

Our Mission

Weltrus mission is to revolutionize the energy storage industry by pioneering advancements in vanadium redox flow battery technology.

Our vision extends beyond mere production; we strive to lead the world towards a sustainable energy future by developing and providing safe, efficient, and long-lasting energy storage solutions. We are committed to continual research and development, ensuring our products not only meet but exceed global standards of performance and sustainability.

Our team, consisting of industry experts, is dedicated to creating energy storage solutions that are not only technologically advanced but also environmentally responsible, thereby contributing to a cleaner, greener planet. As we navigate the complexities of the renewable energy landscape, our goal remains steadfast: to be the driving force behind the transition to renewable energy, making reliable and sustainable energy storage accessible to all, and playing a pivotal role in global energy security.

In doing so, we aim to empower communities, support the growth of renewable energy infrastructure, and inspire a new era of energy innovation.

Welcome to Weltrus

Pioneering VRB Energy Storage Solutions Since 1995



Established in 1992, Group company boasts a core team been immersed in Vanadium Redox Flow Battery (VRB) research since 1995.

As one of the initial global entrants in vanadium liquid flow and membrane R&D, we stand at the forefront of VRB energy storage innovation.

With a commitment to excellence, Weltrus strives to become a world-leading service provider in the energy storage industry, and is quickly gaining recognition as an influential force in the sector

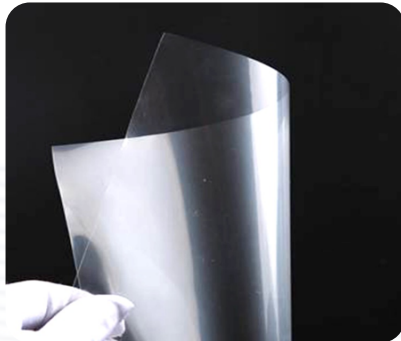
R&D and Production Capabilities State-of-the-art in Flow Battery Solutions



Vertical Integration

Comprehensive Solution and Technical Excellence

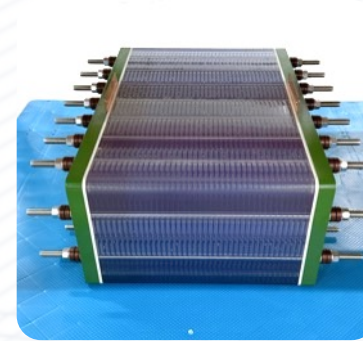
Weltrus proudly serves a global customer base, specializing in the development of a wide range of advanced components for flow battery and fuel cell systems. Our focus lies in crafting high-end ion membranes, electrolytes with a broad thermal range, and integrated Battery Energy Storage Systems (BESS) tailored for diverse applications. This commitment positions us at the forefront of delivering innovative and efficient energy storage solutions worldwide.



Proprietary Perfluorosulfonic acid (PFSA) proton exchange membranes (PEM)



Mixed-Acid Expansive Thermal Range Electrolytes
(0 to 45 °C w/o heat exchanger)



Lifetime leak-proof
High-efficiency
VRB stack (5-32kw)



Integrated & Containerized
ESS systems
(5-125 kW/20-500kwh)

Solution and Technical Excellence

Proprietary FX-PEM Membranes

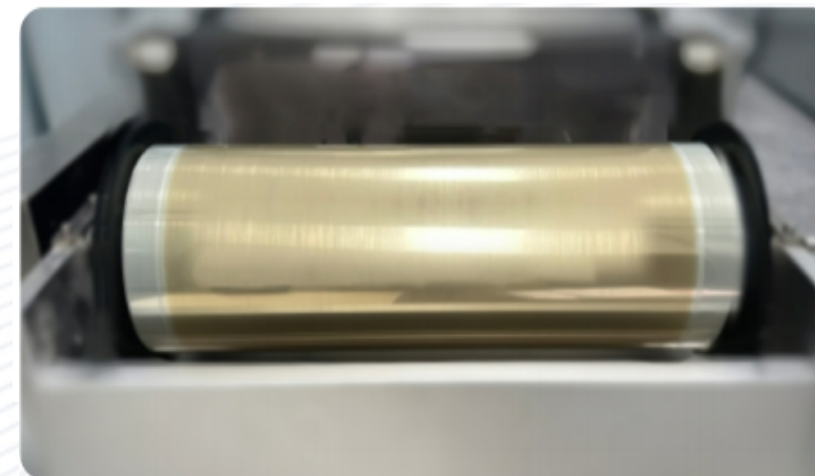
Our proprietary **perfluorosulfonic acid (PFSA) proton exchange membranes** offers industry leading energy conversion efficiency, achieving **over 79% at 200 mA/cm²** and exceeding **83% at 150 mA/cm²**.

