

Game Changer for Energy Storage

VIB ESS

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- About us
- Energy Market & ESS
- Vanadium Ion Battery
- Application
- Vision & Partners

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Company Profile

Battery company founded by
Ph. D. from MIT & KAIST since 2013

Experts in Material, Battery, System,
Facility, Quality, Strategy, Sourcing

Total fundraised amount
No.1 battery startup in South Korea

11 Years

160 Members

100 Million USD

From Fundamental R&D



To Material, Cell, System

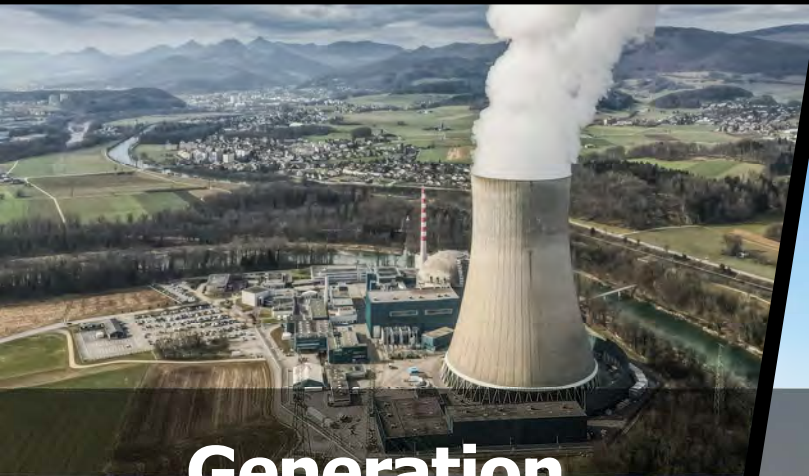


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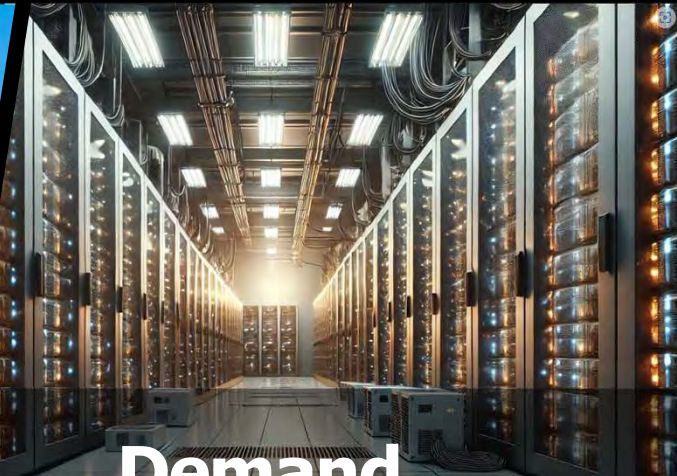
Energy Market



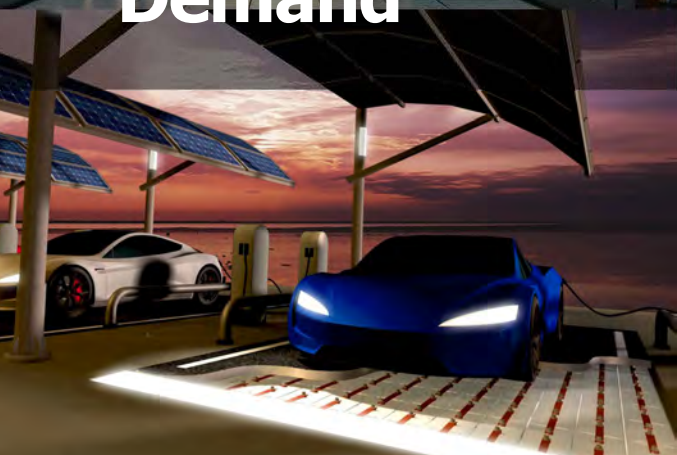
Generation



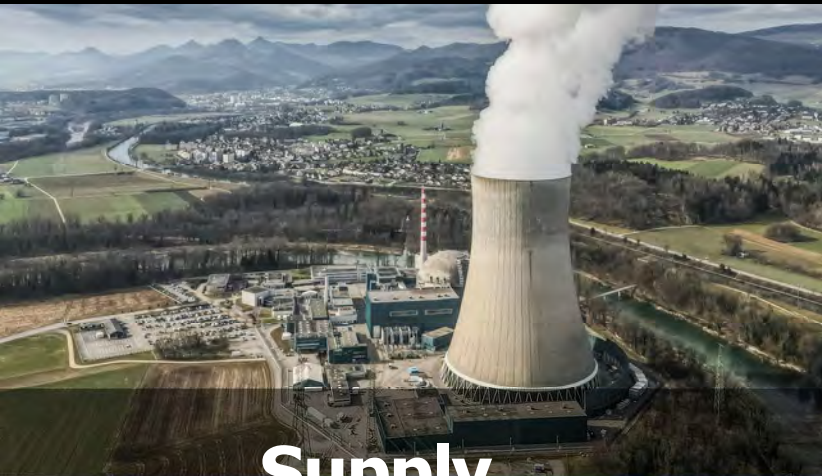
Transmission



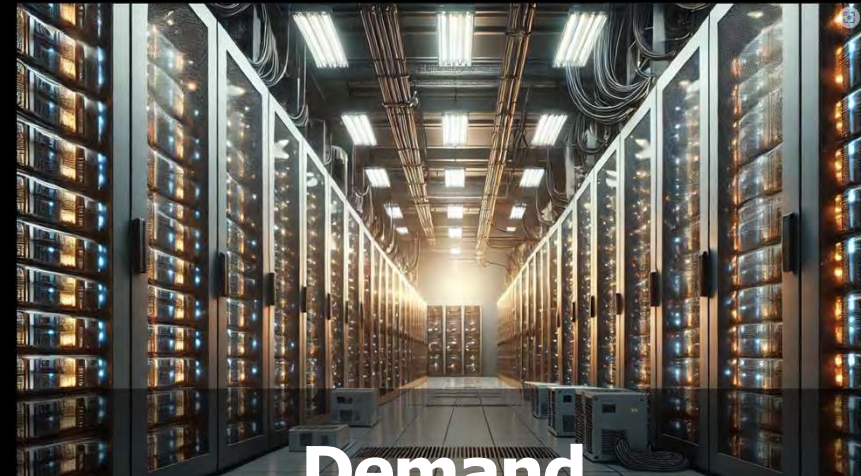
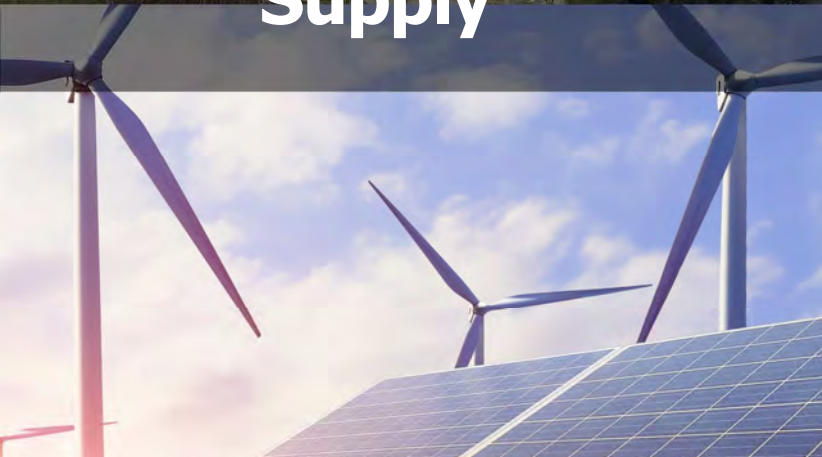
Demand



