

JDENERGY

Distributed Energy Block Intelligent Energy Storage System
Solutions Provider

Traditional energy storage system solutions

Urgent need to iterate on safety and economy



Centralized Solution

The battery cells are first connected in series integrating with BMS, TMS, FSS, Liquid Cooling system in rack level, and then centrally placed in container with several racks in parallel to DC bus.

Traditional solution



Centralized-Distributed Solution

Outdoor cabinets are deployed in a centralized-distributed manner, and single battery clusters are connected in parallel through DC/DC, then converted and connected to the grid in centralized manner

Integration

Key problems



High security risk



Large parallel capacity loss



Complex system

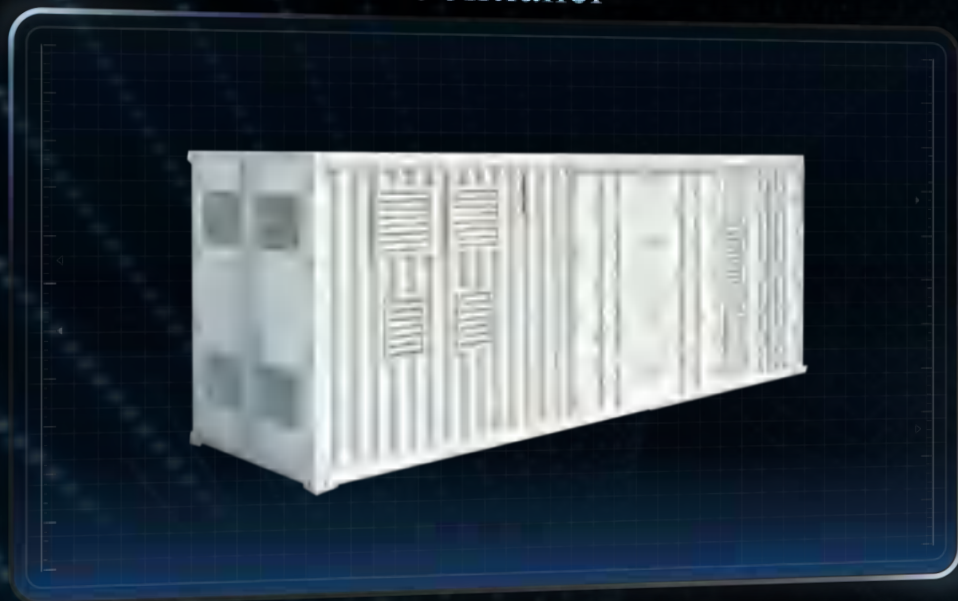


Low conversion efficiency



High system cost

Traditional
Container



JD Eblock



VS

In 2021, JD launched the “All In One” intelligent energy block at the first time in ESS industry

Engineering view

Products are assembled into one system on site
through system design

Energy storage system A



a1

a2

a3

...

an

$$A=f(a1,a2,\dots,an)$$

Product view

All the system functions are realized by one
product, the product is the system

Energy storage system B



b

b

b

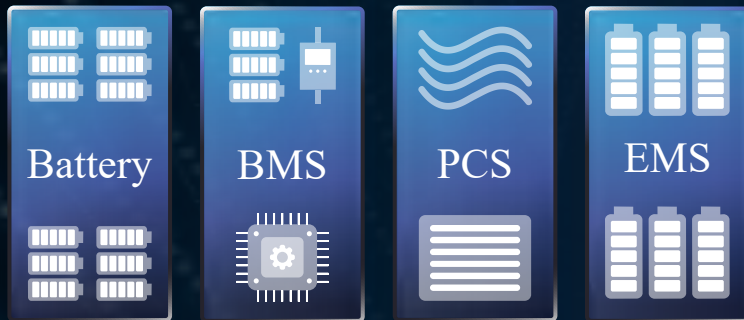
b

$$B = nb$$

Value Enhancement Brought by System View

Traditional Solution

3-level control architecture based on 3S



Control Architecture Refactor

JD Solution

BCS minimalist architecture based on 3S integration



BCS system architecture truly defined from user needs
Realized the optimal balance of energy storage system safety and economy

Values



The energy block solution guarantees ultimate system security,
Achieve the lowest LCOS by improving system efficiency and
storage capacity



Whole life cycle
electricity cost
LCOS

$$\begin{aligned} & \text{Energy storage equipment cost} + \text{Construction, installation and commissioning costs} + \text{Full life cycle operation and maintenance cost} + \text{Augmentation cost} \\ & \frac{\sum_{n=1}^n \text{Energy storage capacity} \times \text{Depth of charge and discharge} \times \text{System efficiency} \times \text{Annual cycle times}}{\end{aligned}$$



eBlock-372

JD Energy AC-690V Grid-
scale and C&I application
product

eBlock-372 / AC-690V

Power Capacity 186kW/372kWh

Conversion Efficiency 90%@rated working conditions (AC side)

AC output 690V

Cabinet Protection IP55 (control IP65)

Thermal Management Liquid cooling

Area Coverage 1.82m²

Energy Density 204kWh/m²

Width × height × depth (mm) 1400 × 2350 × 1300

The best choice for renewable
energy large-scale energy storage ▶



All In One

Integrated into standardized products, operate independently and autonomously,
and realize building block construction and elastic expansion

High performance multifunctional PCS

Multi-level topology, efficiency up to 99.3%

PCS integrates battery management and power distribution functions



Efficient and balanced BCS

Using high-efficiency two-way
equalization technology
Eliminate cascading losses

Long life battery cell

Integrated high-quality and high-cycle
LFP cells
Cycle times >8000

Active Safety System

Partition safety isolation, PACK level immersion fire protection,
Ensure system safety and controllability