With high acid capacity, excellent electrical conductivity, and extended durability. A ideal choice for applications such as **vanadium batteries, flow batteries, fuel cells, ion-exchange membrane electrolyzers, and electrochemical sensors**.

Current **Production capacity is 100,000m²/yr** and expanding to meet the needs of the world's largest VRB manufacturers.

Nominal Thickness / μm	Average Range / $\pm \mu\text{m}$	Water Content %	(25°C) DI Water Swelling Rate / %	Tensile Strength / MPa	Elongation at Break / %	Puncture Strength / gf
50	± 2	5	2.8	32 (isotropic)	178	620
Acid Capacity / meq/g	Sulfonic Acid Resin EW / g/mol	Current Density / mA/cm ²	Coulombic Efficiency / %	Voltage Efficiency / %	Energy Efficiency / %	Lifespan
0.9	1000	160	97	85.5	82.9	> 100,000h

CM-102 Perfluorinated Ion Exchange Membrane



Automated Casting line >100,000m²/yr Capacity

Solution and Technical Excellence

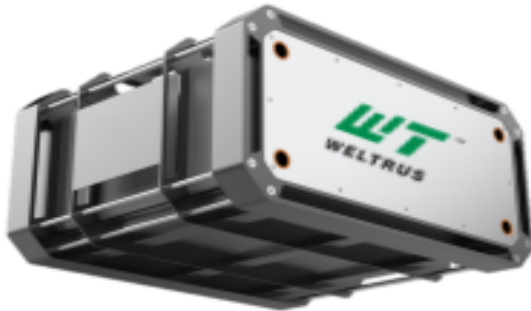
VRB Stacks

VRB Stack

Demonstrating a remarkable **efficiency rate of up to 83%**, our comprehensive VRB stack portfolio **exceeds the performance benchmarks set by leading industry competitors.**

This superior performance is corroborated by international market validation, with a diverse clientele globally spanning from Europe to Oceania.

The latest iteration of our stack design incorporates cutting-edge advancements, **thoroughly resolving leakage concerns throughout the operational lifespan** of the stacks while **significantly augmenting stack efficiency.**



FX-C5K Residential Stack

Rated Power	5kW
Voltage Range	40-60V
Rated Current	105A
Dimensions	750*630*350mm
Weight	130kg / 285lbs
Efficiency	83%
Cycle life (100% DOD)	>20,000

FX-C16K C&I Stack

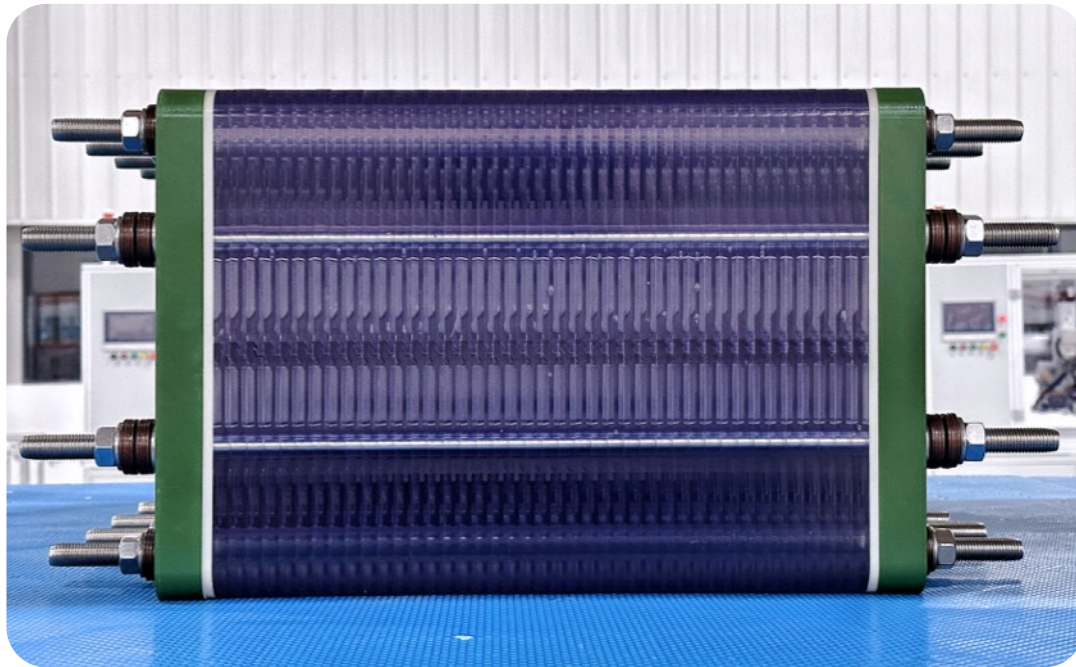
Rated Power	16kW
Voltage Range	48-73V
Rated Current	276A
Dimensions	1200*350*520mm
Weight	220kg / 485lbs
Efficiency	83%
Cycle life (100% DOD)	>20,000