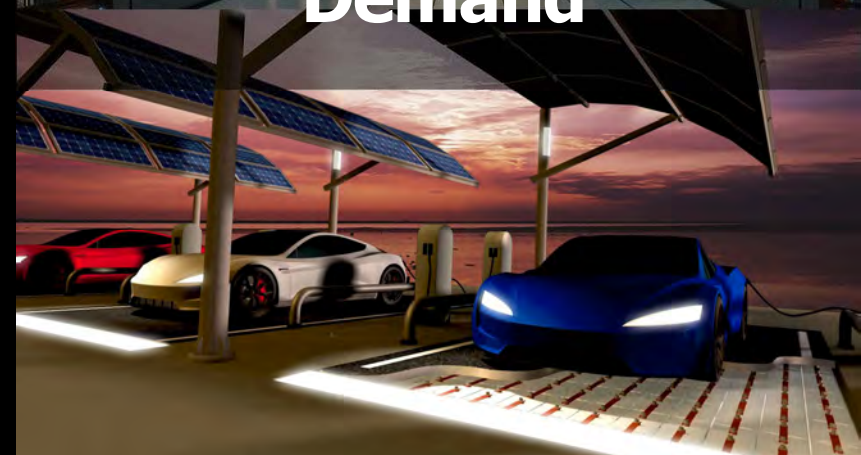
Energy Market: Supply & Demand



Supply

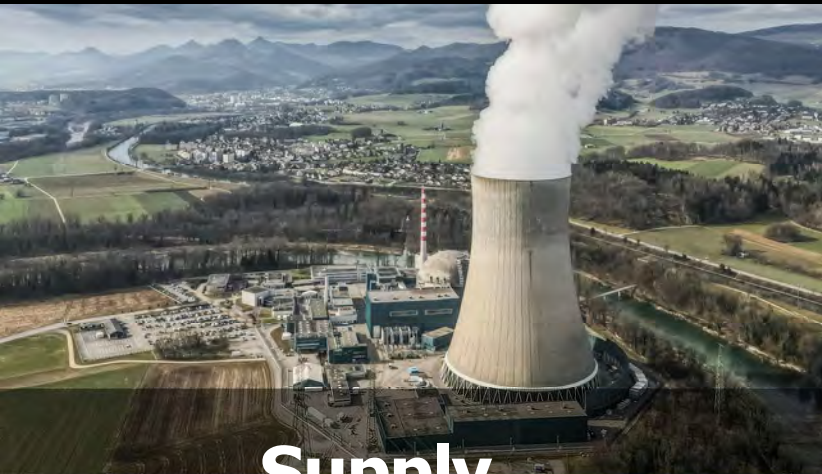


Demand

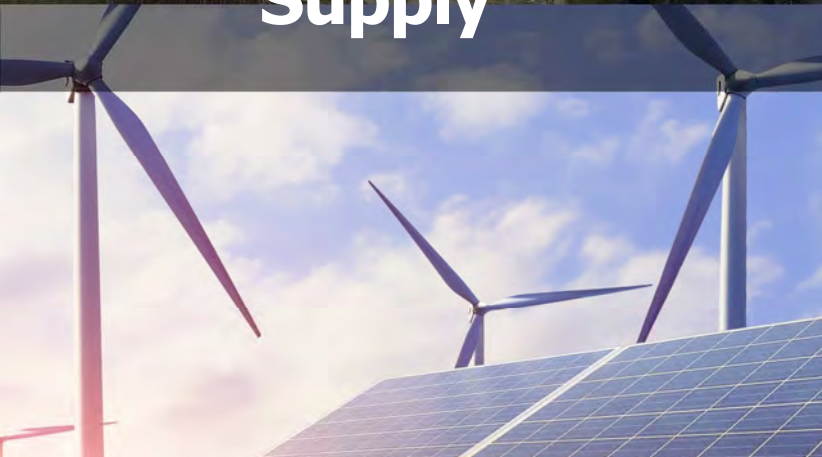


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Traditional Plants → Renewables



Supply



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Unstable: Daily & Local

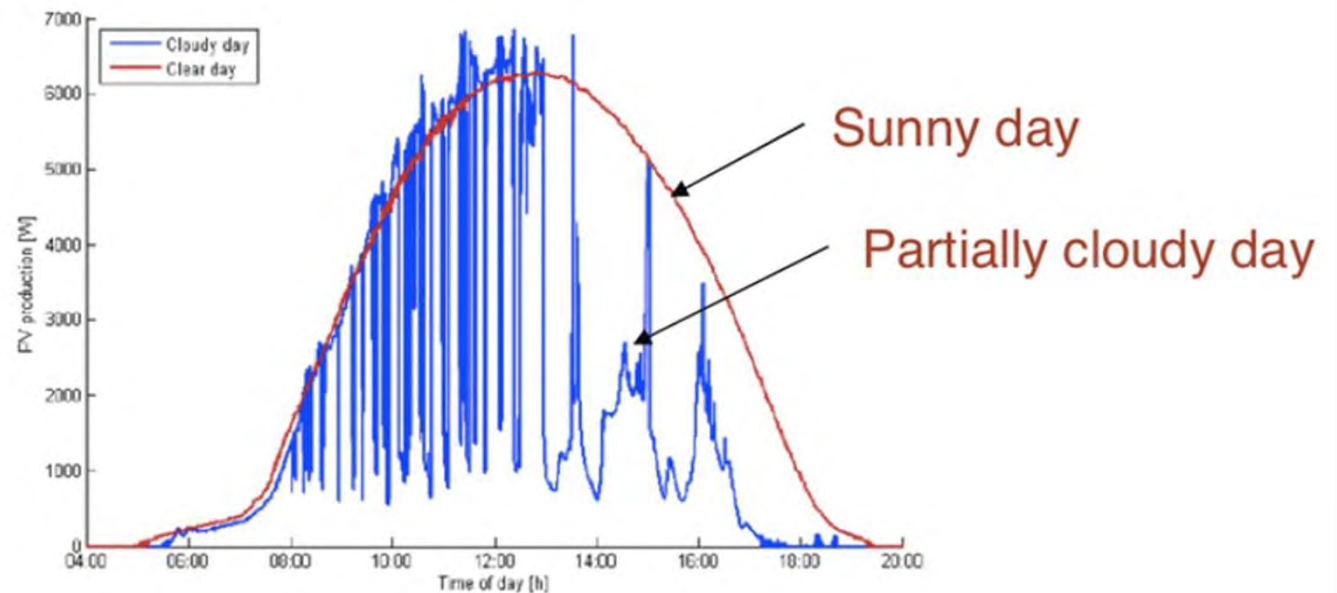


Figure 7 - uploaded by Wander S Wadman

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Typical daily power production profile from solar panels [1].

