- A Trina Solar business division
- Safety
- 25+ years of solar manufacturing experience
- Product Innovation
- Products are 100% tested
- Flexible solutions
- International presence
- Local market expertise

Leading the Energy Transition through Storage

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The Need for Batteries

The world's energy infrastructure is undergoing a rapid transformation

Globally, efforts are being made to reduce CO_2 emissions. Renewable energy generation, especially solar energy, is the most economic and sustainable form of power generation across most parts of the world.

However, the global expansion of solar energy generation capacity is limited due to local grid constraints and intermittent generation. The rapid growth of both solar and wind energy generation capacity over the last 10 to 20 years has forced sectors to think of new ways to meet the growing need for - flexibility.

Batteries are flexible grid assets as they can provide a wide range of services to the electricity grid depending on the needs of the grid at any given time ensuring the reliable and efficient operation of the electricity system.

Tailored Solutions for Specialized ESS Applications

Long cycle life **High energy density** **Lower cost**

Compared to other types of lithium-ion batteries, Lithium iron phosphate (LFP) batteries have become increasingly popular in recent years.

Widely Adopted

LFP batteries have been widely adopted for grid services applications such as frequency regulation, peak shaving, and load shifting. The demand for LFP batteries in grid services is expected to grow due to the increasing adoption of renewable energy sources to balance intermittent generation with demand.

EV Adoption

EV applications are also adopting LFP as the cost of LFP batteries continues to decrease.

Some key considerations for developing ESS batteries

- High Depth of Discharge
- High Safety
- Competitive Costs
- Improved Cycle life
- Enhanced Battery Life

Vertical Integration as Core Competence

Within the battery storage industry, **supply chain** is a critical topic. With EV demand pulling the lion's share of the LFP capacity, the ESS or stationery storage industry is struggling to meet demand, often faced with price increases and longer lead times.

Trina Storage as part of its vertical integration strategy has developed in-house battery cell R&D, integration as well as manufacturing capability.

R&D capability

Multiple research platforms, highly educated professionals and innovative teams, patents for invention, advanced testing equipment and detecting instrument.

Manufacturing capability

Full Product range, improved cell performance with better control over production process, lower average cost achieved through economies of scale.

Integration capability

45000m² planned area of base, strong integration capacity, fully integrated product specially designed for gird service KPIs.

Leading New Technology

Elementa

Flexible, high-performance, inherently safe Utility Scale Battery System

Our latest in-house battery storage system

It is a modular and smart storage solution, tailored for grid-scale installations in key storage markets.

Fully integrated system

Fully integrated and pre-fabricated with industry-leading LFP cells, liquid cooling system, BMS and fire suppression system, it is optimized for flexibility, smooth installation, and efficient maintenance.

Enhanced Lifecycle

Improved lifecycle is possible thanks to its cutting-edge cell technology;
Combined with advanced Battery Management techniques.

Optimized Cost

15% lower solution price & up to 8% cost saving on CAPEX and OPEX compared with tier-1 supplier.

Advanced Safety Features

In-house Liquid Cooled LFP batteries;
Configurable multi-level BMS;
Advanced FSS to minimize any thermal anomalies.