FX-C32K C&I Stack

Rated Power	32kW
Voltage Range	96-146V
Rated Current	276A
Dimensions	1200*530*520mm
Weight	320kg / 705lbs
Efficiency	83%
Cycle life (100% DOD)	>20,000

Solution and Technical Excellence

VRB Stacks



Vanadium Redox Flow Battery (VRB) Stack V1 Series



VRB Stack V2 Series

Solution and Technical Excellence Integrated ESS Systems

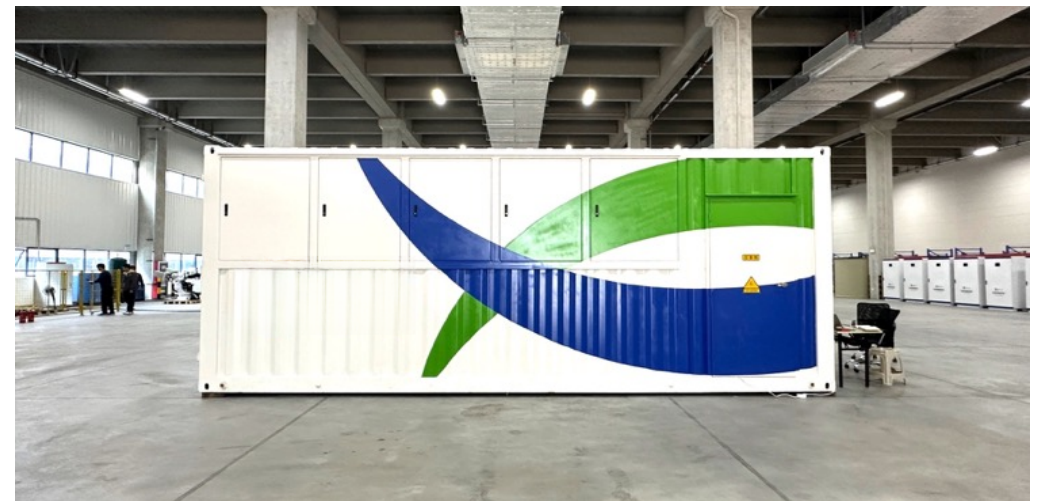
Weltrus ESS systems by Weltrus, a leader in vanadium redox battery BESS systems.

Each system aligns with key international standards for BESS devices, offering unparalleled reliability and versatility.

Our product range spans from compact 5 kW systems to robust 125 kW units with **system level efficiency up to 75%**, each equipped with **standardized 4-hour energy storage capacity**, ranging from 20 kWh to a substantial 500 kWh. This scalability ensures that additional energy requirements can be effortlessly accommodated through our modular add-on options.