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Unstable: Yearly & Global

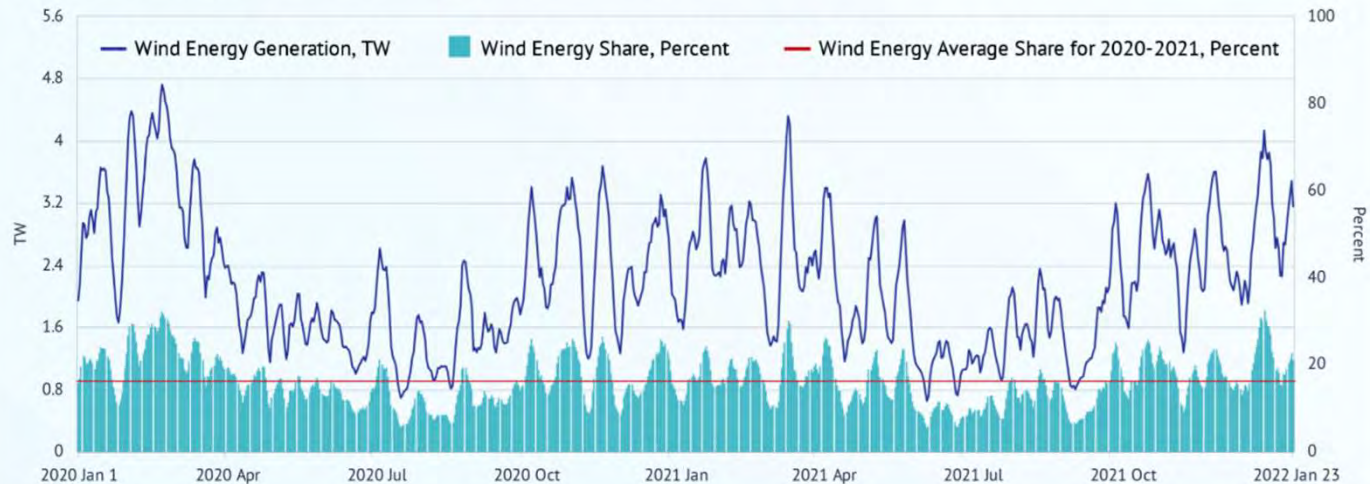


Supply

Europe: Daily Wind Energy Generation

7-day moving average: 28 countries for which data is available since January 1, 2020.

Data Driven



knoema

Source: European Network of Transmission System Operators for Electricity

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Stop Renewables



Supply

朝鮮日報

제주도, '신재생 과속'으로 정전 위험... 3년 뒤부터 전국이 겪을 수도

입력 2023.11.21. 오전 6:02 · 수정 2023.11.21. 오전 9:35

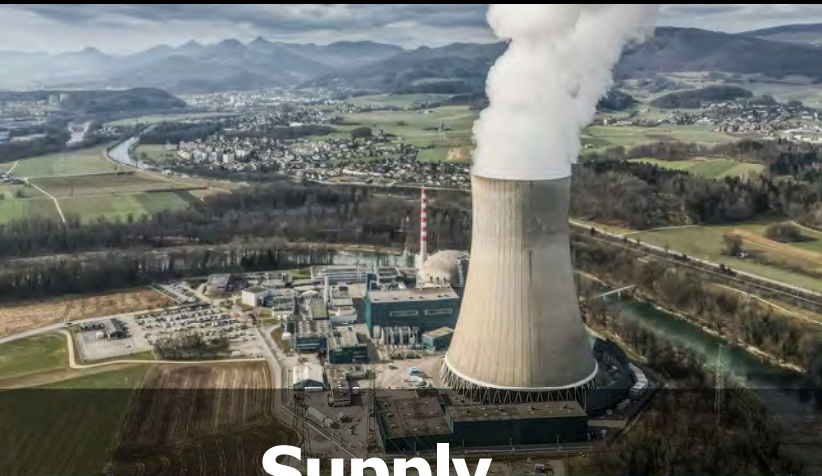


지난 14일 서울 종로구 감사원에서 최재혁 산업금융감사국장이 신재생에너지 사업 추진 실태 감사 결과를 발표하고 있다. /연합뉴스

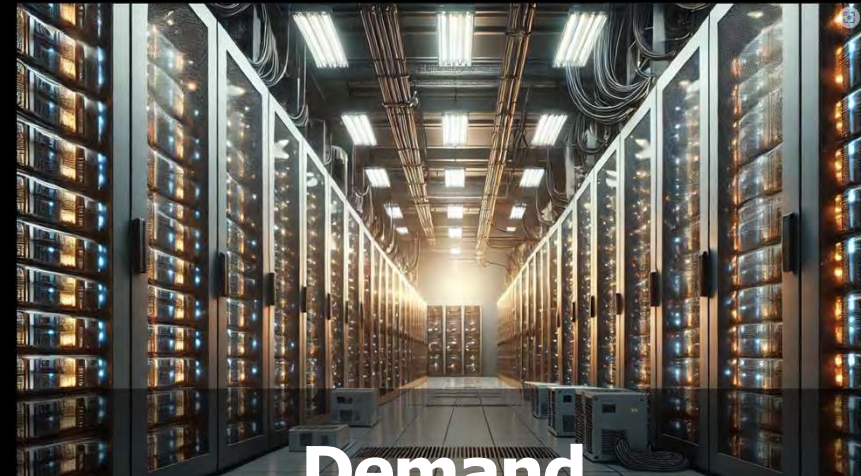
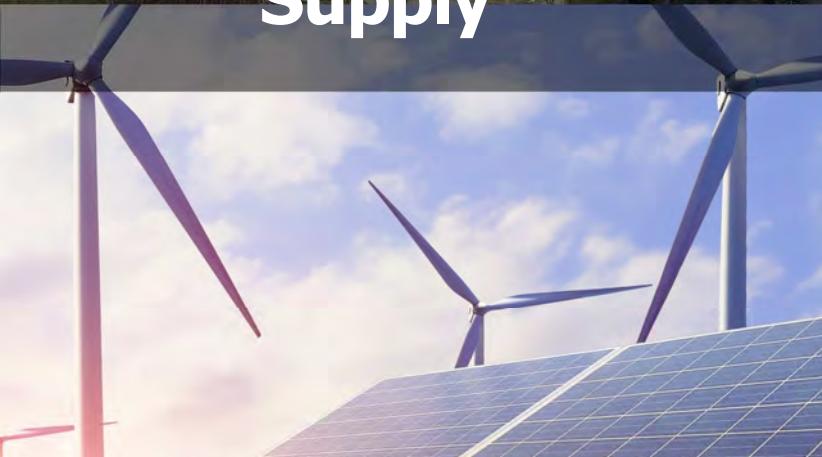
감사원이 제주도가 신재생에너지 과잉 발전(發電)으로 인한 송·배전 설비 과부하와 대규모 정전 위험성에 노출돼 있다며, 2026년부터는 이런 문제가 제주도를 넘어서서 전국적으로 나타날 수 있다고 경고한 것으로 드러났다. 신재생 발전 비중을 너무 빠르게 높이다보니 전력망이 이를 감당하지 못하게 된다는 것이다.