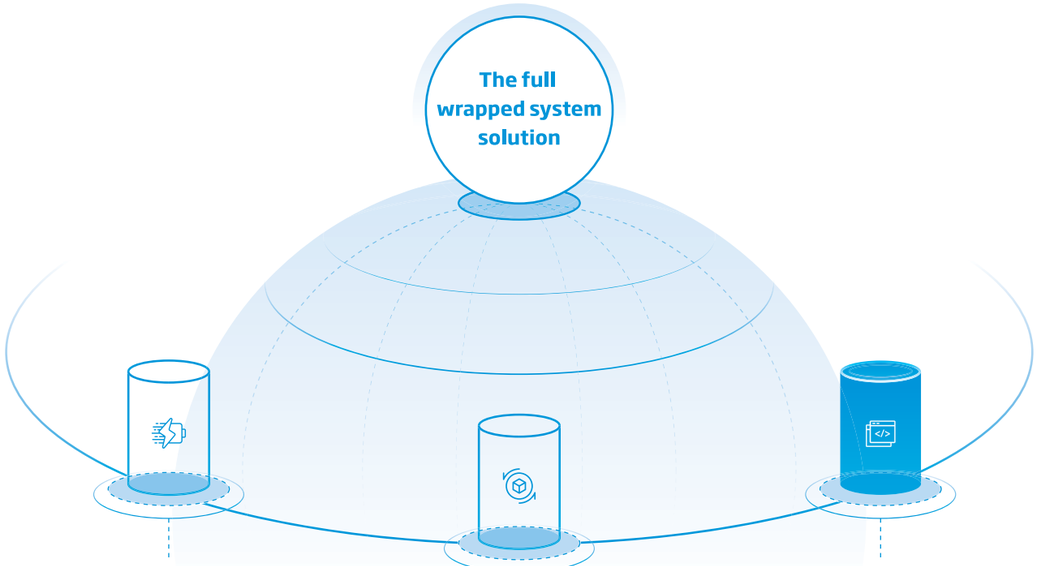
Rapid Installation

30% installation time savings;
Simple & effective plug-play concept;
Above ground infrastructure;
Smooth installation and efficient maintenance.

Integrated Battery System Solution

Trina Storage is a business unit of Trina Solar

Trina Solar is a company with over 25 years of solar manufacturing experience. Supported by a Tier-1 supply chain, Trina Storage provides vertically integrated, bankable, highly scalable, easy-to-install energy storage solutions.



Batteries

High quality, Tier 1 LFP modules, 0.25C to 1C chemistries liquid cooled cells, highly configurable 3- level BMS, advanced fire suppression system.

Power Conversion

State-of-the-art power electronics, DC- and AC-coupled solutions, air and liquid cooled solutions, high efficiency DC/DC and DC/AC.

E²MS - Trina EMS Platform

Comprehensive software and hardware solution that seamlessly integrates with Trina's grid scale battery storage systems to facilitate efficient control, monitoring and optimization of energy flows.

Key Solution Features

Product Excellence

Outstanding degradation and battery performance that run well with financial models;

Full wrapped system solution including product, warranties, and service;

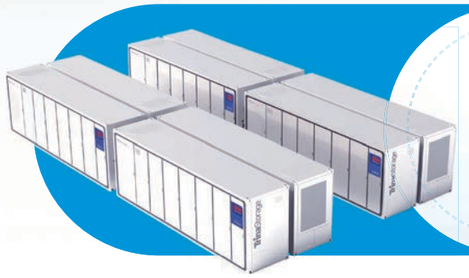
Commercially competitive & cost-effective compared with other Tier-1 suppliers.

Secured Supply Chain

Strong supply chain and bulk buying power in key markets;

Strong partner relationship - PE strategic cooperation in 2022;

Improved solution pricing.



Flexible and Optimized Solution

Customized solution with high flexibility;

Optimized performance and battery lifetime;

Flexible warranty and service terms.

TrinaStorage
Top 10
Bankable System
Integrators

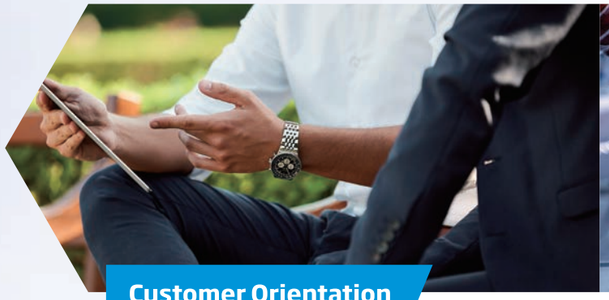
Bankability

Ranked among Top 10 bankable system integrators by BloombergNEF;

Technical bankability with qualified grid services;

Financial bankability with stable financial operation capability.

Key Solution Features



Customer Orientation

- Smooth communication and active support during initial planning, BESS design and project delivery phases;
- Great partner network - Strong relationship with third-party suppliers that further ensures smooth project implementation;
- Solution oriented mindset when faced with price increases to provide added value to customers.

Intelligence

- Advanced PPC;
- 3-level BMS controls to maximize usable capacity and power;
- 100+ years of combined experience to make intelligent choices that optimize the power and usable capacity for maximized customer revenue.

