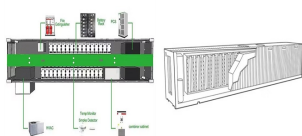


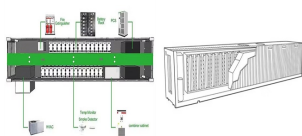
# CAPITAL SMART CHARGING ENERGY STORAGE



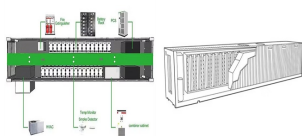
Can large-scale battery energy storage systems meet fast EV charging Demand? One of the most promising solutions is to use large-scale battery energy storage systems (BESS) to meet fast EV charging demand. The capital and operational costs of BESS have been significantly reduced in the last decade due to technology advancement and economies of scale.



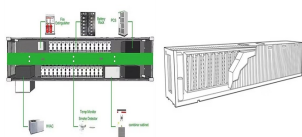
What is a good ESS for a coupling fast EV charging station? A good Energy Storage System (ESS) for a coupling fast EV charging station can be considered a system including batteries and ultra-capacitors. From this brief analysis, batteries are suitable for their high energy densities and ultra-capacitors for their high power densities.



Can a Li-Polymer battery be used as a fast charging station? A real implementation of an electrical vehicles (EVs) fast charging station coupled with an energy storage system, including a Li-Polymer battery, has been deeply described.



Should smart charging be developed? Smart charging should be developed while keeping in mind the specificities of each power system. The smart charging strategy may differ depending on the VRE source that dominates the power system and its generation profile. The incremental benefits of smart charging will be particularly significant in solar-based systems.

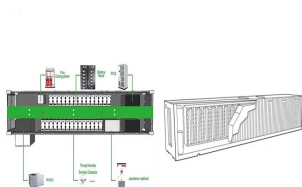


Could smart charging facilitate balancing in the wholesale market? Source: IRENA, 2019b. Smart charging could provide flexibility at both the system and local levels (see Figure S4). At the system level, smart charging could facilitate balancing in the wholesale market.

# CAPITAL SMART CHARGING ENERGY STORAGE



What are the benefits of smart charging? The incremental benefits of smart charging will be particularly significant in solar-based systems. By shifting charging to better coincide with solar PV generation, and by implementing V2G, increased shares of solar could be integrated at the system level and the local grid level, mitigating the need for investments in the distribution grid.



One of the most promising solutions is to use large-scale battery energy storage systems (BESS) to meet fast EV charging demand. The capital and operational costs of BESS have been significantly reduced in the last decade due to technology advancement and economies of scale.



Storage deal volume reached \$15.4 billion in the six months ending June 30, but funding for smart grid companies dropped 11% from the year-earlier period to \$1.8 billion, Mercom Capital Group said.

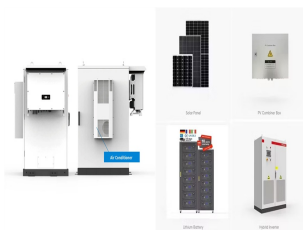


Energy Park, an EV charging solution provider, secured an initial ?35 million (~\$45 million) investment from Zouk Capital, manager of the UK Government's Charging Infrastructure Investment Fund (CIIF). With this funding, the company plans to provide charging facilities to residential sites across the U.K. Gavin Malone, Founder of Energy Park, said, "The ???



Stationary energy storage systems can also charge EVs and mitigate renewable power generation intermittencies. the on-the-road solar energy harvesting method for smart charging of solar PHEVs has been studied in another work to reduce the the initial capital cost for constructing battery swapping/switching stations is much higher than

# CAPITAL SMART CHARGING ENERGY STORAGE



Venture capital funding in the global energy storage space broke records in 2023, On the smart grid side, corporate funding dropped 30% year-over-year in 2023, recording \$3.3 billion in 60



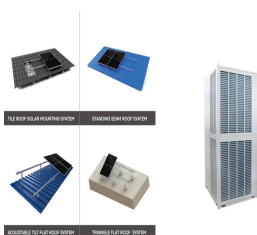
uncontrolled charging could increase peak stress on the grid, necessitating upgrades at the distribution level. Emerging innovations in smart charging for EVs span not just technologies but business models and regulatory frameworks (IRENA, 2019a). These will be crucial to integrate renewable energy sources while avoiding network congestion.



