



# Electric Vehicle Battery Energy Storage Systems (BESS)





contributing to the growth of the global EV market. Given current political conditions, the **IEA expects** that every other car sold globally could be electric by 2035. With more countries setting and meeting energy and climate pledges, that number could increase to every two of three cars sold being electric vehicles.

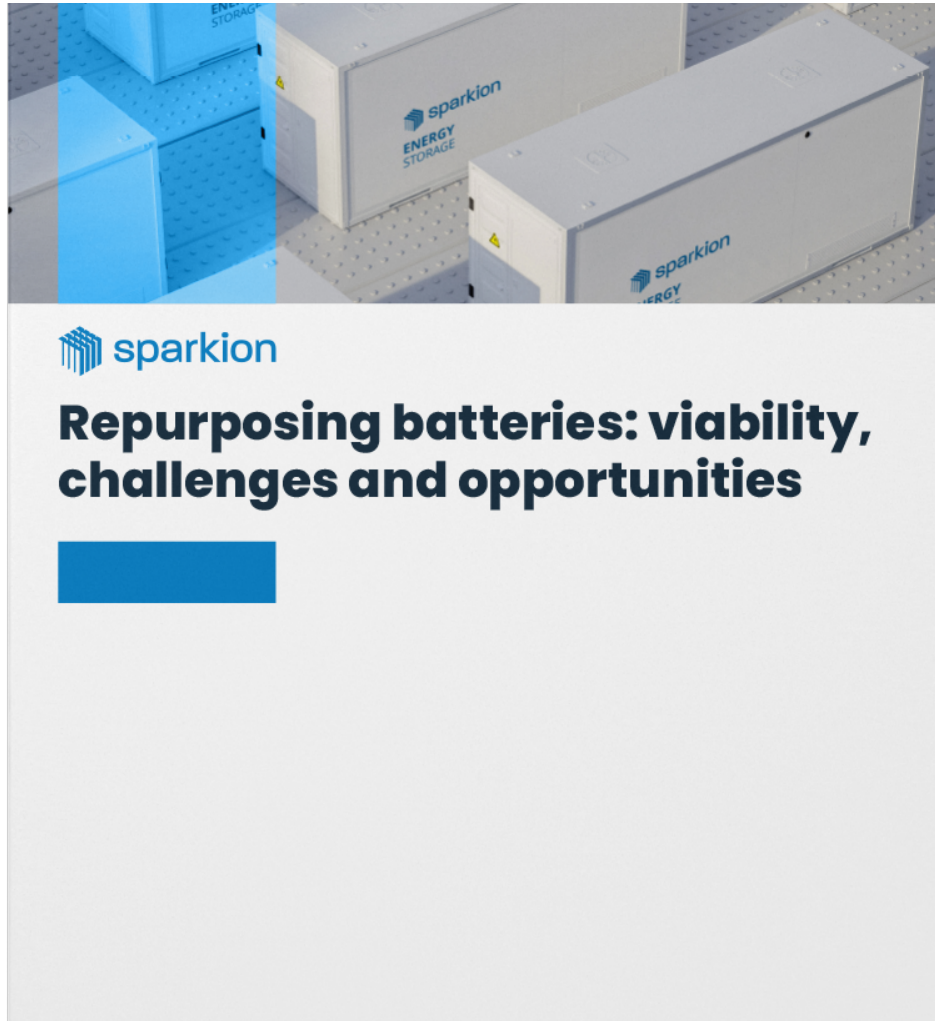
**Charge point operators (CPOs)** and fleet operators of EV charging sites face both opportunity and challenges in this growing market. They will need to meet the increased demand for electricity and provide reliable charging while making economic business sense.

Some of the obstacles they face include:

- Energy market price volatility
- Limited grid capacity
- Misalignment between onsite solar production and EV charging

Adding a battery to your EV charging site can allow storing available electricity from the grid or from **renewable energy** for use later. This flexibility helps keep EV charging stations up and running while helping reduce operational costs. An energy management system that can communicate with all site devices can further optimize your onsite energy usage according to your custom site plan, while allowing participation in utility programs for reduced charges and increased revenue.





## Download our White Paper on Repurposing EV Batteries into Energy Storage System

Learn how Sparkion's battery energy storage system maximizes the value of second-life EV batteries. Download the white paper now



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... and other components are needed in protective enclosures or racks to protect them from animals, climate and other hazards.