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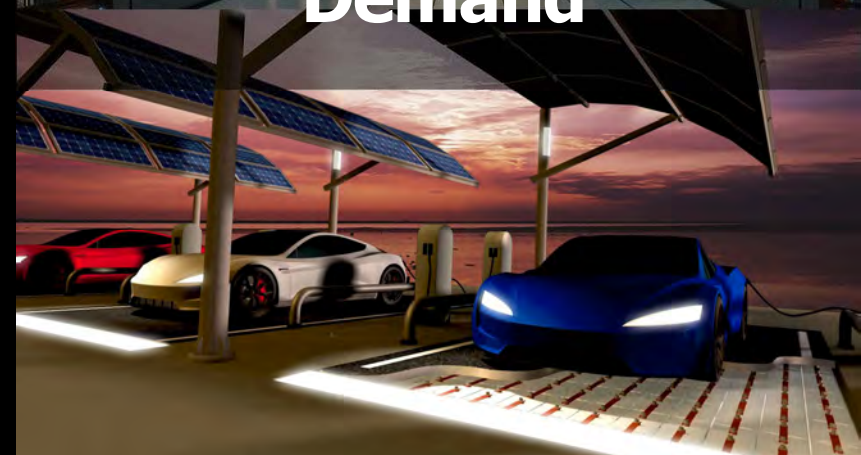
Supply is limited & unstable



Supply



Demand



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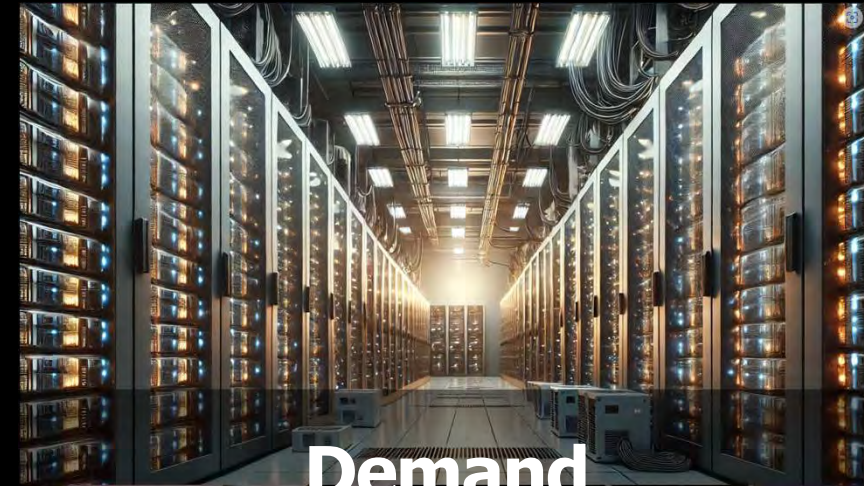
Demand skyrockets : EV



1~2 kW per house

350 kW per EV

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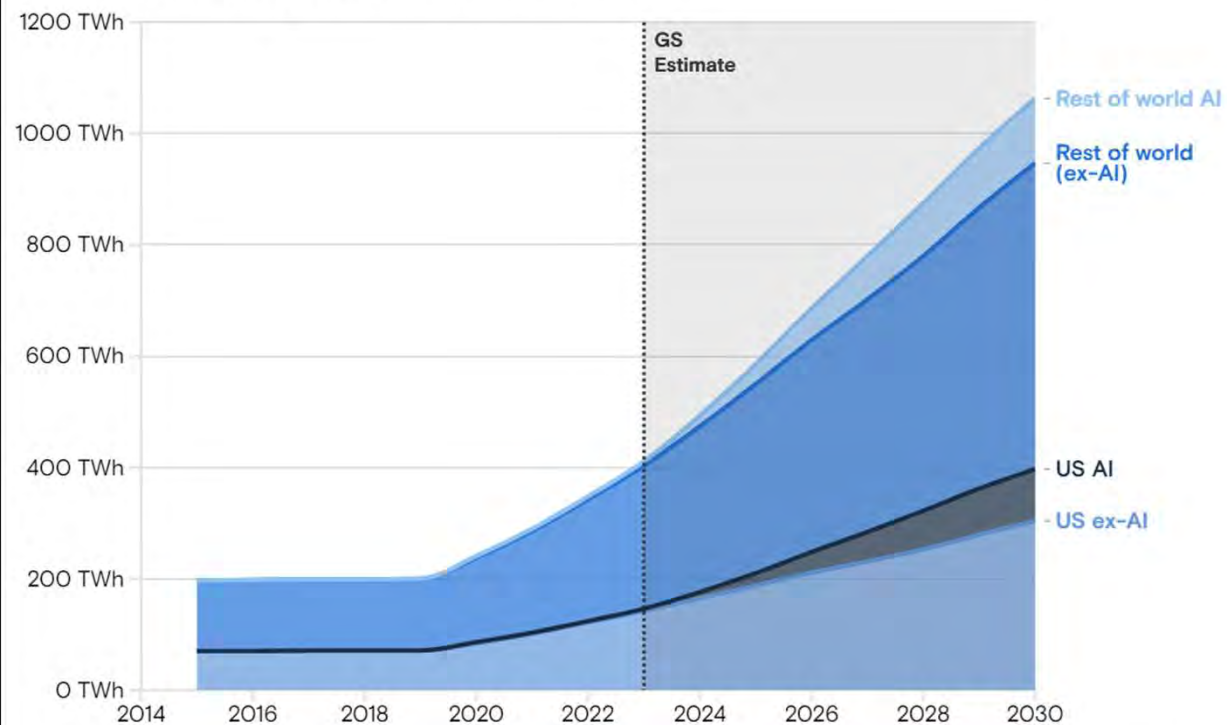


Demand



Demand skyrockets : IT & AI

Data center power demand

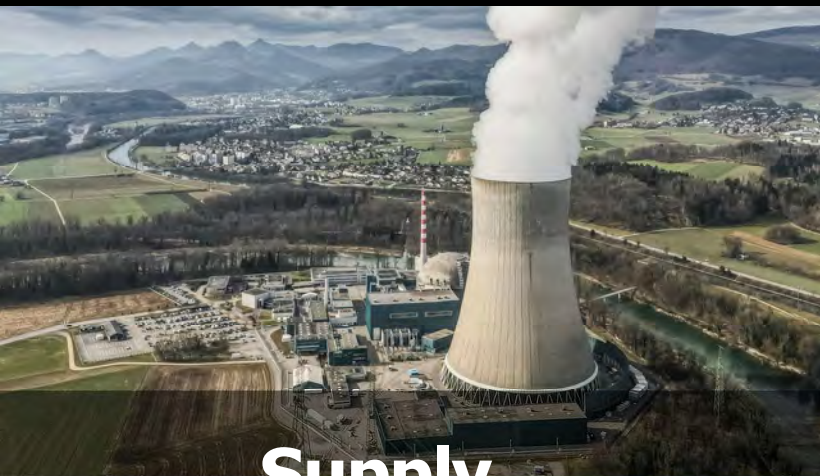


Source: Masanet et al. (2020), Cisco, IEA, Goldman Sachs Research

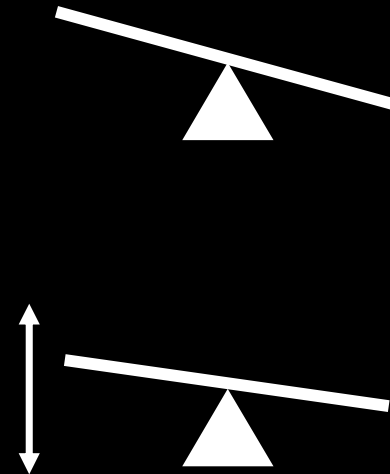
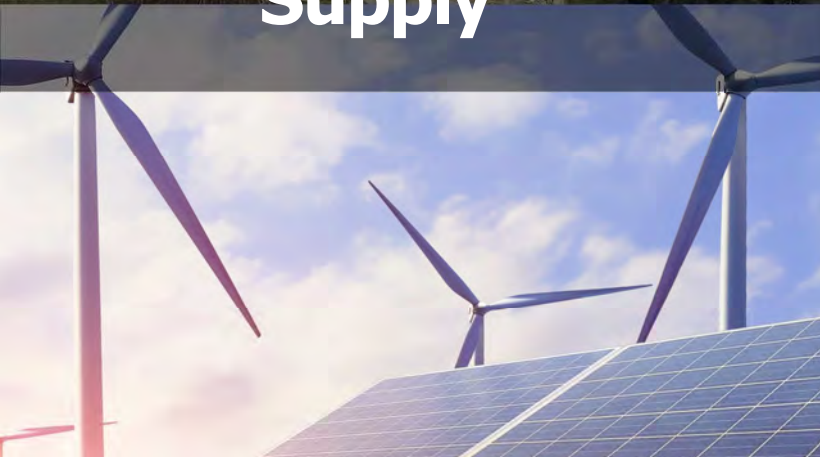
Goldman
Sachs