Efficient thermal management system

Integrated high-efficiency liquid cooling system
Temperature difference < 3°C

Ultimate safety - Partition safety isolation

Cluster isolation, cabinet passed fire resistance test for 1.5 hours

Special heat insulation and high temperature resistant material

Safety distance



Ultimate safety - Realize 3S control and protection integration

New control architecture

Eliminates blind spots in control and protection



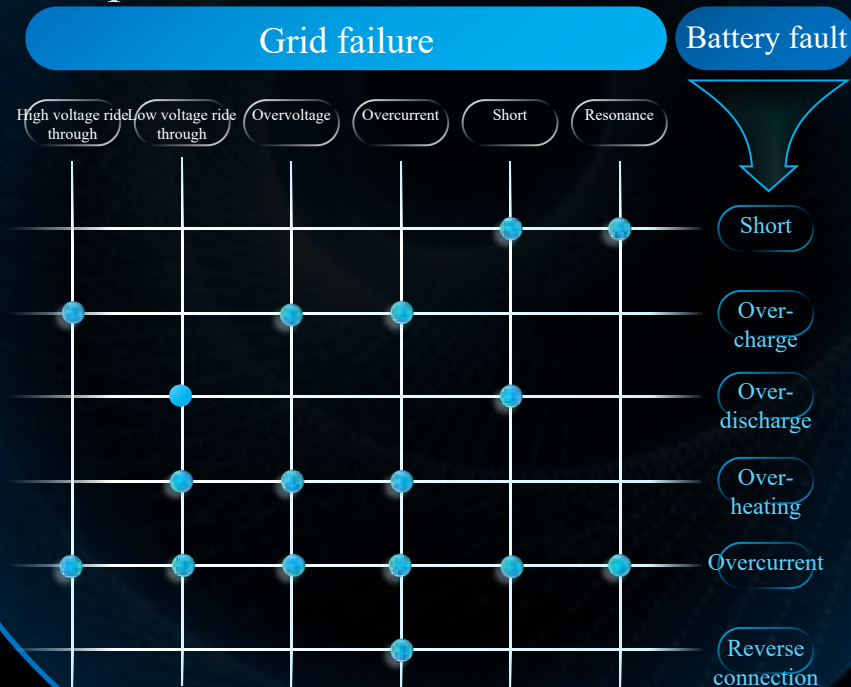
Extreme safety - Comprehensive control and protection

AC grid side

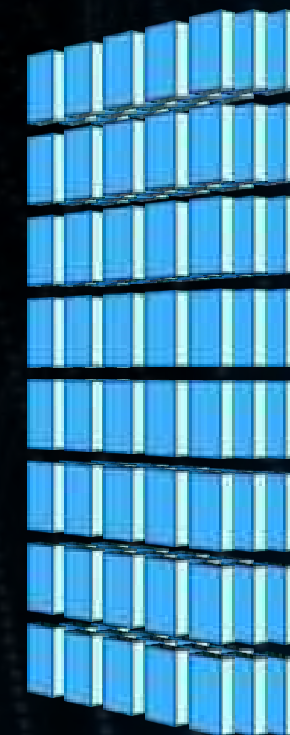


Matrix type

Comprehensive control and protection of AC and DC faults



DC battery side



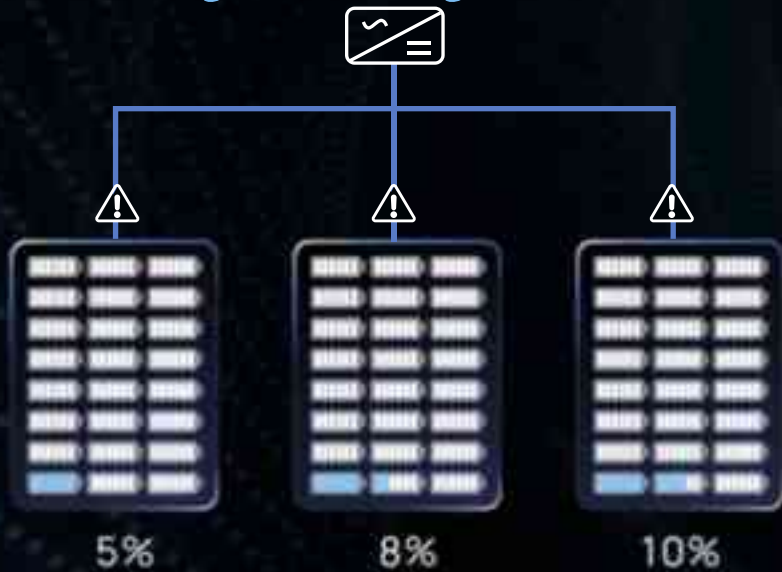
Cost-effective

increased storage capacity

The parallel loss tolerance rate is 0 throughout the whole life cycle, and the depth of storage and discharge is 100%

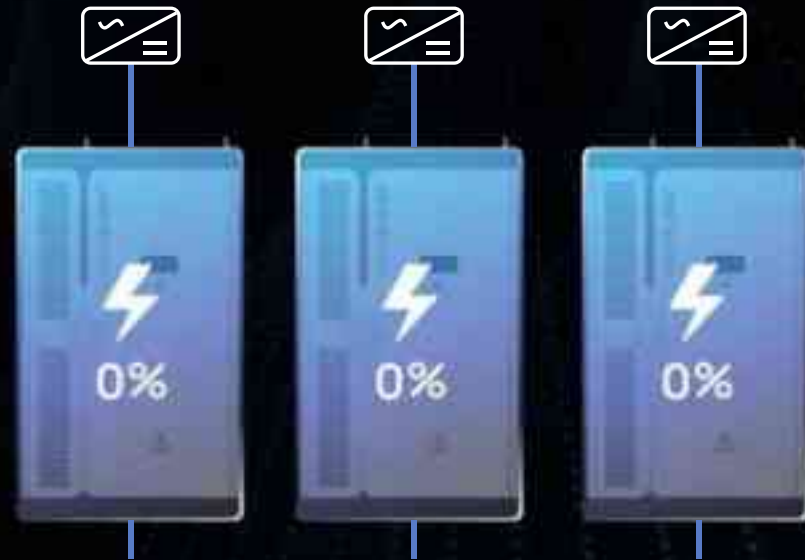
Traditional method

Cannot fully charge or discharge,
big circulating current



Energy block solution

Independent charge and
discharge to eliminate losses



Cost-effective improved conversion efficiency

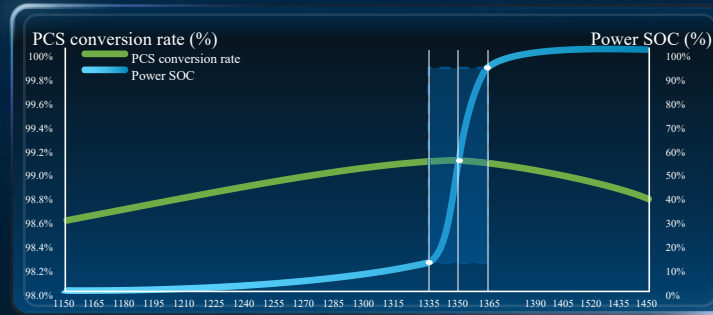
Under rated working conditions, the conversion efficiency of the AC side of the system is $> 90\%$