- **Power conversion system:** The PCS consists of an inverter that converts direct current (DC) stored in the batteries to alternating current (AC) for grid use, and vice versa. This conversion enables the system to charge from and discharge to the grid.
- **Battery management system:** The **BMS** monitors and manages the state of each cell/module to ensure safe and efficient operation. Some of its jobs include balancing charge across cells, monitoring temperature, voltage and current, and guarding against overcharging, over-discharging and overheating, which could jeopardize BESS operation.







onsite devices to direct the energy flow across the EV charging site and between the site and the grid. The EMS monitors the site in real-time to efficiently orchestrate onsite solar generation, electricity storage and grid power availability to achieve operational balance.

## Advantages of adding a BESS to your EV charging site

CPOs struggle with increasing mismatch between their EV charging station energy demand schedule, utility supply charges and infrastructure needs. Having the ability to store grid or renewable energy in a BESS greatly increases site flexibility, which offers a number of benefits through increased alignment.

### Cost-effective charging

Power from the grid costs more at some times than others. With a battery, you can store utility electricity when it's less expensive and discharge the power to your EV charging site when prices go up. Strategically shifting loads around in light of utility time-of-use rates can help you better manage electricity expenses.

### Increased profit margins

Utility demand charges are typically based on your highest level of grid use during a billing period. Switching to using battery power when you're getting close to your grid limit can lower your peak demand for grid power. This **peak shaving** helps use your resources more efficiently and avoid utility charges, reducing operating costs and improving the profitability of your charging network over time.



### Get more customers in and out



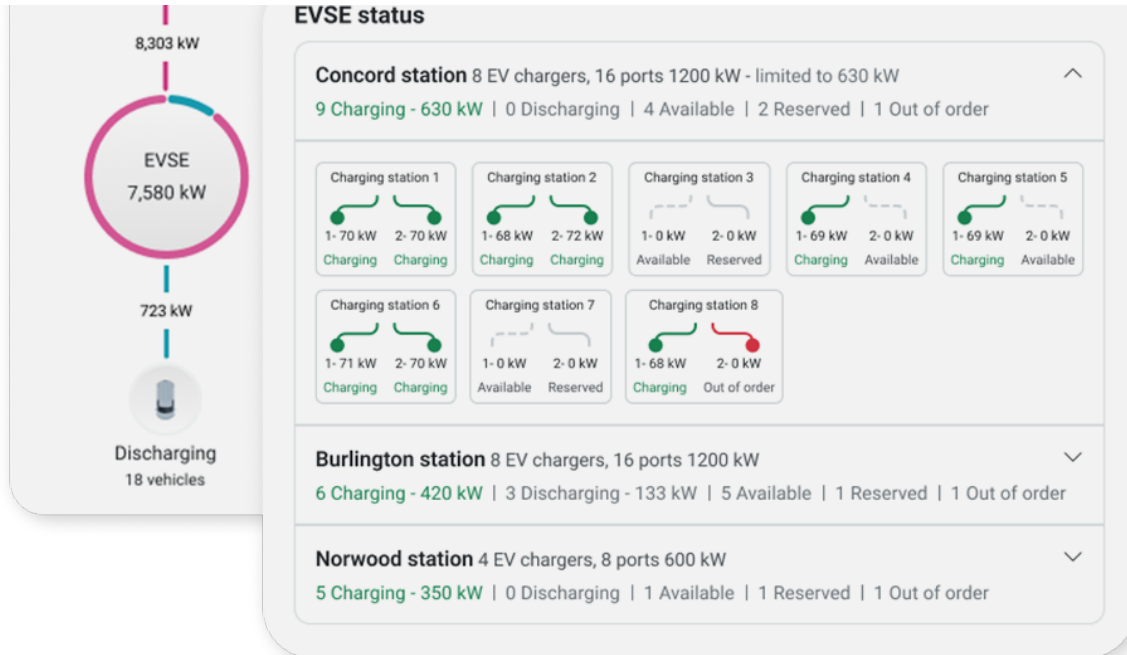
## Clean, cheap energy

Charging your battery with solar power offers a cost-effective alternative when the price of grid electricity peaks. Batteries coupled with renewables can also increase the resiliency of your site by islanding (disconnecting from the grid) through grid outages. Additionally, powering EVs with renewables demonstrates your commitment to environmental responsibility, which resonates with environmentally conscious EV users.

While adding a battery to your EV charging site offers many potential benefits, a good EMS is key to getting the most value from your battery storage.