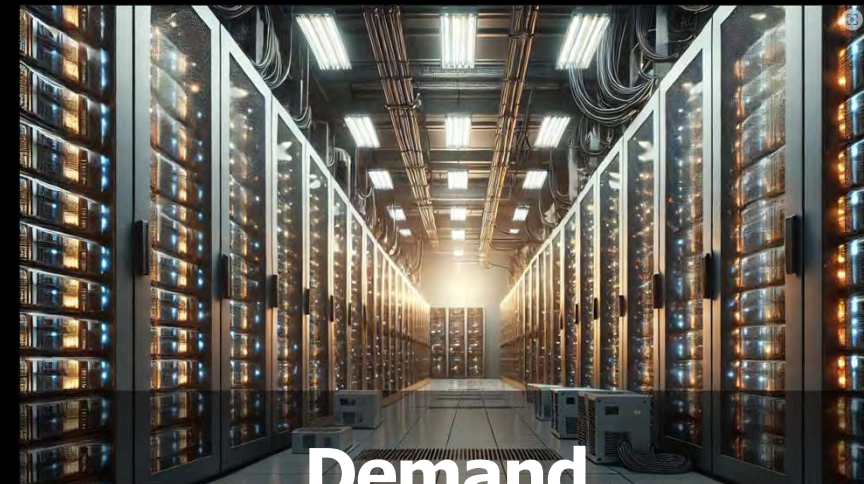
Imbalance & Fluctuation



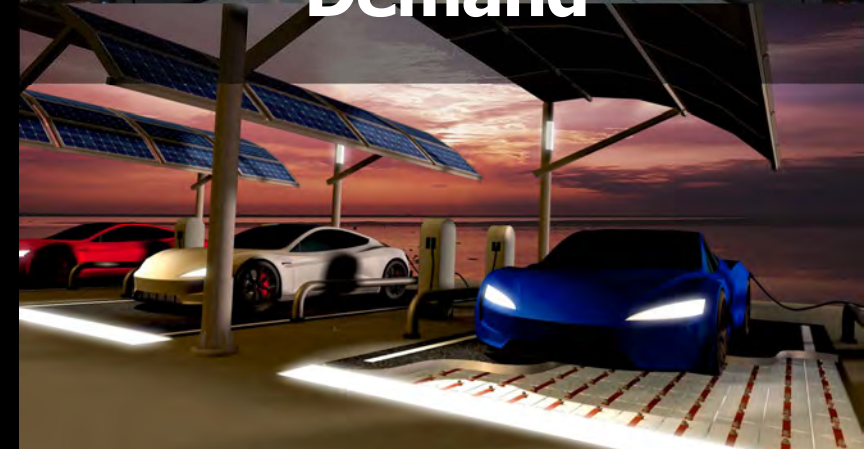
Supply



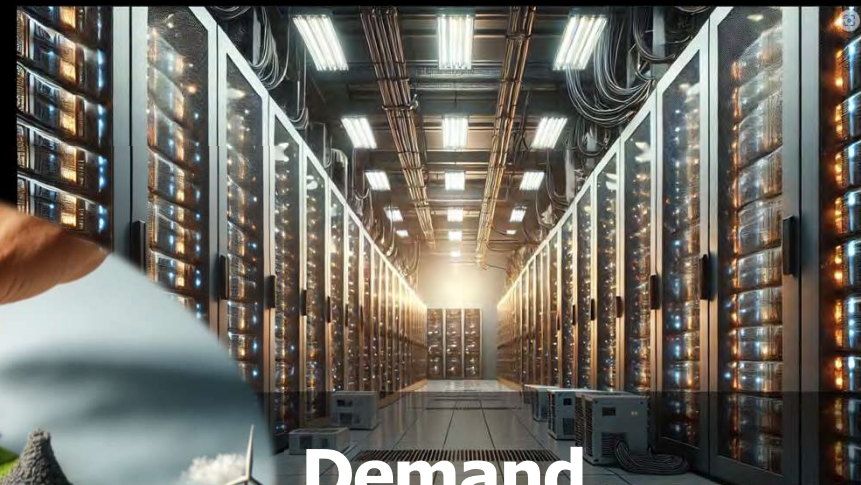
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Demand



Final Piece for Balance



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Final Piece for Balance : ESS



Energy Storage System (ESS)

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Final Piece for Balance : ESS



1,194 GWh

Global ESS installation capacity, 2030

Bloomberg NEF

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Final Piece for Balance : ESS