Vector control algorithm



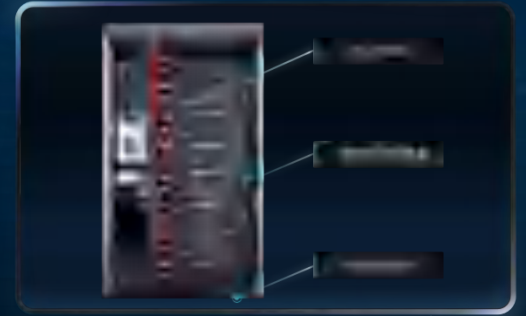
Efficiency increased by 0.5%
Vector control algorithm for minimum switching loss

Optimal fit of battery and PCS



Efficiency increased by 0.3%
Optimal fitting design of battery pack voltage and PCS efficiency curve

Optimal design for thermal management



Energy consumption reduced by 30%
Independent liquid cooling unit pipeline/optimal control strategy



Cost-effective - Operation and maintenance revolution



»»»» Operation and maintenance costs ↓ 45% ««««

Device decoupling

Independent charging and discharging of each battery cluster will not be affected
Equipment utilization > 99.9%

Module replacement

Standard modular design
Device-level expert operation and maintenance is transformed into modular replacement

Smart O&M

Panoramic monitoring of highly reliable standardized energy blocks
Cloud data mining analysis

Easy to recharge

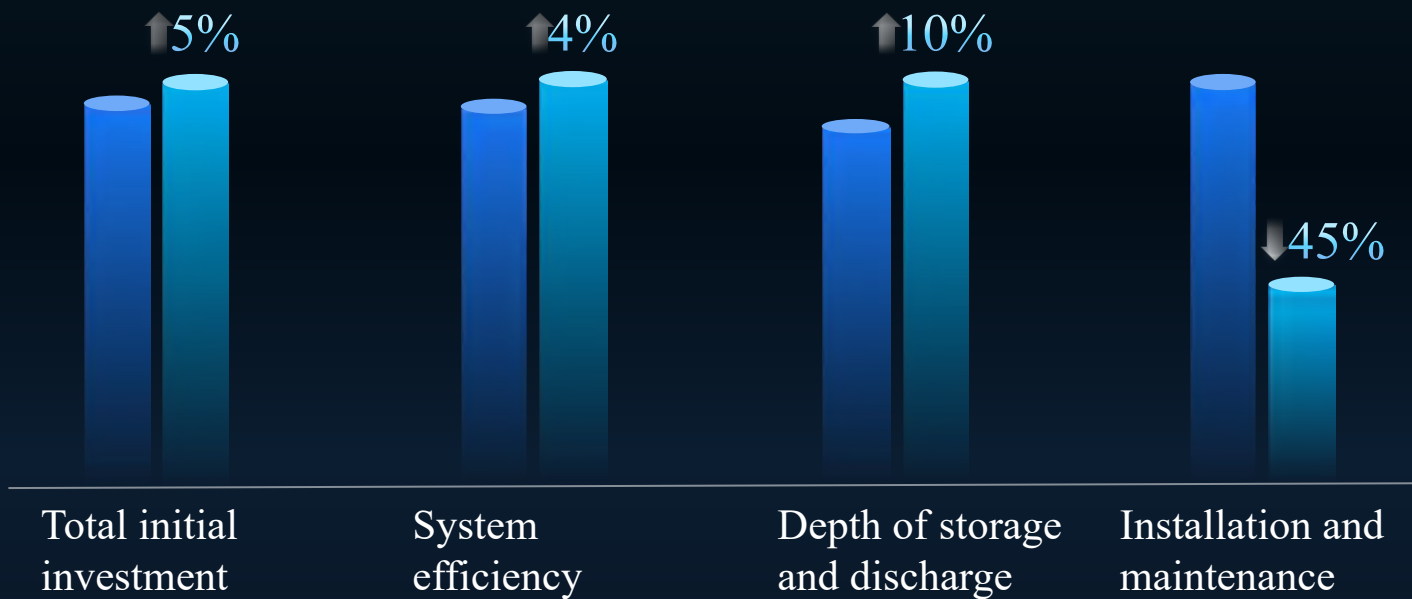
Support mixed use of old and new batteries
AC parallel energy blocks for power station supplementation



