Case Study: ATESS' Grid-Connected Solar Storage Charging System Revolutionizes the AEA in Peterborough

Agricultural Engineers Association (AEA) with nearby ATESS container

Introduction

In the evolving landscape of energy solutions, the integration of power grid with energy storage solutions and EV charging stations, collectively known as a Grid-Connected Solar Storage Charging System, is paramount. It allows for efficient energy management by storing electricity from the grid during off-peak times and using it when demand is high, thus optimizing energy costs and ensuring a stable power supply for EV charging without incorporating solar panels or other renewable energy sources. ATESS' involvement in the Peterborough AEA project in the UK highlights a significant opportunity to deploy a Grid-Connected Solar Storage

Charging System that not only addresses specific energy challenges but also advances environmental sustainability.

This white paper aims to demonstrate the application and impact of the Grid-Connected Solar Storage Charging System within the AEA project in Peterborough. It provides an overview of the project's background, details the system's configuration and operation, and discusses the economic, environmental, and social benefits realized through this innovative approach.

Background of the AEA Project

The Agricultural Engineers Association (AEA), established in 1875, has long been a cornerstone of British agriculture, promoting the technical, trade, and commercial interests of manufacturers and suppliers of agricultural machinery. Over the years, AEA has evolved into a vital voice for the agricultural and outdoor power equipment sectors, representing a diverse range of manufacturers, from combine harvesters to pruning shears.

The AEA project in Peterborough required a substantial upgrade to its existing EV charging infrastructure, which previously relied on standard building facilities lacking specialized charging capabilities. With a current peak power requirement of 300kW for chargers, the local grid alone proved insufficient to meet this demand.

The project's goal was to optimize energy utilization by integrating a high-performance energy storage system alongside advanced EV chargers.

Two set of 150kW ATESS EVD-150D DC EV chargers

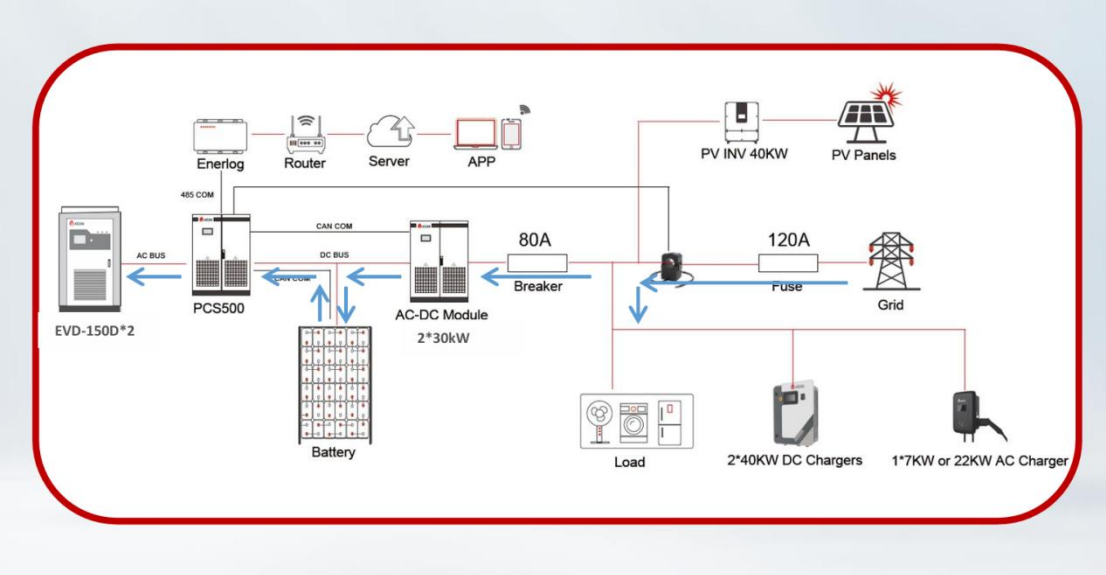
Two set of 40 kW ATESS EVD-40S/D DC EV chargers

System Configuration

To address the grid's limitations, the system implemented at the AEA project ensures that the EVs can be charged efficiently without overloading the grid, providing a reliable and sustainable charging solution.

System Configuration				
	Item	Quantity	Description	Comments
580kWh Battery unit (464kWh usable @ 80%DOD)	ATESS Slave Battery Rack BR145T-1C for container	4	Battery rack with inbuild BPU, support max 19 battery modules, 145kWh capacity per rack	ATESS
	ATESS ESS-BM-38.4-200TPB-1C	76	Battery module 7.68kWh, 19 each BR145	ATESS
	ATESS Batt-Master Cabinet9R-1C	1	For combination and management of battery racks	ATESS
Battery inverter	PCS500	1	500kW bidirectional battery inverter	ATESS
EV Charger	EVD-40S/D	2	40KW DC Chargers	ATESS
	NOVO EVA-07/11/22S-S/P	1	7KW or 22KW AC Chargers	ATESS
	EVD-150D	2	150kW large capacity fast DC EV charging station	ATESS
AC-DC Module	RTF	2	30KW Modular rectifier cabinet can be combined with ATESS PCS to form a DC coupling solution	ATESS
Accessories	Isolating transformer 500	1	500kW, 400V/400V isolating transformer for critical load connection	ATESS
	Container 20ft	1	For housing the whole ESS systems including inverter, transformer and batteries	ATESS
	EnerLog	1	For ESS monitoring	ATESS
	CT1000	3	For grid sensing	ATESS

System Configuration



Overall diagram

Operating Procedure

This system adopts ATESS DC coupling solution. In off-grid mode, the PCS (Power Conversion System) provides power to the EV charger using the battery as the primary energy source. During startup, both the EV charger and PCS will draw surge power, which is absorbed by the battery, thereby preventing any impact on the grid. The AC-DC rectifier module is unidirectional and can autonomously limit the input power and current to below 80A, without requiring external control mechanisms. An external sensor is employed to monitor the power and current intake at the main grid connection point. If the current exceeds 120A, the system will automatically reduce the power supplied to the EV charger and the battery charging process.

Note: It is crucial to ensure that the total load, including the EV chargers, remains between 80A and 120A. Exceeding 120A will trigger the 120A fuse. The battery is designed to supply power to only two 150kW EV chargers.

An ATESS PCS500 battery inverter inside the ATESS container

Outcomes and Impact

The implementation of ATESS' Grid-Connected Solar Storage Charging System in the AEA project in Peterborough has resulted in significant economic, operational, and environmental benefits. By integrating advanced energy storage with EV charging infrastructure, the system has optimized energy costs by utilizing stored electricity during peak demand, ensuring a stable power supply without overloading the local grid. This innovative approach has optimized energy utilization, provided a reliable and sustainable solution, and contributed to the project's overall efficiency and sustainability.

Conclusion

ATESS' involvement in the Peterborough AEA project demonstrates the transformative potential of Grid-Connected Solar Storage Charging Systems in modern energy infrastructure. The project not only meets the high power demands of EV charging but also supports long-term sustainability and operational efficiency. This successful integration showcases ATESS' commitment to advancing energy solutions that address contemporary challenges while paving the way for a more sustainable future.