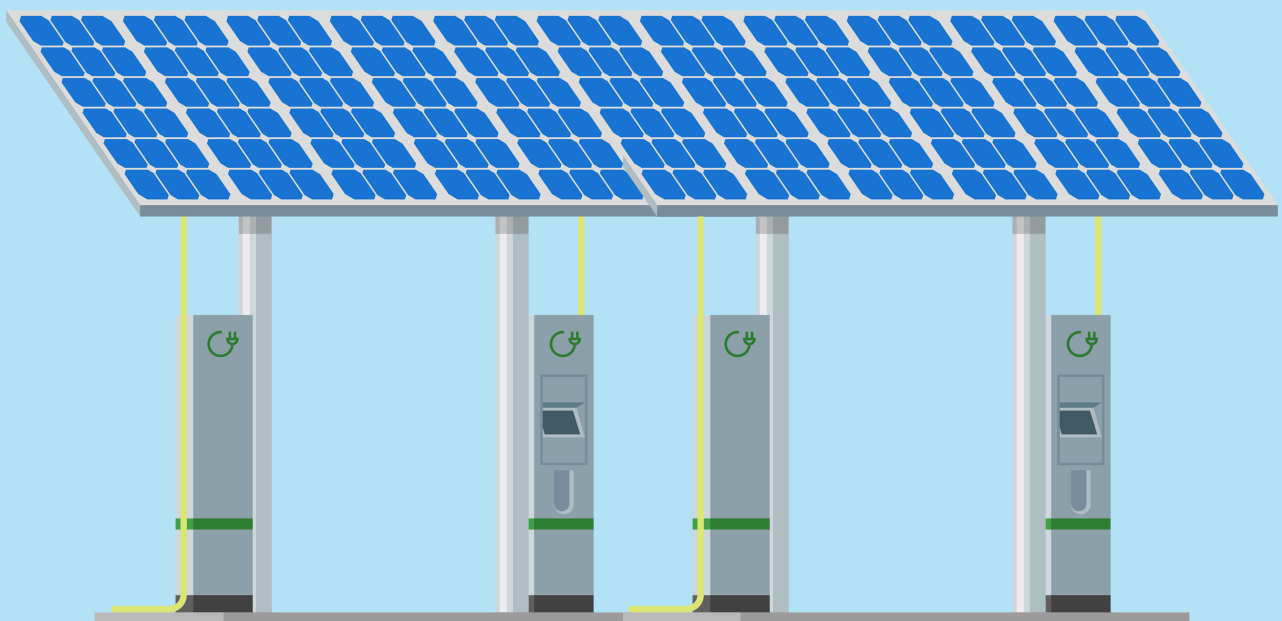


# Case Study

## Stourton Park & Ride



## Summary

- **Location:** England, Leeds
- **Capacity:** 1.2MWp
- **Type:** Solar carports, EV charging, Battery storage, HV/LV infrastructure
- **Developer:** Leeds City Council & BAM
- **Owner:** Leeds City Council, EvoEnergy
- **Panel type:** Monocrystalline
- **Completion date:** September 2022

**SYSTEM SIZE: 1.2MW**

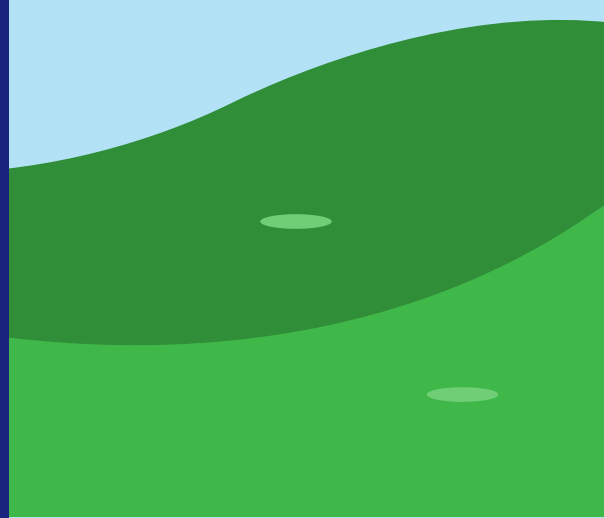
**BATTERY SIZE: 500kW/ 950kWh**

**EV CHARGING UNITS: 26**

**CO<sub>2</sub> SAVED PER YEAR: 471,000KG**



EvoEnergy is the UK's leading renewable energy company. We offer a range of complementary services and technologies to secure our client's energy future and carbon targets. We consult, develop, design, construct, monitor and maintain projects to deliver financial savings and renewable energy for leading brands all over the country.



## Overview

Stourton Park & Ride in Leeds hosts a 1.2MW system of solar car ports, a Smart high and low-voltage infrastructure (HV/LV), a high spec battery energy storage system (BESS) and a vast number of electric vehicle charging points. The system provides the site with a reliable source of renewable energy and high quality electric vehicle (EV) charging facilities.

It was developed by Leeds City Council to introduce a wave of integrated renewable energy technology into the city, and became the first fully solar-powered park-and-ride in the country. This project is an example of how to push the boundaries on every front with solar PV, curved carport frames, behind the meter batteries and future proofed EV charging points combining to solve a problem on a 400kW grid constrained site connection.