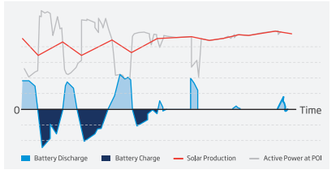
- Experienced team and outstanding local delivery & execution capability;
- Strong engineering and design capability;
- Proven track record of system integration and project deployment swiftly and effectively;
- Smooth construction process;
- Extensive quality control;
- Effective risk management.

- Local and international service support;
- Trusted service network of qualified service providers;
- Planned and unplanned maintenance;
- Unparalleled warranty commitment - only brand to survive its warranty period;
- Performance guarantee tests.

Solar + Storage

With a 25-year heritage in PV solutions, Trina Storage provides the most efficient and optimal energy storage systems for utility and grid operator customers. We deliver enhanced PV generation that achieves maximum consumption.

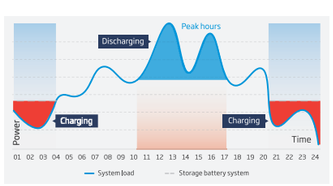
- Smart design with an optimized and cost-efficient solution
- Tier 1 hardware and software
- Flexible solutions designed for each customer's needs
- Trustworthy, expert partner network and strong supply chain
- Up to 20-year warranty



Renewable Integration

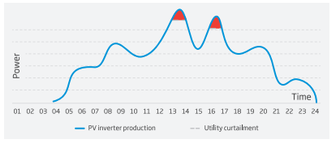
As wind and solar energy adoption continues to grow, energy grids can be impacted by the intermittent nature of RE sources. Incorporating battery storage technology is the most cost-effective option for the safe and successful integration of renewables;

Other benefits of renewable integration include the management of short-term variability on the power grid and a modernization of the grid.



Energy Shifting

Energy storage can be utilized to shift the peak generation from the PV system as energy demand fluctuates. It saves energy during periods when demand is low. Installed storage captures solar energy and allows local utilities to be more independent in their energy mix. Energy shifting enables organizations to get the maximum revenue from their PV generation, enabling higher DC/AC ratios for PV plants as well as time-variant grid injection.



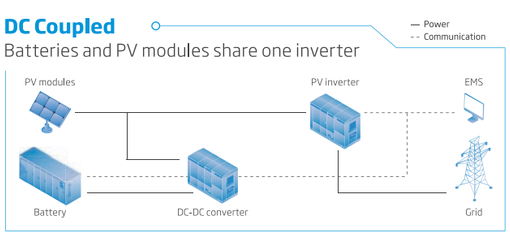
Renewables Curtailment Avoidance

Production may be curtailed by a grid operator for various reasons, such as increasing the stability of the network.

At the same time, energy storage allows PV excess energy to be stored and delivered when needed.

DC Coupled

Batteries and PV modules share one inverter

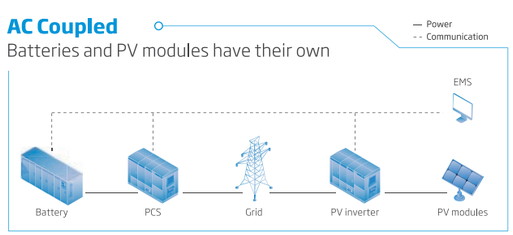


PV inverter with a direct connection to PV modules and connection via DC-DC converter to batteries.

lower CAPEX due to less equipment

AC Coupled

Batteries and PV modules have their own



respective inverters and either share one point of connection (POC) or have separate POCs (ESS standalone)

more operational flexibility

TrinaStorage

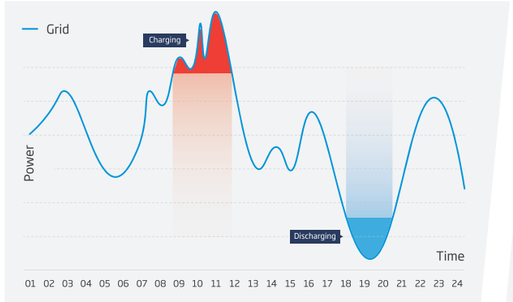
Standalone (Grid Service)

High efficiency, standalone utility-scale solutions for ultra-fast grid services, T&D deferral and market pooled assets.