\$ 634 Billion

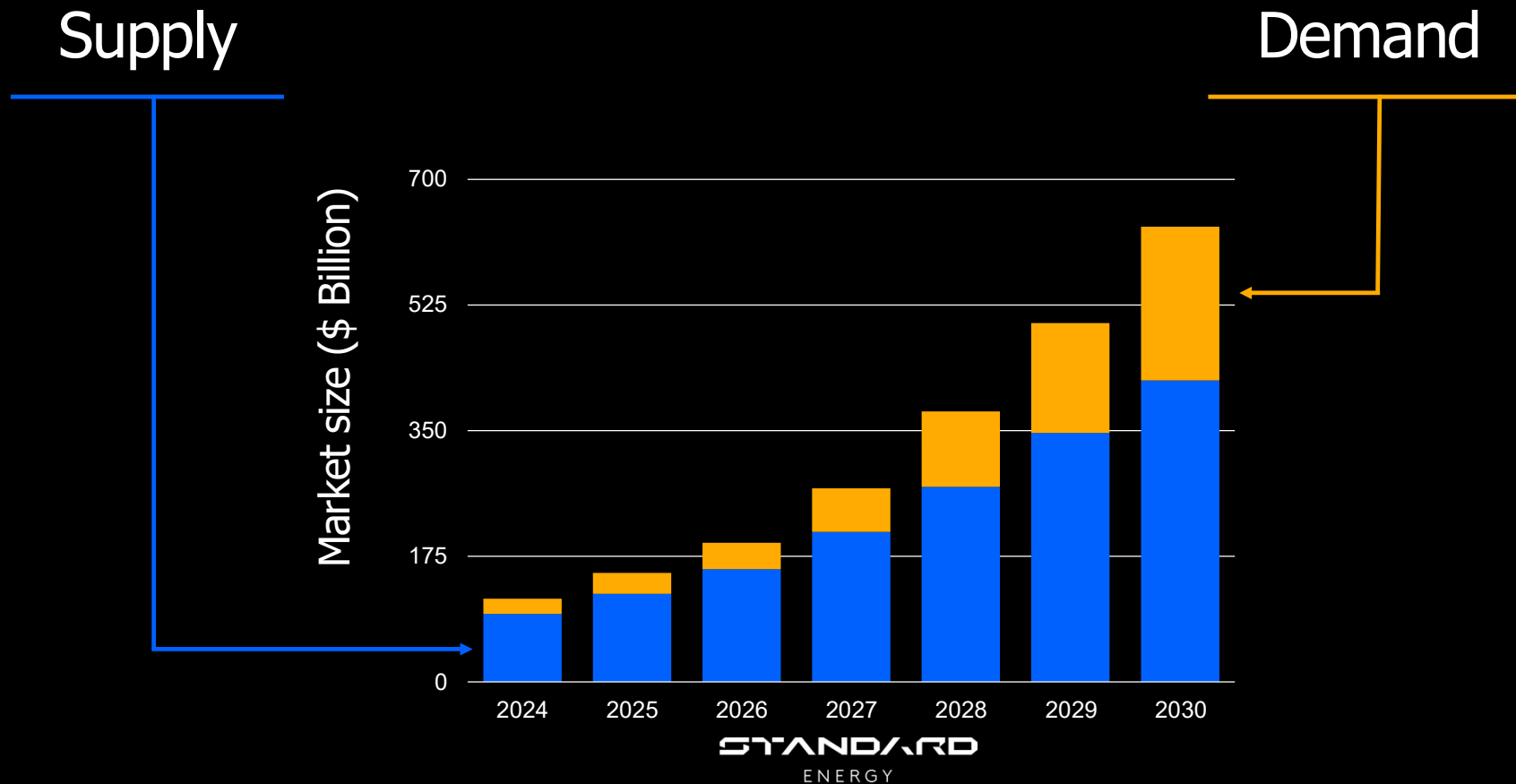
Global ESS market size, 2030

Supply

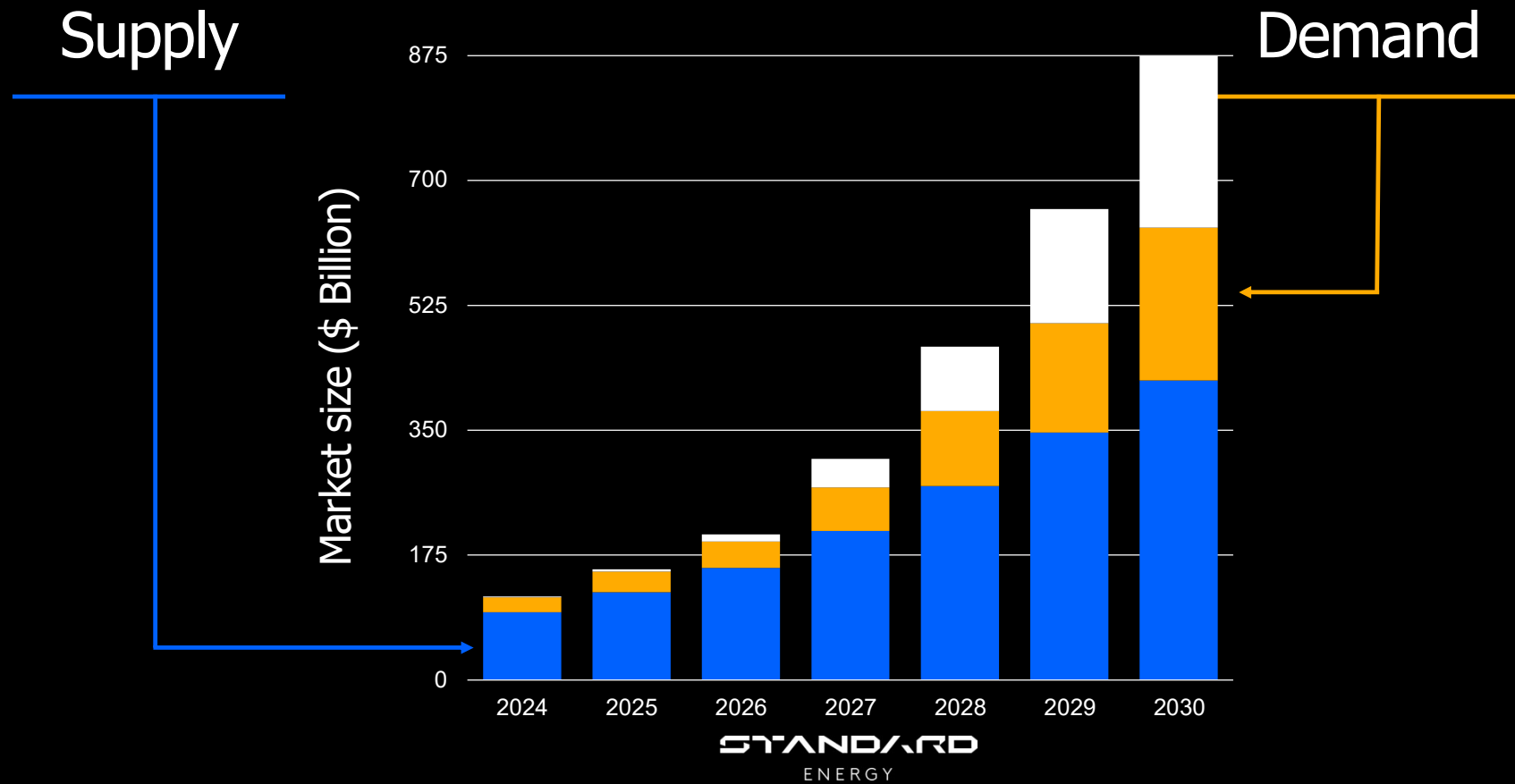
Demand

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Both Supply & Demand needs ESS



AI needs ESS



ESS Status

Supply

Category	Technology
High power (Short duration)	?
Medium power (Medium duration)	Lithium Ion Battery
Low power (Long duration)	Lithium Ion Battery Flow Battery

Demand

Category	Technology
AI, Datacenter (Large scale)	?
Building, Factory, Infra (Indoor medium scale)	?
Home (Small scale)	Lithium Ion Battery Lead Acid Battery

Crucial market but Critical Concern



Crucial market but Critical Concern

Lithium Ion Battery

Fire Accidents

Lead Acid Battery

Low Performance

All Solid, Sodium Ion

Low Maturity

Technology that Market is Waiting for

Absolute Safety

No ignition & No leakage

Consistently High Performance

Efficiency, Power, Cycle life

Technological Maturity

Technical Readiness Level (TRL) > 7

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the
vanadium ion battery
energy storage system
station for fast EV chargers

Why We Created a New Battery

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Vanadium Ion Battery

“ Technology born from the market needs ”

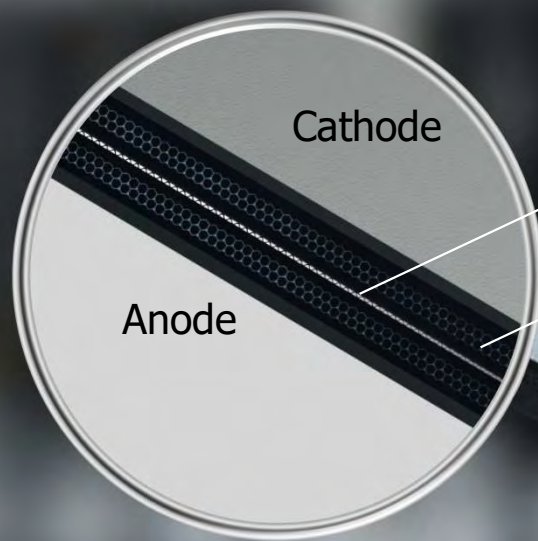
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Vanadium Ion Battery