eBlock-372



Reduce LCOS by more than 15% through efficiency and power improvement

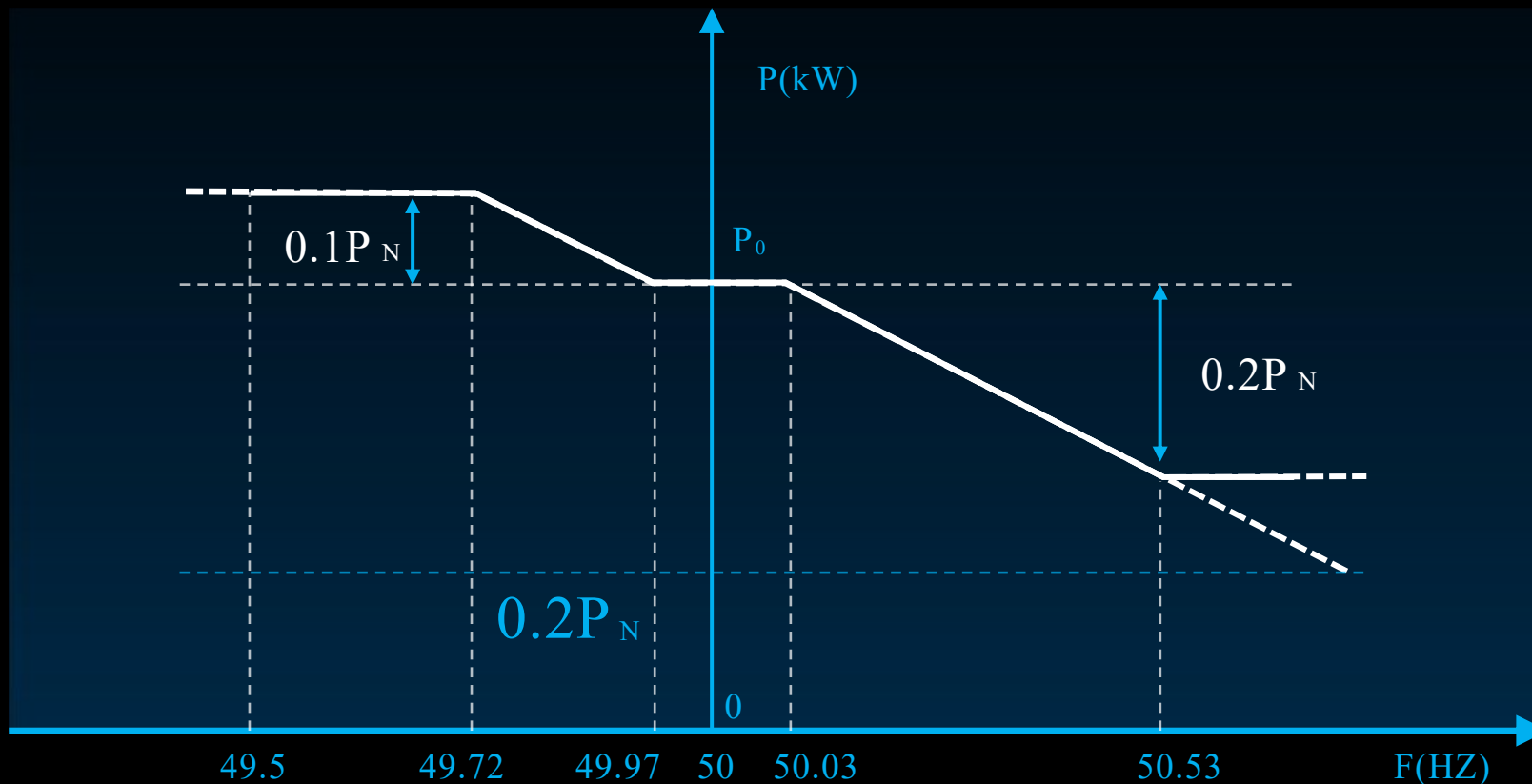


Grid friendly - weak grid support



DSP+FPGA+ARM multi-core control platform, high-speed communication architecture, advanced vector control algorithm and cluster management algorithm, let eBlock support all grid system safety and stability strategies.

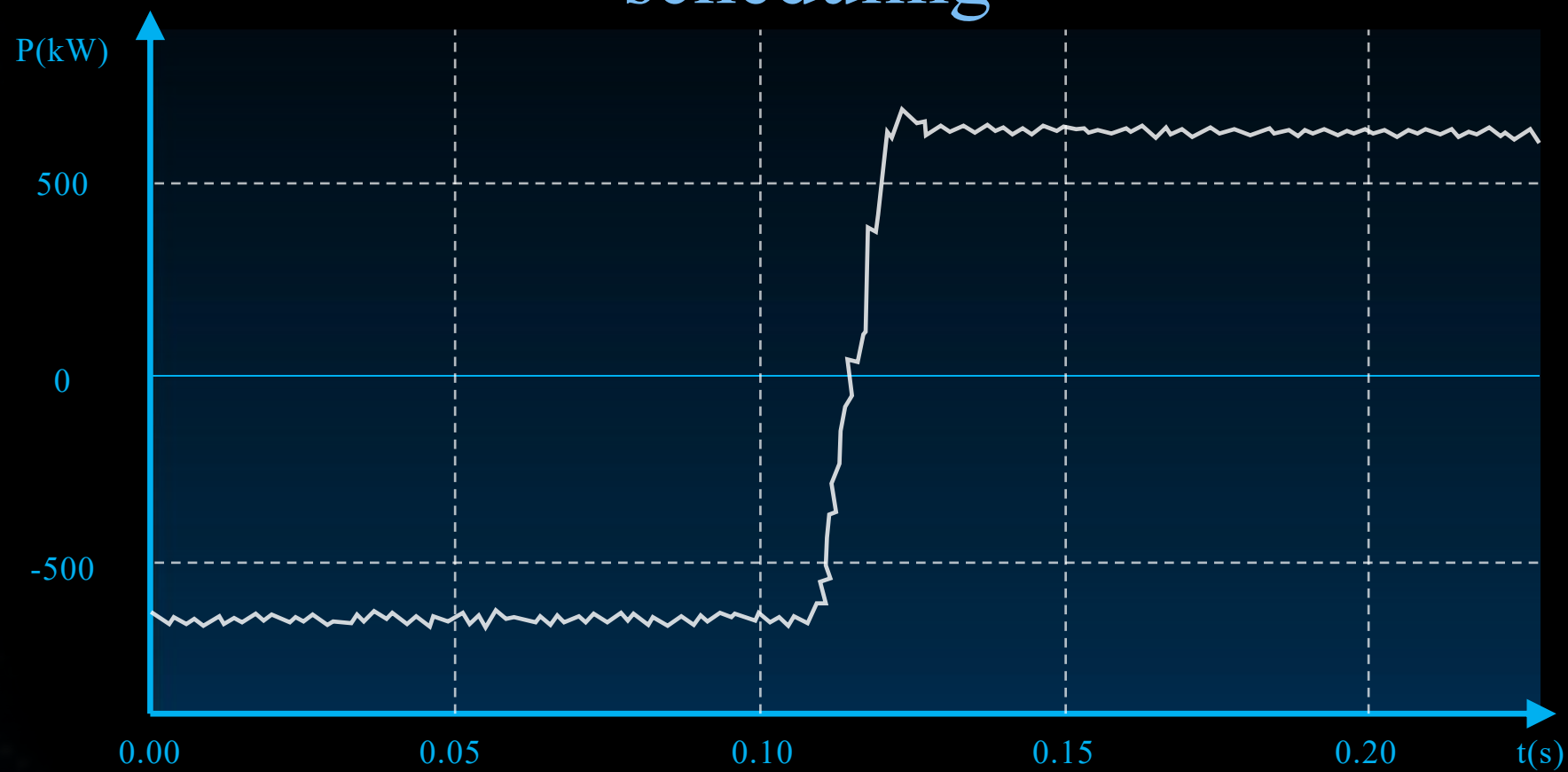
Grid friendly - Primary/secondary frequency regulation



GB/T 40595-2021 Guide for Technology and Test on Primary Frequency Control of Grid-connected Power Resource, DL/T 2246.2-2011 Technical Specifications for Grid-connected Operation and Control of Electrochemical Energy Storage Power Stations Requires that the energy storage power station has primary frequency control function and automatic generation control (AGC) function, and all indicators meet the standard requirements.