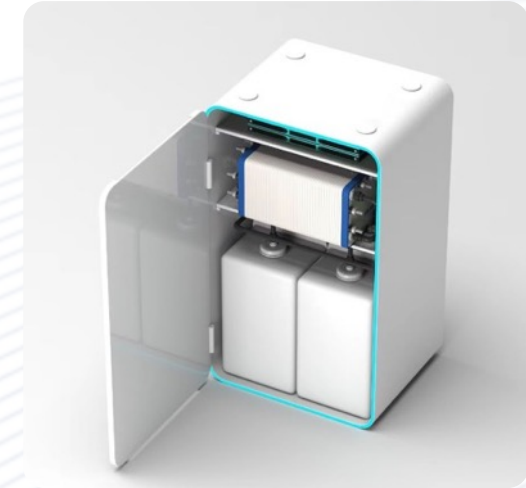


Conventional Setup | Customized Engineering



Containerized Package | 125kw/500kwh 20ft Modular

5kw/10kw/20kw 4 hour+ Scalable System Module for Residential, Small C&I ESS



5kw/10kw/20kw 4 hour+ Scalable System Module for Residential, Small C&I FX-ESS

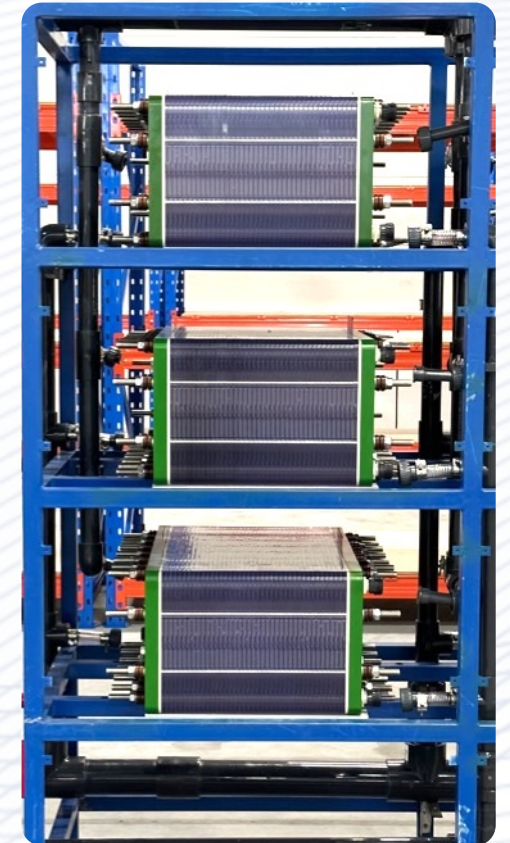
Model	FX-ESS-5kW /20kWh	FX-ESS-10kW /40kWh	FX-ESS-50kW /200kWh	FX-ESS-125kW /500kWh	FX-ESS-250kW /500kWh
Rated Voltage	48VDC	48VDC	174VDC	464VDC	928VDC
Rated Current	105A	210A	288A	276A	276A
Rated Efficiency	>70%	>70%	>70%	>70%	>70%
Rated Power	5kW	10kW	50kW	125kW	250kW
Rated Duration*	4h	4h	4h	4h	2h
Rated Energy*	20kWh (Included)	40kWh (Included)	200kWh (Included)	500kWh (Included)	500kWh (Included)
Rated Capacity	420Ah	840Ah	1,149Ah	1,078Ah	539Ah
Battery Weight	2.2T	4.2T	26T	49T	70T
Cabinet Size	2.8*1.2*2.08m	2.8*1.3*2.08m	6.1*2.44*2.59m	12.2*2.44*2.9m	12.2*2.44*2.9m
Electrolyte Weight	1.4T	2.8T	14T	35T	35T
Electrolyte	1m ³	2m ³	10m ³	25m ³	25m ³
AC Rated Voltage	220V	220V/380V	220V/380V	220V/380V	220V/380V

Preliminary Spec | Standard ESS Systems

Custom Engineering Racking System In-Door Setup for Laboratory, POC System



Conventional Setup | Customized Engineering



50kw-250kw 4 hour+ Scalable System Module for C&I & Grid-Tie BESS



Solution and Technical Excellence

Expansive Thermal Range Electrolytes

Weltrus in-house Mixed-Acid Expansive Thermal Range Electrolytes (0 to 45 °C w/o heat exchanger)

Weltrus prides itself on its proprietary formulation and advanced acid mixing process, which operates in the temperature range of -30°C to 60°C (transport permits and other relevant documentation are pending, and mass production is expected by 2025).

Density	1.3 g/cm ³
Energy Density	20 kWh/m ³
Specific Energy	15 kWh/t
Charge Cut-off Voltage	1.65 VDC/Cell
Discharge Cut-off Voltage	1.0 VDC/Cell
Operating Temperature	0 to 45°C

FX-VES-1.5M vanadium electrolyte formula is unique with high conductivity, wide operating temperatures, and good stability without the need for a heat exchanger. During charging and discharging, vanadium ion migration is minimal, with little change in liquid level, effectively solving the balance issues between positive and negative electrolytes and energy attenuation problems.



Solution and Technical Excellence

ODM Client Testimonials/Case Studies



Singapore | Micro-grid | Since 2021



New Zealand | Farm C&I | Since 2018



The Netherlands | Wind Support | Since 2018



China | C&I Peak Shaving



China | Mining Micro-Grid



China | FTM Grid-tied ESS

Key Offerings

Your Vision, Our Components

Weltrus is at the forefront of innovative Long-Duration Energy Storage solutions, specializing in the development of advanced components for flow battery and fuel cell systems. Our key offerings include:

1. Proprietary PFSA PEM set the standard in the industry, offering unparalleled performance and durability flow batteries, fuel cells, ion-exchange membrane electrolyzers, and electrochemical sensors.
2. VRB stack designed to be lifetime leak-proof and to provide high-efficiency energy storage and conversion solutions ranging from 5 to 32 kW.
3. Integrated and containerized ESS system, offering scalable solutions from 5 to 125 kW / 20 to 500 kWh, tailored for a variety of energy storage needs.
4. Mixed-Acid Electrolytes, designed to operate efficiently across a wide thermal range (0 to 45°C), ensuring versatility and reliability in diverse environments.

Commitment to Strategic Collaboration and Customization

Weltrus prioritizes the creation of partnerships and tailored solutions to meet the unique requirements of its clients. Emphasizing strategic collaborations, the company offers a range of customization and ODM capabilities, leveraging state-of-the-art in-house R&D and design prowess.

The focus is on delivering comprehensive energy solutions that improve efficiency, reliability, and sustainability, paving the way towards a cleaner, energy-efficient future through innovation.