Single sealed battery with Vanadium electrode & self-balancing mechanism



Separator

- Highly selective asymmetric proton exchange membrane

Electrode : liquid & solid 2-phase electrode

- Liquid electrode : post-treated aqueous Vanadium electrode
- Solid electrode : highly reversible dual-layer graphite electrode


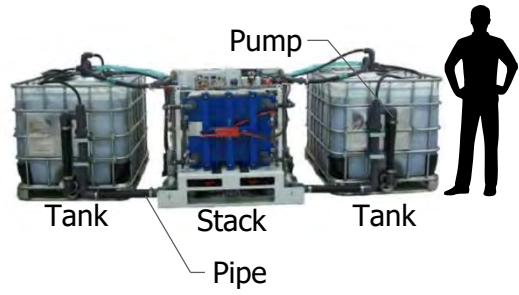
Frame structure

- Cathode / Anode self-balancing mechanism

We hold 236 patents & 103 trademarks

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Technologies for Energy Storage System

	Vanadium Ion Battery (VIB)	Lithium Ion Battery (LIB)	Vanadium Flow Battery (VFB)
Active material	Vanadium	Lithium	Vanadium
Operation mechanism	Static	Static	Flow by mechanical pumps
Structure	Single sealed cell	Single sealed cell	Stacks, pumps, pipes, electrolyte tanks
Scalability	Multiple cells	Multiple cells	Size of electrolyte tanks
Image			

Technologies for Energy Storage System

	Vanadium Ion Battery	Lithium Ion Battery	Vanadium Flow Battery
Safety (no ignition)	O	X	O
Safety (no chemical leakage)	O	O	X
Energy efficiency	97.5%	95%~98%	70%~75%
Maximum power	High	Medium	Low
Cycle life (Charge / Discharge repeatability)	100,000	4,000	10,000
Recyclability	High	Low	Medium
Power / Energy density	Medium	High	Low
Standard / Certification	O	O	O

Stationary

Energy Storage System

Mobile

EV, Phone, Laptop

	Vanadium Ion Battery	Lithium Ion Battery	Vanadium Flow Battery
Safety (no ignition)	O	X	O <small>Best</small>
Safety (no chemical leakage)	O	O	X
Energy efficiency	97.5%	95%~98%	70%~75%
Maximum power	High	Medium	Low (0.2C)
Cycle life (Charge / Discharge repeatability)	100,000	4,000	10,000
Recyclability	High	Low	Medium
Power / Energy density	Medium	High	Low
Standard / Certification	O	O	O

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Ultimate Safety Tests

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화재 위험이 없는 배터리?!
ESS에 최적화! 바나듐 이온 배터리

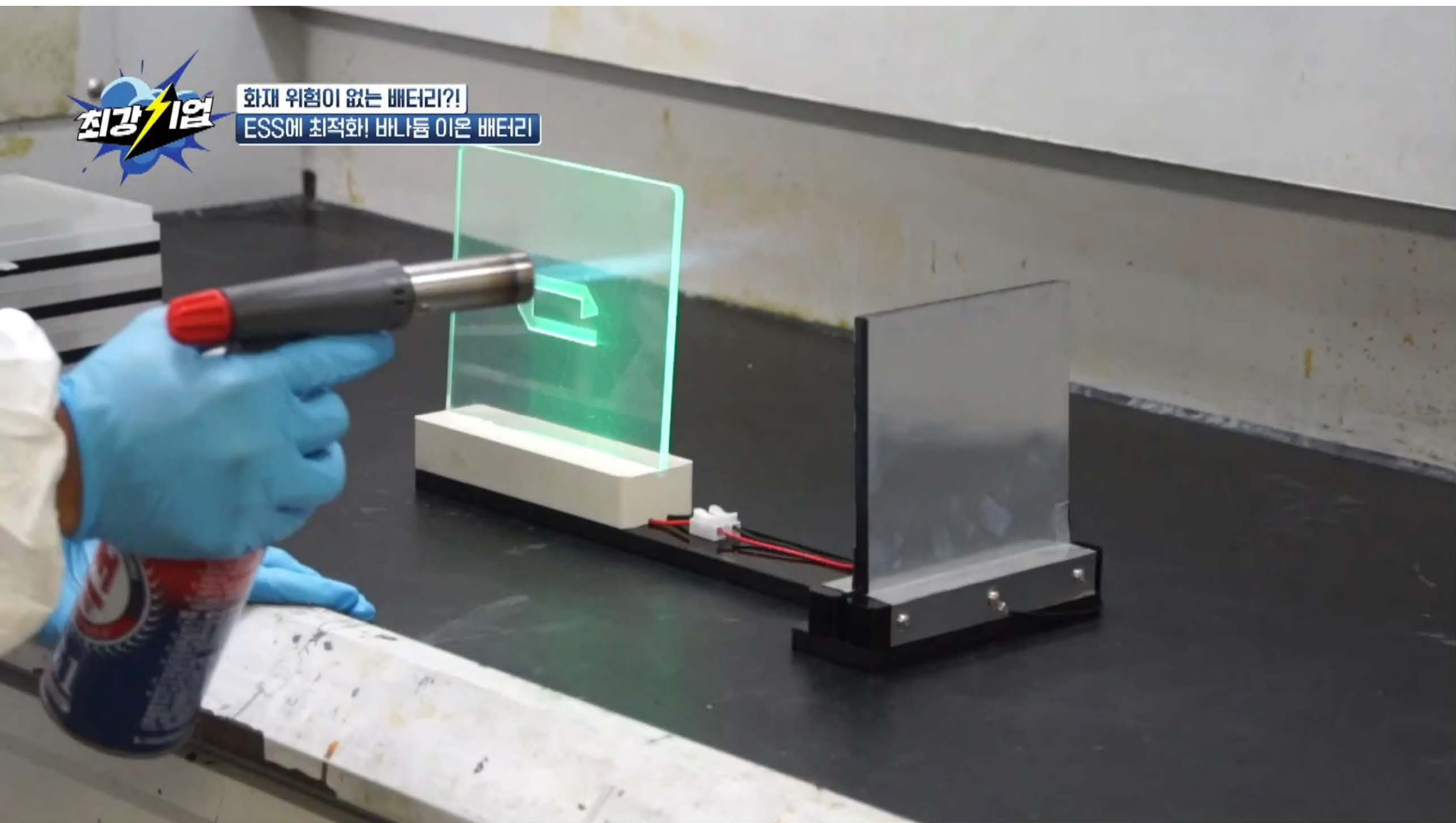




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Factory Energy Management System (EMS)



Power Support for Ultra Fast EV Charging Station



Uninterruptible Power Supply (UPS)

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Emergency Power for Electrified Vessel



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Home ESS



World's first & only


Certification of product & production capability

SPSPSPSP SPS-C KBIA-10804-01-7563
SPSPSPS
SPSPSP
SPSPS
SPSP
SPS

바나듐이온전지 — 성능 요구사항
SPS-C KBIA-10804-01-7563:2023

한국배터리산업협회

2023년 05월 22일 제정



단체표준제품인증서

인증번호 : 제 KBIA-EVB-M029-192 호
업체명 : 스탠다드에너지
대표자 : 김부기
공장소재지 : 대전광역시 유성구 테크노2로 305 (탑입동)
공장사업자등록번호 : 314-86-49925
인증계약 유효기간 : 2024.06.24 ~ 2027.06.23
단체표준명 : 바나듐이온전지 — 성능 요구사항
단체표준번호 : SPS-C KBIA-10804-01-7563
종류·등급·호칭·모델 : · 모노블록 전지 - VCAL1020

단체표준인증업무규정 제25조의 규정에 의한 인증심사를 실시한 결과 한국배터리산업협회 단체표준 인증심사의기준에 적합하므로 단체표준 인증업무규정 제32조 규정에 의하여 위와 같이 한국배터리산업협회 단체표준표시를 인증합니다.