## Project Summary

Leeds City Council required an innovative renewable energy system to improve Yorkshire's local EV charging network and provide better connectivity while reducing carbon emissions in the city. To achieve this, we installed a 1.2MW of solar car ports, smart HV/LV infrastructure, Battery Energy Storage and an Electric Vehicle charging facility. The curved layout means that the edge of each solar carport had to be placed extremely close together, requiring an extra level of skill from our technical design team. The Y shaped solar carports with trapezoid steel roofs add strength, with an integrated gutter system to enable rooftop access for panel maintenance. The trapezoid steel roof supports maintenance and gives a clean finish for users looking up from underneath. The carport frames are installed in concentric semi circles with east-west orientation to split generation curves and maximise the opportunity for on-site consumption. In addition to this, a 500kW/ 950kWh Tesla battery has been integrated into the main building to maximise solar consumption and help alleviate some of the peaks caused by simultaneous EV charging.



## Outcomes/Solution

Each panel pair has a Solaredge optimiser behind, meaning that you can see the sun pass across the sky (or the earth move around the sun!) in the live Solaredge portal. Having separate MPPTs for the panels is a necessity due to the curved layout. Solaredge inverters are centrally located in the terminus building, operating at 850V. This meant no inverters around the carport structures, leading to a cleaner finish for drivers and more efficient electrical distribution. To decrease the cost, highly efficient Sunpower Maxeon 400W panels were used, maximising the generation capacity. The panels will yield more energy per year from the first year and will degrade slower than other panels meaning more is generated over the system's lifetime. So, Leeds City Council now has a modern renewable energy system with the potential for future expansion.



The PV system is estimated to generate 852,000 kWh per year, only 12% of which is estimated to be exported, because of the battery system. Overall, the solar PV will offset 471 tonnes of carbon in the first year, which is the equivalent of removing 203 cars from the roads. Payback for the EV charging points is estimated to be less than 10 years, based on an average of two charges per day in year 1, rising 8% year-on-year. What's more, due to low battery energy throughput, battery life will be extended to 15 years and beyond.

Due to import restrictions, currently the battery load-shifts the solar PV and takes grid import for the site to zero most of the time. In the future, we have modelled battery scenarios such as peak shaving, grid services, time of use energy shifting, depending on future grid conditions. Any of these are possible with Tesla's highly flexible Site Master Controller. The EV feeder pillars and electrical distribution is built with 25% redundancy for the future retrofit of more EV charging points as demand allows. Stourton Park and Ride is now the UK's leading charging infrastructure site, which demonstrates how smart energy solutions can overcome grid limitations.

## Community Benefit

**Enhanced Electric Vehicle Charging Network:** The Stourton Park & Ride project improves Yorkshire's local electric vehicle charging network, providing better connectivity and accessibility for EV owners. By expanding the availability of charging infrastructure, the project encourages the adoption of electric vehicles and supports the growth of a sustainable transportation system.



**Technological Innovation:** The project serves as an exemplar of innovative renewable energy technology and smart energy solutions. It pushes the boundaries by combining solar PV, curved carport frames, battery energy storage, and future-proofed EV charging points to address the constraints of a grid-constrained site. This showcases Leeds City Council's commitment to embracing advanced energy solutions and sets an example for other communities and projects.

**Financial Savings and Extended Battery Life:** The integration of solar and battery systems offers low-cost electricity compared to grid prices for EV charging points. This leads to estimated payback periods of less than 10 years and extends the battery life to 15 years and beyond. The cost savings and increased longevity benefit the community by providing sustainable and efficient charging infrastructure.

**Positive Environmental Impact:** The project's focus on renewable energy and clean transportation contributes to a positive environmental impact beyond the local community. By reducing carbon emissions, improving air quality, and supporting the transition to clean energy, the project aligns with broader national and global goals for sustainable development and a greener future.

## Local Benefit

**Reliable Renewable Energy:** The Stourton Park & Ride project provides the local area in Leeds with a reliable source of renewable energy through its 1.2MW system of solar carports. By generating clean energy on-site, the project reduces dependence on traditional energy sources and contributes to a more sustainable and environmentally friendly local energy supply.

**High-Quality EV Charging Facilities:** The project includes a vast number of electric vehicle charging points, offering high-quality charging infrastructure to the local community. This encourages the adoption of electric vehicles by providing convenient and efficient charging options, promoting cleaner transportation and reducing emissions from conventional vehicles.

**Improved Air Quality:** By promoting electric vehicles and providing renewable energy-powered charging facilities, the project helps improve air quality in Leeds. The transition from combustion engine vehicles to electric vehicles reduces harmful emissions, leading to cleaner air and a healthier environment for local residents.

**Reduction in Carbon Emissions:** The integration of solar carports, battery energy storage, and EV charging points contributes to a significant reduction in carbon emissions. The solar PV system is estimated to generate 852,000 kWh per year and offset 471 tonnes of carbon emissions in the first year alone. By utilizing renewable energy and promoting electric vehicles, the project actively supports Leeds City Council's goal of achieving carbon neutrality by 2030.



Learn more about what's happening at EvoEnergy at [www.evoenergy.co.uk](http://www.evoenergy.co.uk)



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