Sparkion's SparkCore™ energy management system for EVs automatically optimizes your charging and discharging to ensure reliable, cost-effective operation of all your site assets based on varying prices, renewable production, changing loads and available grid capacity. SparkCore™ aligns your business operations with grid conditions, ensuring your battery charges before and deploys during your peak demand times to reduce your grid consumption and avoid extra utility costs for the highest profit margins. The EMS also integrates with your energy storage to supplement grid power where capacity is limited to deliver more energy and allow more customers to charge up quicker without making expensive infrastructure upgrades.





*SparkCore™ EV charger energy management system can integrate with your EV battery energy storage system to supplement grid power where capacity is limited.*

Furthermore, Sparkion's SparkCore™ can communicate with your onsite renewable energy and storage systems for maximum benefits. For example, charging your battery with solar power offers a cost-effective alternative when the price of grid electricity peaks. SparkCore™ helps find the best way to bring renewables into your customized operational model to add more value to your business and achieve sustainability goals that align with those of your customers.

**Increase the value of your EV battery energy storage system with second-life EV batteries**



**Use EV batteries** in your commercial BESS can add further value for charge point operators (CPOs). Meanwhile, auto manufacturers and fleets have a unique opportunity to repurpose their own batteries for EV charging to add economic and environmental benefits.

- **Provide enough power**

Charging depots and enterprises from EVs to C&I to utilities and more are investing in energy storage to reduce operating costs and maintain vehicle uptime with cost-efficient, resilient energy.

- **Maximize BESS investment**

Repurposing EV batteries in your BESS can provide even more value through reduced costs and more efficient EV charging. Fleet owners can significantly reduce energy and BESS costs by repurposing their inventory.

- **Increase sustainability**

Repurposing retired EV batteries into a BESS reduces waste and prevents additional Earth mineral depletion, enhancing your sustainability efforts and economics. Pairing your BESS with onsite clean energy can even further your impact.

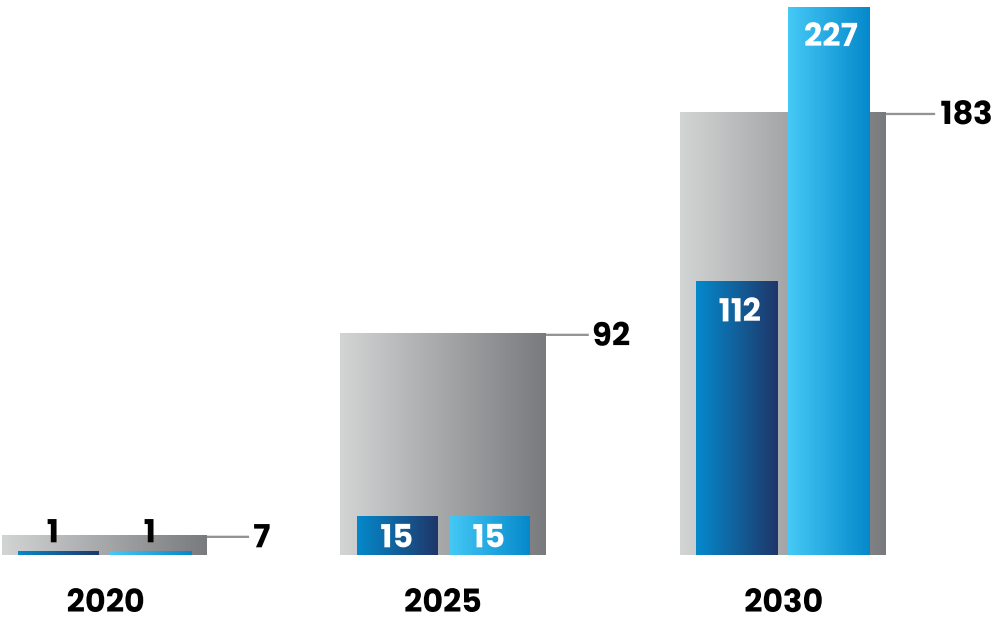




entire battery pack, decreasing economic efficiency. Sparkion's proprietary SparkSwitch technology allows bypassing weak cells to generate more energy per cycle to reduce the BESS cost-per-kWh by as much as 60% while cutting CapEx cost to half of competitive solutions.

**Utility-scale lithium-ion battery demand and second-life EV<sup>1</sup> battery supply,<sup>2</sup> gigawatt-hours/year (GWh/y)**

- Second-life EV batteries supply (breakthrough case)
- Utility-scale lithium-ion-battery-storage demand
- Second-life EV batteries supply (base case)



<sup>1</sup> Electric vehicle.  
<sup>2</sup> Only for batteries from passenger cars.