Energy Storage Industries ??? Asia Pacific (ESI), an iron flow battery manufacturer and energy storage project developer, has received a total investment of AU\$65 million (~\$40 million) in funding; AU\$25 million (~\$17 million) from the Queensland Government, and AU\$40 million (~\$23 million) of private capital from an undisclosed international



Venture Capital Funding in Energy Storage Up Significantly with \$994 Million in Q1 2021; April 19; Staff; Efficiency, Smart Grid, Storage; In Q1 2021, \$1.3 billion was raised in VC funding by Battery Storage, Smart Grid, and Energy Efficiency companies, a 410% increase from the \$252 million raised in Q1 2020. with a Smart Charging company

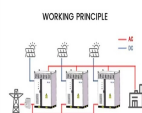


Concurrent with increasing residential electricity prices, the rewards for exported solar electricity are falling. Therefore, local PV self-consumption is gaining attention in several countries [7], [8].Energy storage is one effective way of allowing a larger fraction of demand to be met by PV-generation [9] and recent work has demonstrated that batteries can be used to ???

# CAPITAL SMART CHARGING ENERGY STORAGE



1.2 Railway Energy Storage Systems. Ideally, the most effective way to increase the global efficiency of traction systems is to use the regenerative braking energy to feed another train in traction mode (and absorbing the totality of the braking energy) [1]. However, this solution requires an excellent synchronism and a small distance between "in traction mode" and "in ???"



At present, renewable energy sources (RESs) and electric vehicles (EVs) are presented as viable solutions to reduce operation costs and lessen the negative environmental effects of microgrids (? 1/4 Gs). Thus, the rising demand for EV charging and storage systems coupled with the growing penetration of various RESs has generated new obstacles to the ???



The Strategy's investment objective is to provide long term capital growth. The Strategy seeks to achieve its objective by investing in a portfolio of companies worldwide that provide technological solutions and services targeting the decarbonisation of the global energy sector. Smart Energy Strategy. Solutions for a decarbonised energy

## Commercial and Industrial ESS

- Budget-Friendly Solution
- Renewable Energy Integration
- Modular Design for Flexible Expansion



storage systems that are applied in smart grids. Various energy storage systems are. over the increased capital and operational costs to Positive values represent the charge of storage on



Smart Grid companies brought in \$3.3 billion in total corporate funding in 2023 AUSTIN, Texas--(BUSINESS WIRE)-- Mercom Capital Group, LLC, a global clean energy communications and consulting firm, released its report on funding and mergers and acquisitions (M& A) activity for the Energy Storage and Smart Grid sectors in 2023. Get the report:

# CAPITAL SMART CHARGING ENERGY STORAGE



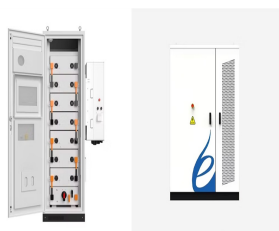
Unlike conventional EV charging stations that require high-voltage grid connections, JOLT's technology uses battery storage to provide additional energy for fast and convenient charging. According to the company, each JOLT station can deliver up to 320 kW of power, allowing EV drivers to charge up to 100 km of driving range in just 5 minutes.



However, energy storage project M& A deals saw a 50% decline, with six transactions in Q1 2024 compared to 12 during the same period last year. "Compared to solar, M& A deals in the energy sector aren't as robust due to higher cost of capital, and it will be interesting to monitor how this trend evolves," commented Prabhu. Smart Grid



The smart charging stations are available in a wide range of charging capacities and functionalities. The powerful combination of Alfen's transformer stations, energy storage systems and charging stations enables the company to strike an optimal balance between decentralised generation and consumption.



Energy Storage. Corporate funding in Energy Storage came to \$11.7 billion in 29 deals in Q1 2024, an increase of 432% year-over-year (YoY) compared to \$2.2 billion in 27 deals in Q1 2023. In a quarter-over-quarter (QoQ) comparison, funding increased 216% compared to the \$3.7 billion raised in 26 deals in Q4 2023.