- Tier 1 products delivered (hardware, software, components)
- Smart design with an optimized and cost-efficient solution
- Flexible warranty package
- Minimal response time thanks to advanced power plant controlling
- Instantaneous active and reactive power supply
- Trustworthy, expert partner network and strong supply chain
- Flexible solutions designed for each customer's needs

Frequency Regulation System

Frequency regulation is known as a crucial method for stable power grid operation:



Grid over frequency (when generation is higher than demand)

Inverter power output is curtailed and energy is stored through charging batteries

Grid under frequency (when generation is lower than demand)

Inverter power output is increased by discharging the batteries and injecting more power to the grid

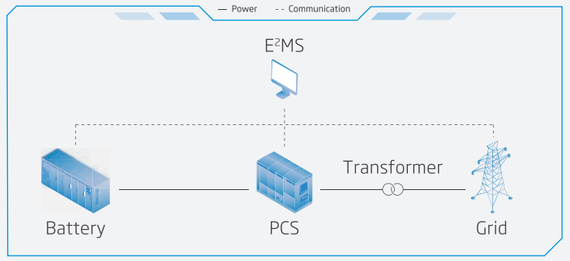
Gas Peaker Replacement

Batteries are a good alternative when it comes to managing grid peaks and provide many benefits:

- Cost efficiencies
- CO_2 emission avoidance
- Better power quality

Transmission & Distribution Deferral

A small amount of storage can result in the delay or avoidance of a costly T&D upgrade. New RE assets lead to a change in power flows in distribution networks, allowing greater use of distribution networks. Energy Storage also prevents high costs generated by network upgrades.



Standalone

Battery is connected to the grid via PCS, transformer and substation;

Battery capacity can be used to provide ancillary services such as firm frequency response (FFR), balancing mechanism to grid providers;

Highly efficient power plant controller guarantees fast response times complying with the highest grid standards.

Other Applications

Modular and easy-to-install solution with minimum onsite work. High performance, high availability systems for electricity bill savings and minimum downtime for industrial customers: Optimized off grid battery storage systems for Microgrids.

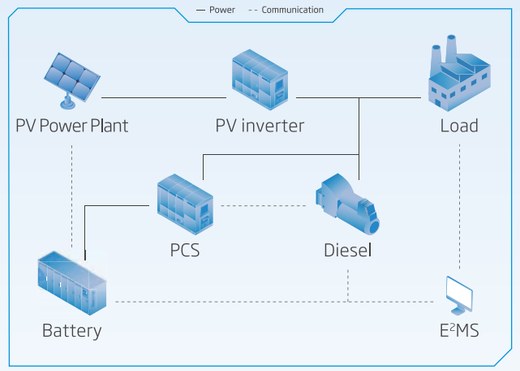
Microgrid

- Off-grid and grid-connected Microgrids
- Industrial power supply is independent from oil price
- Increasing RE penetration and sustainability
- Ramp-up control for diesel allows the switching off of diesel generators in times of renewable energy-generation
- Site resiliency
- Hedging against possible emission penalties
- Green and sustainable power supply
- Overcome planned and unplanned power outages

Large Industrial

- Demand response
- Site resiliency
- Lower demand charges
- Potential addition of PV
- Smart design with an optimized and cost-efficient solution
- Tier 1 hardware and software
- Trustworthy, expert partner network and strong supply chain
- Flexible solutions designed for each customer's needs

Microgrid

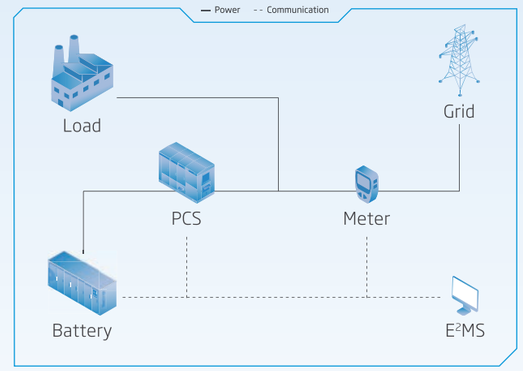


Grid forming PCS allows the power supply by only Battery. Battery+PV or both in parallel with Diesel;

Ramp-rate control allows Diesel to be turned off in time of high renewable penetration and to be switched on when needed;

Dispatch strategy controlled by by E²MS, our advanced Energy Management System.

Large Industrial



Battery is being charged from the grid in times of lower load consumption;

When load consumption increases, battery can supply power to the load in order to limit power consumption from grid.