and DAH Solar. The zone supports Shanghai Electric to scale up and become a top-tier competitive enterprise, collaborates with companies to cultivate and attract the industrial chain, and aims to achieve local supply in areas like ion membranes, graphite felts, bipolar plates, and inverters, forming a flow battery energy storage industry cluster base.

Anhui Chaohu Economic Development Zone Presents Investment Environment

Mr. Wu Xingming, Vice President of Zhejiang Stars New Energy Technology Co., Ltd., presented a report titled "Development Path of VRFB Energy Storage from an Operational Perspective." He discussed industry status, company overview, and Stars' Tradable Smart Hybrid Storage Power Station. Stars' 42kW and 62.5kW stacks passed third-party authoritative testing, with the 42kW stack achieving an energy efficiency of 83.42% at a current density of 160mA/cm². The Tradable Smart Hybrid Storage Power Station explores the commercial

value of independent storage, innovates operational models to unlock asset potential, and establishes diversified revenue channels, transforming from a "cost project" passively meeting grid requirements into a "value asset" actively generating income. By combining two or more storage technologies, complementary advantages can be achieved, offering an alternative path to high performance, long lifespan, and low cost.

Wu Xingming, Vice President, Zhejiang Stars New Energy Technology Co., Ltd.

Ms. Xia Qinglin, R&D Department Manager of Big Pawer Energy Storage Technology Hubei Co., Ltd., presented a report titled "Industrialization Opportunities and Challenges of Vanadium Battery Electrolyte." She discussed long-duration storage development, the value of VRFBs and vanadium electrolyte, electrolyte opportunities and challenges, and Big Pawer's industrialization introduction. She proposed that building a full lifecycle closed-loop economic system for vanadium electrolyte

(manufacturing-use-regeneration-recycling) is the core path to solving vanadium resource supply bottlenecks, reducing costs across the industrial chain, and enhancing VRFB industry sustainability. Vanadium electrolyte development faces challenges like long-term overcapacity, high dependence on system manufacturers, inconsistent performance, and immature recycling technologies. She suggested accelerating iterative process technology improvements, fostering industry-academia-research collaboration to develop functional vanadium electrolytes; building a full industry chain from "vanadium resource development - electrolyte - stack manufacturing - system integration - end application"; establishing efficient, low-cost electrolyte recycling and regeneration systems; and noted that electrolyte "leasing + recycling" may become a mainstream business model.

Xia Qinglin, R&D Department Manager, Big Pawer Energy Storage Technology Hubei Co., Ltd.

Associate Professor Li Xin from Hefei University of Technology presented a report titled "Sensing and Control for VRFB Energy Storage." He discussed battery systems, control systems, and future trends. He noted that VRFB sensors have significant defects, battery control logic is imperfect, and system dispatch levels are not high. VRFB systems require a variety of complex sensors involving both analog and digital signals, necessitating proper sensor selection, adaptation, and interface coordination. Their EMS+BMS bidirectional interactive control system can achieve full time-scale and full parameter coverage for diverse application scenarios.

Li Xin, Associate Professor, Hefei University of Technology

Mr. Wang Hongbo, Manager of the Smart Energy Department, China Energy Engineering Group Anhui Electric Power Design Institute Co., Ltd., presented a report titled "Analysis of Anhui Province's Industrial & Commercial Energy Storage Policies and Integrated PV-Storage

Development Ideas." He discussed policy trends for industrial & commercial storage in Anhui, main revenue sources and business models, electricity pricing policies and charge/discharge strategies, and integrated PV-Storage development ideas. Main revenue sources include peak-valley arbitrage, demand management, demand-side response, and PV-Storage integration. Main business models include self-investment, Energy Performance Contracting (EPC), financial leasing, and virtual power plants/load aggregators. Distributed PV in Anhui faces challenges like integration difficulties and grid pressure, and is being promoted through PV-Storage coordination and increasing self-consumption ratios.

Wang Hongbo, Manager, Smart Energy Department, China Energy Engineering Group Anhui Electric Power Design Institute Co., Ltd.

On December 12, the ASIACHEM China International VRFB Forum delegation visited Shanghai Electric Energy Storage Technology Co., Ltd.'s Chaohu production base, showcasing the company's core technological

achievements and large-scale production capacity. Shanghai Electric Energy Storage focuses on independent R&D, manufacturing, and sales of key materials, stacks, and system integration for flow battery energy storage products, with its leading products and core technologies holding a leading position domestically.

With this, the China International Vanadium Flow Battery Forum 2025, organized by ASIACHEM Consulting, concluded successfully. We look forward to the vigorous development of the VRFB industry and to meeting everyone again in the future!

Forum Venue