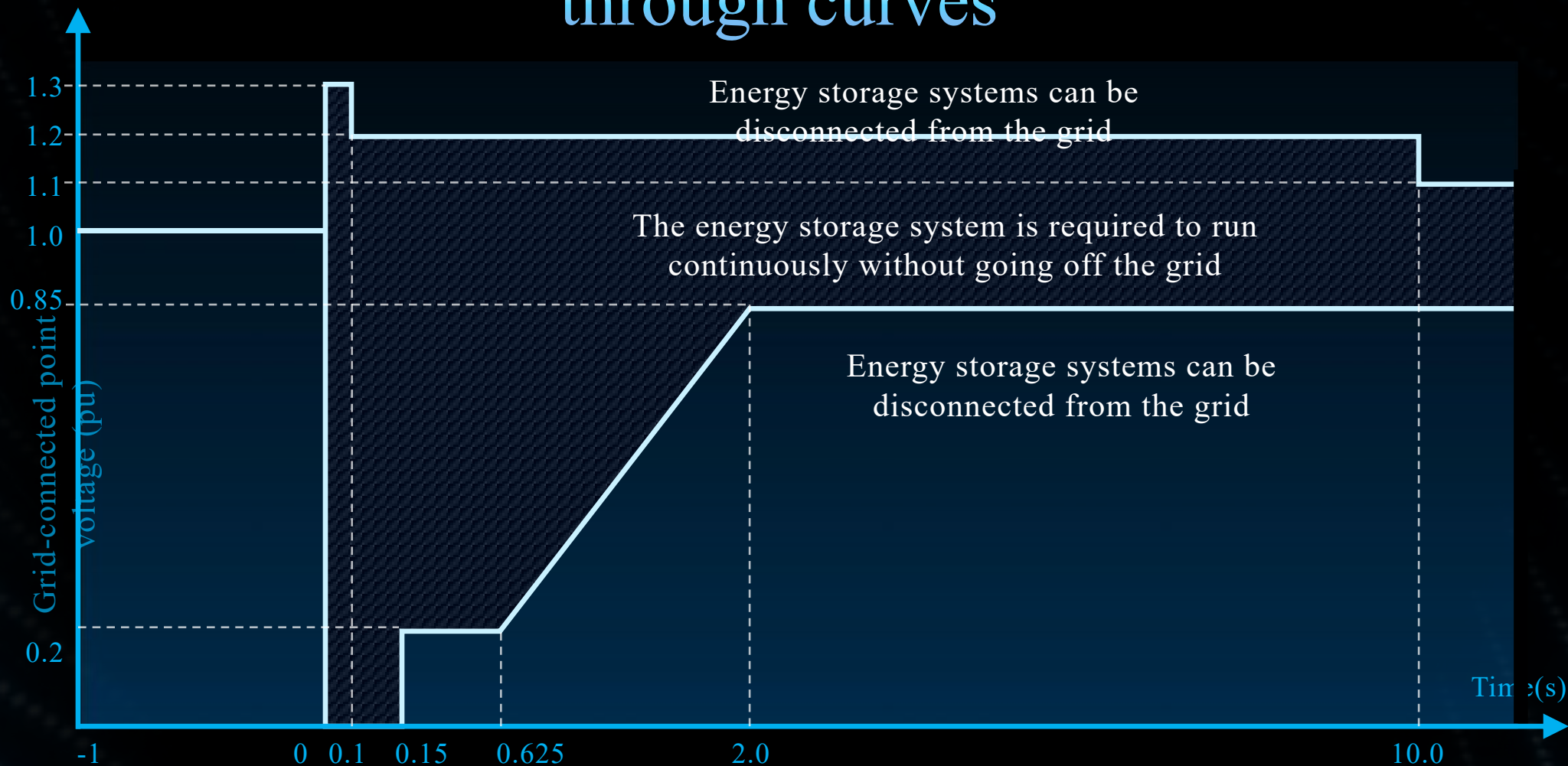


Grid friendly - AGC/AVC scheduling

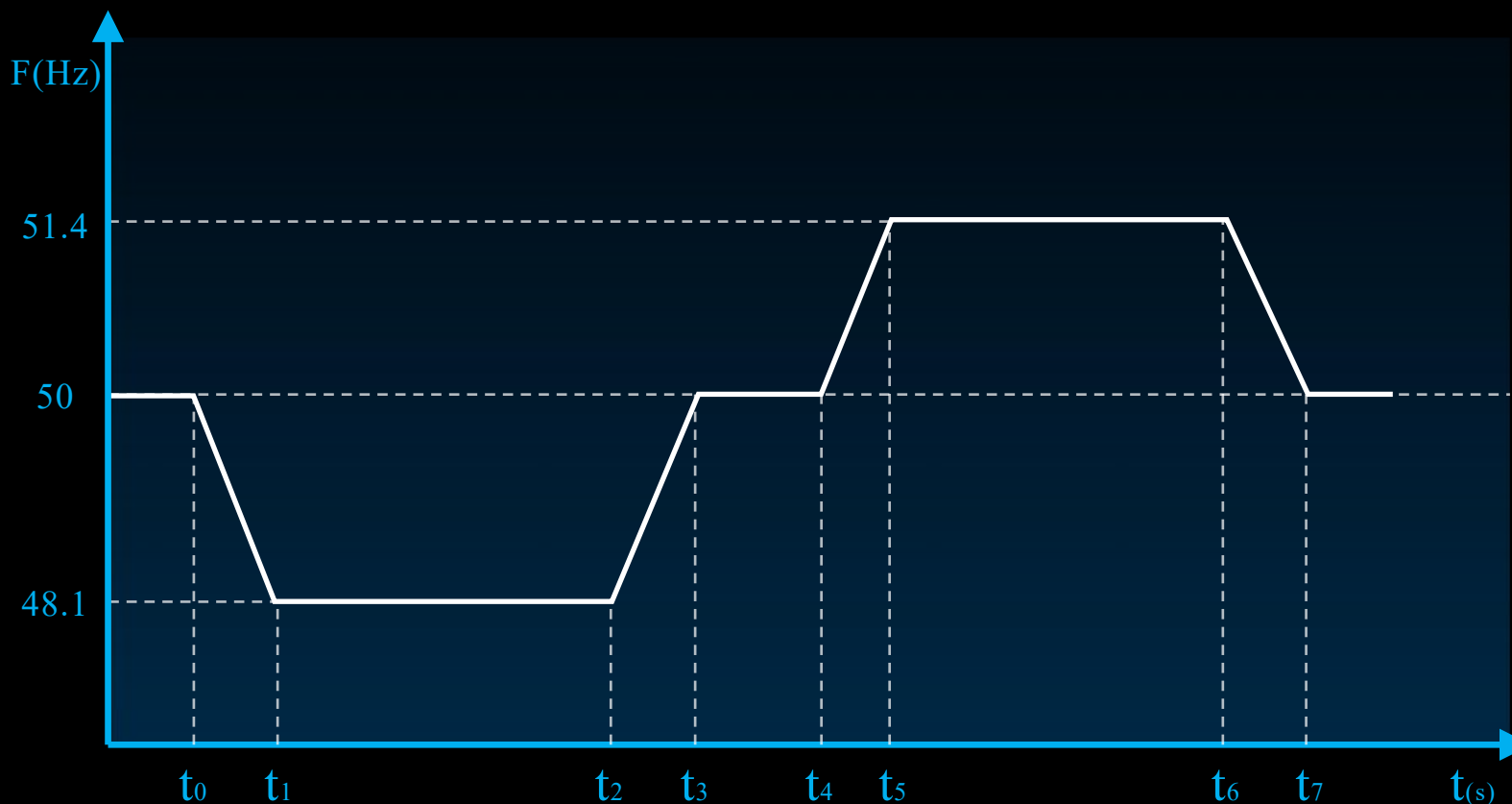


GB/T 34120-2017 Technical Specification for Power Conversion System of Electrochemical Energy Storage System stipulates that the charging and discharging conversion time of the power conversion system should not exceed 100ms