2024년 06월 24일

한국배터리산업협회

첨부서류 : 단체표준 제정관련 목록, 기본모델의 내용, 단체표준 표시 인증서 발급 이력 현황
• 최초인증일 : 2024.06.24 • 최종변경일 :
• 변경/재교부사용 :
• 자기 사후관리 완료기한 :



문서확인번호 : 0322-0133-0769-3013

Factory ESS



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Before VIB ESS

Supply

Category	Technology
High power (Short duration)	?
Medium power (Medium duration)	Lithium Ion Battery
Low power (Long duration)	Lithium Ion Battery

Demand

Category	Technology
AI, Datacenter (Large scale)	?
Building, Factory, Infra (Indoor medium scale)	?
Home (Small scale)	Lithium Ion Battery

Before VIB ESS

Supply

Category	Technology
High power (Short duration)	High power & longevity required
Medium power (Medium duration)	Lithium Ion Battery
Low power (Long duration)	Lithium Ion Battery

Demand

Category	Technology
AI, Datacenter (Large scale)	High power & safety required
Building, Factory, Infra (Indoor medium scale)	High power & safety required
Home (Small scale)	Lithium Ion Battery

With VIB ESS

Supply

Category	Technology
High power (Short duration)	Vanadium Ion Battery
Medium power (Medium duration)	Lithium Ion Battery
Low power (Long duration)	Lithium Ion Battery

Demand

Category	Technology
AI, Datacenter (Large scale)	Vanadium Ion Battery
Building, Factory, Infra (Indoor medium scale)	Vanadium Ion Battery
Home (Small scale)	Lithium Ion Battery

Different Market

Monopoly market (size : \$214 billion, 2030)

Category	Technology
AI, Datacenter (Large scale)	Vanadium Ion Battery
Building, Factory, Infra (Indoor medium scale)	Vanadium Ion Battery
Home (Small scale)	Lithium Ion Battery

Competitive market (size : \$420 billion, 2030)

Category	Technology
High power (Short duration)	Vanadium Ion Battery
Medium power (Medium duration)	Lithium Ion Battery
Low power (Long duration)	Lithium Ion Battery

Partners

Fabless with core mother facility

Category	Short term (2024-2025)	Long term (2025-)	Partnership	Region
Development	•	•	In-house Co-development	Headquarters
Pilot production	•	•		
Mass production	-	Partnership	Licensing M&A JV	Asia (2024-) North America (2025-) Europe (2026-) Middle East (2026-)
Certification	•	Partnership		
Sales	•	Partnership		
Maintenance	•	Partnership		

Partners

Supply Chain

Chemical Company

Facility Company

Heavy Industry Company

Transportation Company

Construction Company

Certification Company

▪

▪

▪

Demand Chain

ESS Integrator

Home ESS Distributor

Gas Station Company

Datacenter Operator

AI Center Operator

Utility Company

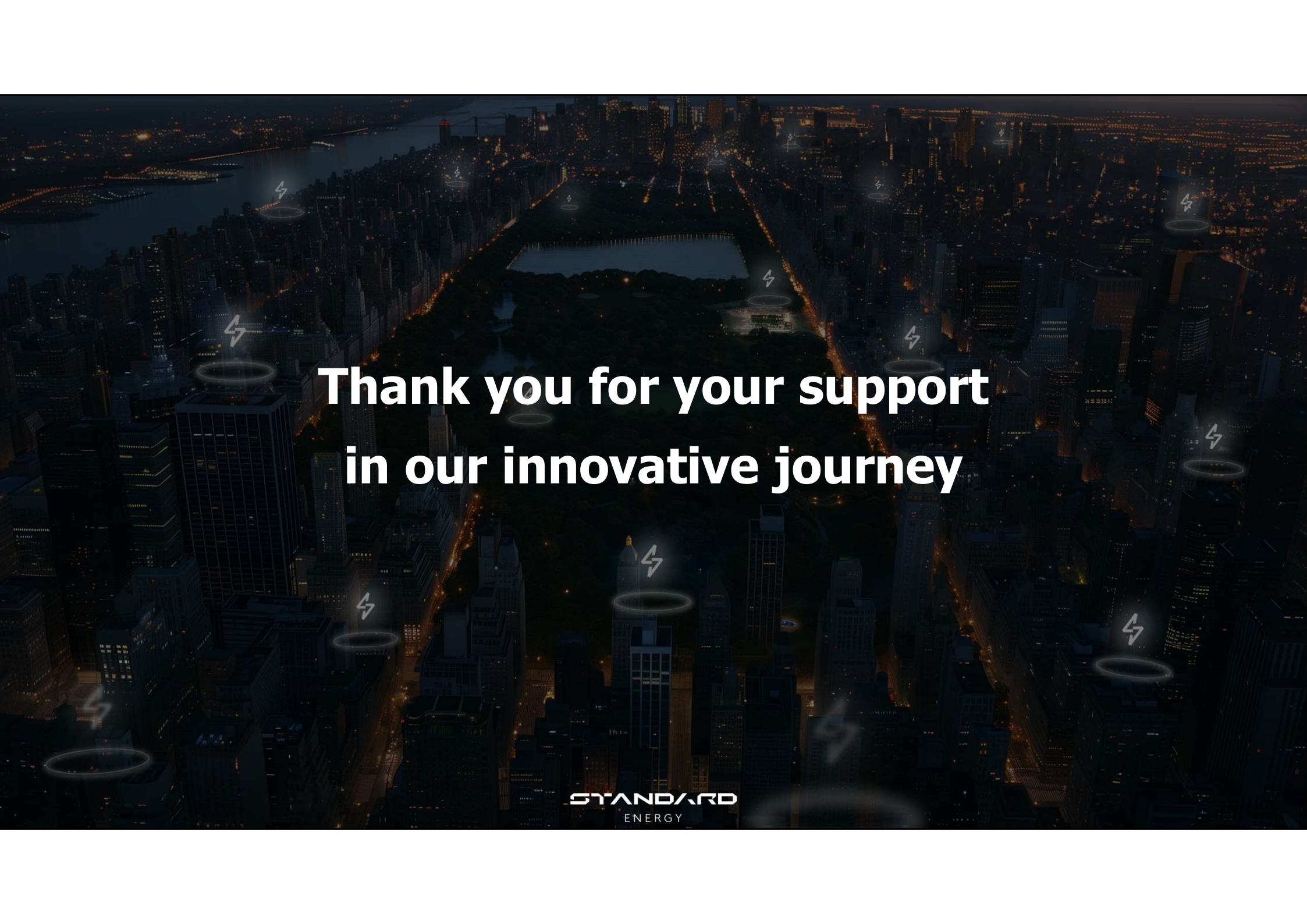
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An aerial night view of New York City, showing the dense urban landscape and Central Park. The city is illuminated by its lights, and the park is a dark, central feature. Overlaid on the image are several glowing white energy symbols (lightning bolts) and circular halos, suggesting a focus on energy or technology. The text "Thank you for your support in our innovative journey" is centered in the middle of the image.

**Thank you for your support
in our innovative journey**

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Contact Information

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