This paper proposes a collaborative interactive control strategy for distributed photovoltaic, energy storage, and V2G charging piles in a single low-voltage distribution station area. The optical storage and charging smart distribution station area is used as the fulcrum of the distribution network load regulation, to suppress the fluctuation

# CAPITAL SMART CHARGING ENERGY STORAGE



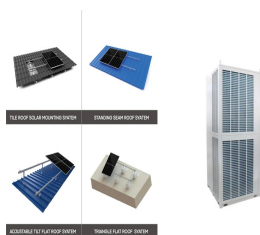
In addition, some studies show that the battery of the vehicle can be used as an energy storage system. Thus, charging systems can be developed to cut peaks and fill valleys in the energy consumption graph to solve the duck curve problem. studies on smart charging stations and smart energy management algorithms are important.



In the first half (1H) of 2023, corporate funding for energy storage companies reached an impressive \$7.1 billion across 59 deals, according to Mercom Capital Group's 1H and Q2 2023 Funding and M& A Report Storage and Grid Report.. Although this represented a 55% year-over-year (YoY) decrease compared to the unprecedented \$15.8 billion raised in 60 ???



In July 2021 China announced plans to install over 30 GW of energy storage by 2025 (excluding pumped-storage hydropower), a more than three-fold increase on its installed capacity as of 2022. The United States' Inflation Reduction Act, passed in August 2022, includes an investment tax credit for stand-alone storage, which is expected to



Venture Capital Funding for Energy Storage Rises 115% in 9M of 2023. During Q3, however, the corporate funding for storage recorded a 67% surge. October 26, 2023 Despite substantial investments in smart charging companies, VC funding experienced a significant decline in Q3 2023, dropping by 65% QoQ, as it amounted to \$248 million across 11



Mercom Capital Group, an integrated communications and research firm focused exclusively on clean energy markets, released its report on funding and merger and acquisition (M& A) activity for the Energy Storage and Smart Grid sectors for the third quarter (Q3) and the first nine months (9M) of 2024.. Energy Storage. Corporate funding for Energy ???



# CAPITAL SMART CHARGING ENERGY STORAGE



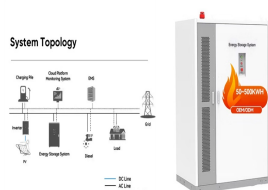
For the sake of simplification, this survey covers capital expenditure (CAPEX) costs. For example, some costs that aren't covered in this analysis include: Total battery energy storage project costs average \$580k/MW. 68% of battery project costs range between \$400k/MW and \$700k/MW.



energy storage until the end of the decade and beyond, driven by a substantial ramp-up in manufacturing capacity by Chinese, American and European battery makers and the use of ever larger prismatic cells for energy storage, allowing for more energy storage capacity per unit and greater system integration efficiency.



Global VC funding (venture capital, private equity, and corporate venture capital) for Battery Storage, Smart Grid, and Efficiency companies in 2020 was 12% higher with \$2.6 billion compared to \$2.3 billion raised in 2019. Battery Storage. Total corporate funding in the battery storage sector was up 136% with \$6.6 billion in 54 deals in 2020.



Working with partners across the country, the Charging Smart program is helping local governments become leaders in EV deployment. Municipalities play an important role in establishing policies, procedures, and programs that impact the deployment of electric vehicle charging equipment in their communities. By expediting the installation of EV charging ???



In 1H of 2024, venture capital (VC) funding for energy storage companies amounted to \$2.4 billion across 48 deals, a 37% decrease from the \$3.8 billion in 43 deals during the same period in 2023. All aspects of smart charging, from hardware to software, are seeing increased financing due to incentives for electric vehicles (EVs) under the

# CAPITAL SMART CHARGING ENERGY STORAGE



0.09 \$/kWh/energy throughput 0.12 \$/kWh/energy throughput Operational cost for low charge rate applications (above C10 ???Grid scale long duration 0.10 \$/kWh/energy throughput 0.15 \$/kWh/energy throughput 0.20 \$/kWh/energy throughput 0.25 \$/kWh/energy throughput Operational cost for high charge rate applications (C10 or faster BTMS