Grid friendly - Fault voltage ride through curves

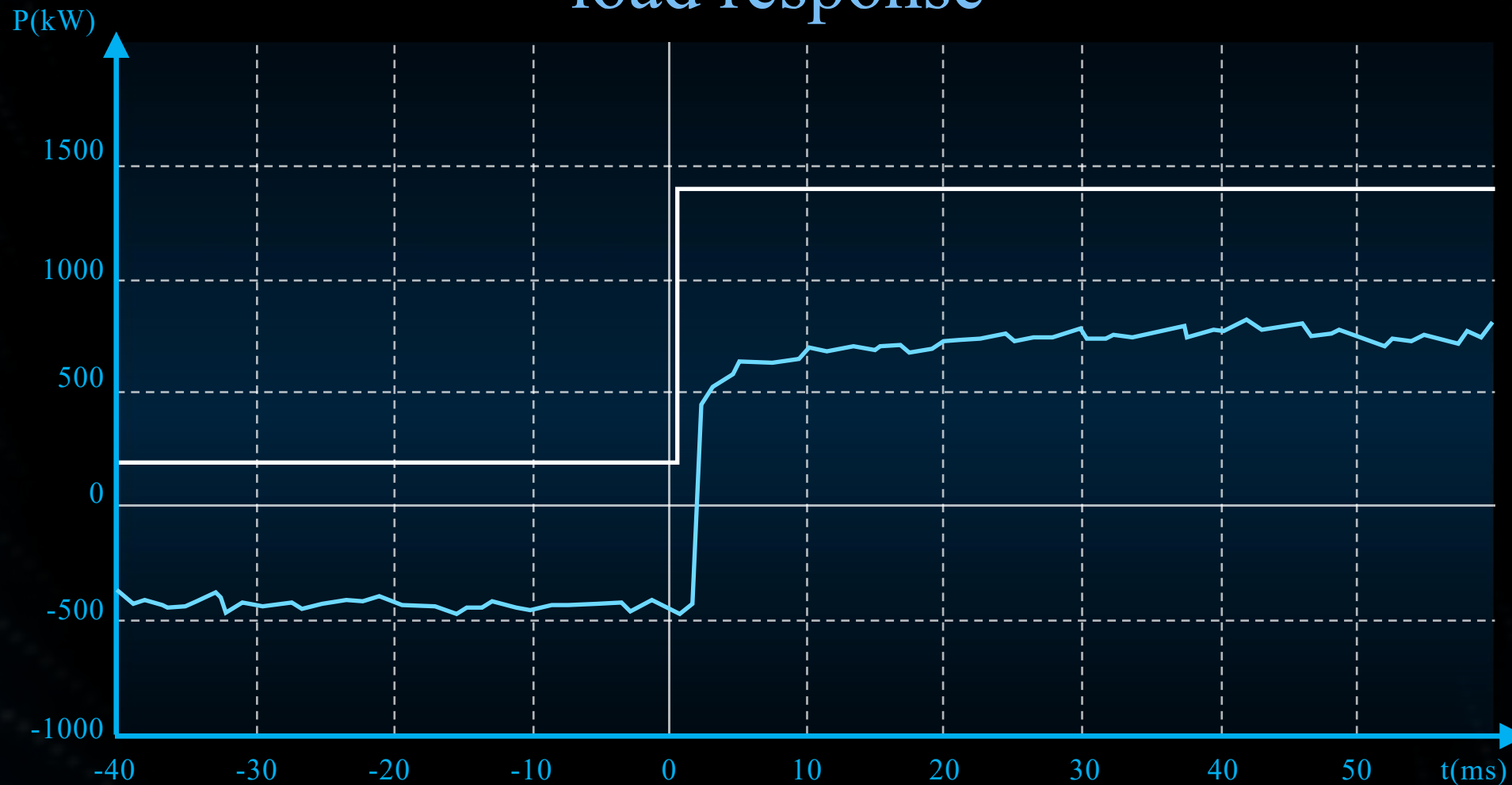


Grid friendly - Inertia control



DL/T 2246.2-2011 Technical Specifications for Grid-connected Operation and Control of Electrochemical Energy Storage Power Stations requires that the active power output by the energy storage power station responds to the frequency change rate of the system. When the frequency deviation exceeds $\pm 0.05\text{Hz}$, the electrochemical energy storage power station should provide inertia support to change the active power output according to the frequency rate of change, including switching from charging to discharging. When supported by inertia, the active power variation is not less than 10%PN, the response time is not greater than 0.5s, the active power error is not more than $\pm 2\%PN$, and the inertial time constant is 4s~12s.

Grid friendly - Source grid load response



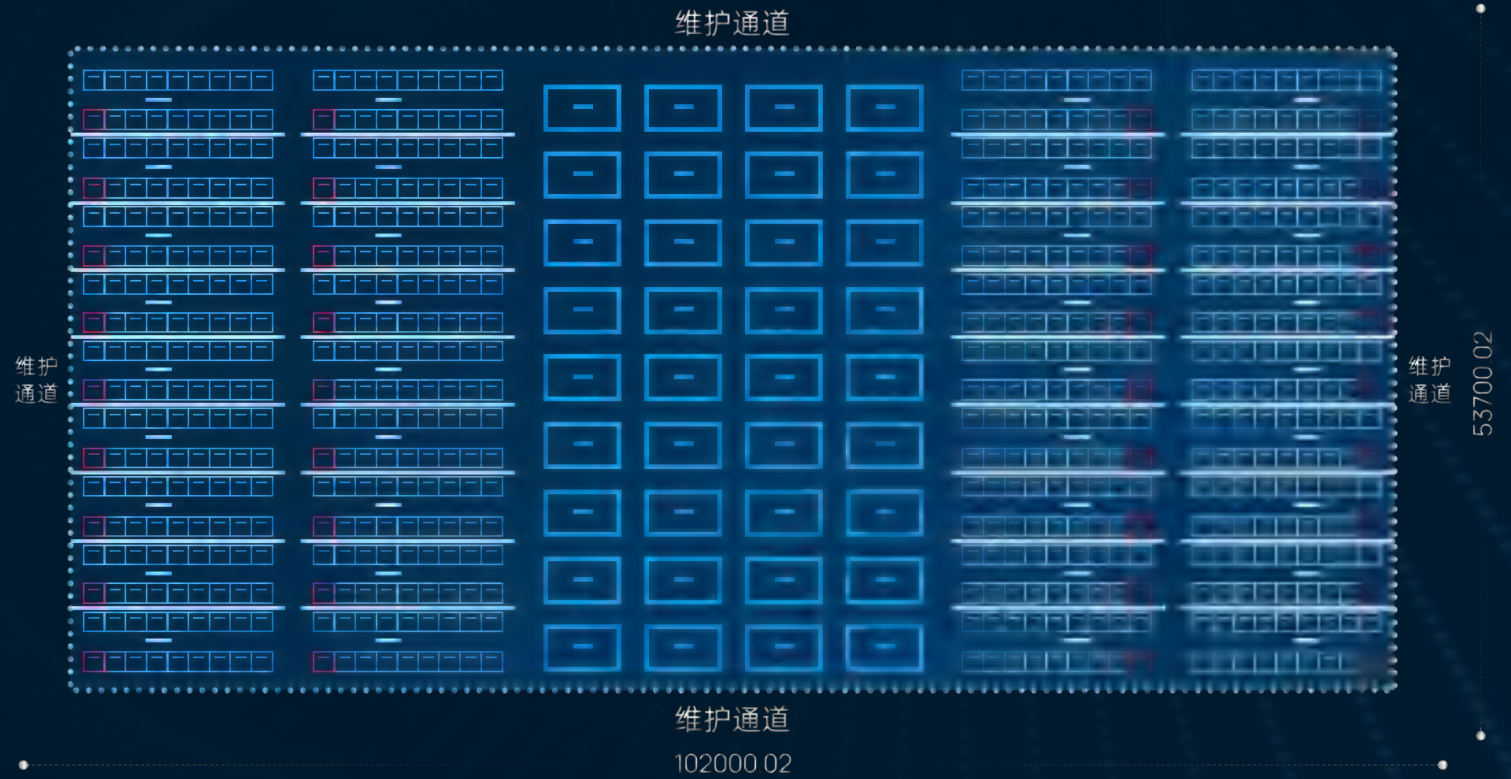


Flexible deployment - small footprint



Covering a total area of 8.2 mu,
Compared with traditional scheme (occupies 11 mu)
Reduced by 25%

200MWh application layout
36 square arrays composed of 15 eBlock372



High economic returns

High system efficiency



System efficiency > 90%

4~5% ↑
Improved system efficiency

Short charge and discharge time



125kW peak continuous operation capability
Fully charge and discharge in 1.6 hours
100% charge and discharge during 2 hour peak period

10% ↑
Increased storage capacity

Low energy consumption in thermal management



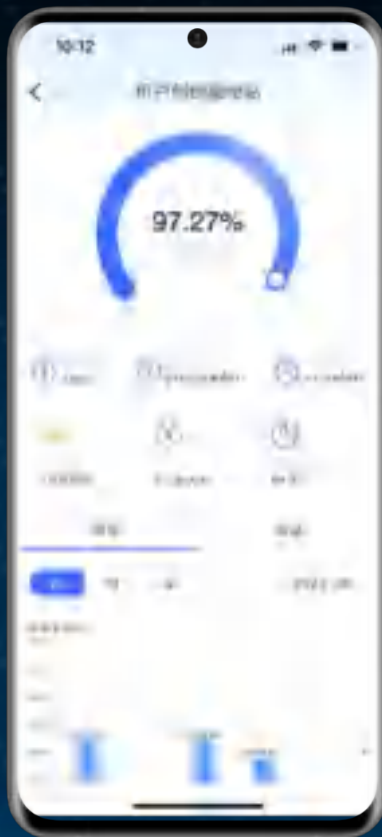
Compact cabinet layout
Less air ducts
High thermal management efficiency

30% ↓
Energy consumption reduction

16% ↑
Increased economic benefits

eBlock-200 Intelligent O&M

Operating
income
Under control



Operation
strategy
Real-time
control

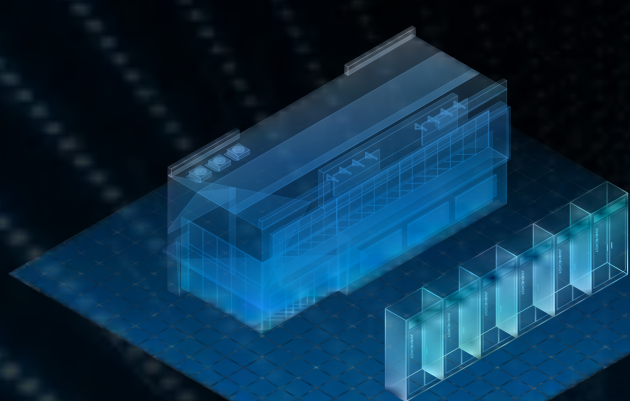


Equipment
monitoring
Meticulous



Flexible deployment and elastic expansion

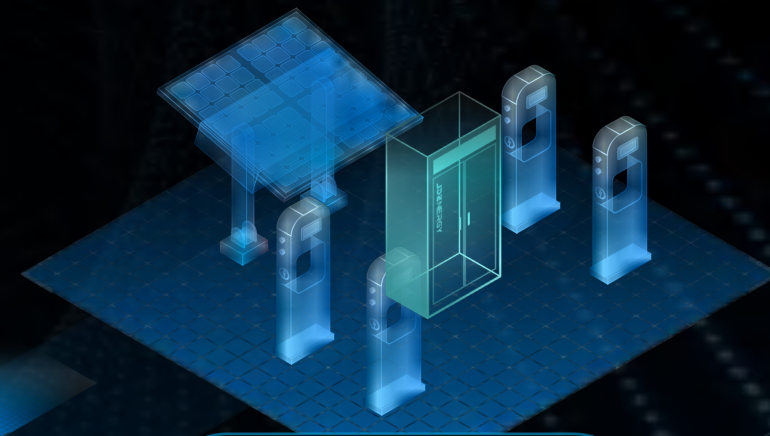
The outdoor unit is 1.26m², suitable for various application scenarios



Centralized deployment



Decentralized deployment



Combine storage and charge



CASE: Zhejiang 0.688MWh industrial and commercial energy storage power station (actual operating data)



About 1.25 million yuan

Total initial investment

92.5%

System efficiency
(two charges and two discharges per day)

360,000 yuan

Savings on electricity bills in the first year (330 days of annual operation)

3.5 years

Recover cost

About 3.2 million yuan

10-year total return



Company Introduction

JDENERGY
奇点能源

- 📅 Registration date: November 28, 2018
- 💰 Financing amount obtained: 408 million yuan
- 🌐 Official website: www.jd-energy.com.cn
- 📍 Address: High-tech Zone, Xi'an, Shaanxi

Let stable and clean electricity benefit everyone

RELIABLE CLEAN POWER FOR EVERYONE

Founded in 2018, JD Energy focuses on core technology research and product development of energy storage systems, and contributes industry-leading solutions to promote large-scale clean energy access and achieve global carbon neutrality goals.

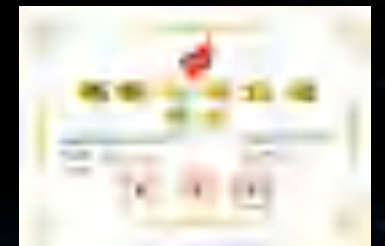


Technological innovation ability

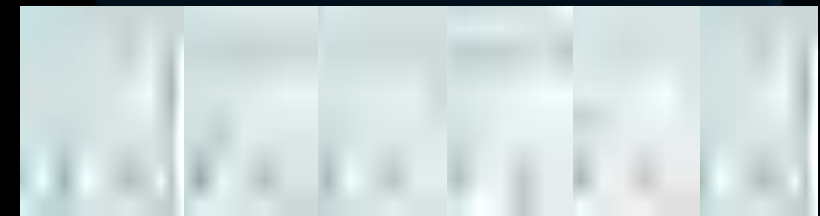
JD Energy technical team is made up of more than 100 people and led by well-known technical experts in the industry, has established a complete electrochemical energy storage technology and power electronics laboratory, and formed system integration capabilities in battery PACK, BMS, PCS, EMS product research and development and GWh eBlock. It has successively obtained more than 100 invention patents and technical certifications, obtained a national high-tech enterprise certificate, and won first prize in the 10th China Innovation and Entrepreneurship Competition (Shaanxi competition area) and first prize in the 2022 Maker China Shaanxi area competition.



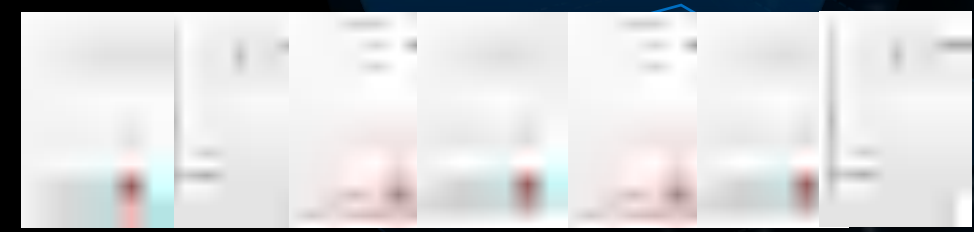
40+ test reports/CQC mark certification test reports



National High-Tech Enterprise Certificate



16+ computer software copyright registration certificates



42+ utility model/invention patent certificates

Manufacturing deliverability

JD Energy has formed the R&D and manufacturing capabilities of battery PACK, BMS, PCS, EMS and integrated energy storage product eBlock, the system integration, intelligent operation and maintenance capabilities of industrial and commercial energy storage power stations, solar storage and charging stations, and new energy storage power stations to provide users with a complete overall solution for energy storage power stations and one-stop energy management services.

10 _{GWh} Currently meets 1GWh energy block
Manufacturing deliverability

15 _{GWh} The company is constructing
5GWh automated production base

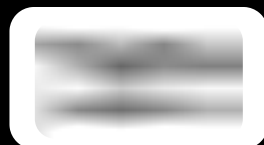


Market recognition

Strategic Cooperation



Signed an agreement with CATL to jointly study the integration technology of GWh energy storage power stations and jointly develop the eBlock solution for 280Ah new batteries



Reached strategic cooperation with CATL, EVE, China Energy Construction Guangdong Institute, HTHIUM, TBEA, Jolywood, etc.

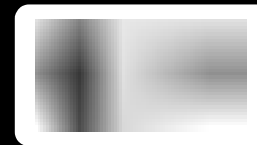
Engineering Applications



State Grid Comprehensive Energy Company, State Grid Hunan Company
State Grid Chongqing Company, State Grid Shaanxi Company



China Southern Power Grid Guangdong Power Grid Investment Co., Ltd. jointly promoted the user-side energy block demonstration power station to exceed 30MWh



Building solar-storage-charging demonstration power station in Xiaogang Village, Anhui together with SPIC and Ningde Times

Typical application

Energy storage applications on the source grid side

The distributed block energy storage system can be used in conjunction with wind and PV power plants to stabilize the power fluctuations of new energy power generation, reduce the rate of wind and light curtailment, respond to AGC scheduling, and realize power auxiliary services such as peak regulation and frequency regulation of the power grid.



Ningxia Tongli 200MWh energy storage project



Hunan Yongzhou grid side energy storage project



Chongqing Changshou 10MWh energy storage project



Hebei Zhangjiakou 40MWh energy storage project

Typical application

Industrial and commercial energy storage applications

Distributed block energy storage products can be flexibly deployed in various industrial and commercial parks, and are suitable for industrial and commercial enterprises with obvious differences in peak and valley power consumption. Through load shifting, capacity reduction and demand reduction, users can save electricity costs, improve power quality, and provide emergency power backup services for important loads.



Guangdong Huizhou user-side energy storage project



Guangzhou Panyu user-side energy storage project



Zhejiang Yiwu user-side energy storage project



Guangdong Dongguan user side energy storage project

Typical application

Solar-storage-charge fusion application

Block energy storage products can be integrated with photovoltaic systems and charging pile systems. Through the two-way adjustment capability of energy storage equipment to electric energy, the self-consumption rate of photovoltaic power generation can be improved, and the impact of high-power electrical equipment such as charging piles on the transformer load rate can be reduced, and peak shift capacity expansion can be realized to meet the comprehensive energy consumption needs of users to the greatest extent.



Beijing Yizhuang Development Zone storage and charge integrated project



Shenzhen Baoan solar-storage integrated project



Qingyuan beautiful village energy storage project



Guangzhou Baiyun storage and charge integrated project

Some of the projects that have been put into operation

Energy blocks have signed more than 1000MWh in total in State Grid, China Southern Power Grid, China Energy Construction, China Power Construction, and State Power Investment Corporation

