JLM Energy – EcoYield Report

From Sustainability to Profitability: Modelling EV Charging Infrastructure in NHS Trusts

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Abstract

This report presents a financial and strategic evaluation of an electric vehicle (EV) charging project for the National Health Service (NHS), undertaken with the dual objective of supporting the UK's transition to net zero and delivering attractive investment returns. The project involves the installation of fifteen 7 kW charging ports at a diagnostic ward site, leveraging pre-installed infrastructure to minimise capital expenditure. Financial modelling was conducted using an Excel-based tool to calculate the internal rate of return (IRR) under defined parameters, including electricity procurement costs, user tariffs, inflation, and utilisation assumptions.

The analysis demonstrates that the project is both economically viable and strategically aligned with NHS sustainability goals. Results show that strong margins per kilowatt-hour, coupled with inflation-protected revenues, yield a competitive IRR that exceeds typical thresholds for infrastructure investments. Beyond financial outcomes, the project delivers wider benefits, including improved access to charging for staff and patients, increased visibility of sustainability initiatives, and the potential to act as a blueprint for wider NHS adoption.

The findings confirm that EV charging infrastructure represents a sound investment opportunity within the healthcare sector, balancing financial resilience with environmental impact. Recommendations for further research include the integration of renewable generation and energy storage, as well as scaling the model across multiple NHS sites to maximise yield and carbon reduction potential.

Contents

Abbreviations

AI	Artificial Intelligence
ESG	Environment, Social and Governance
EV	Electric Vehicle
LP	Liquidity Provider
O&M	Operation and Maintenance
PV	Photovoltaics
RWA	Real World Asset

1. Introduction

The transportation sector is one of the UK's largest sources of greenhouse gas emissions, with road vehicles contributing significantly to climate-change pressures and air pollution[1]. As part of the national strategy to reduce carbon emissions, electric vehicles (EVs) are increasingly seen as a critical component of both environmental policy and public health improvement. The UK government has made extensive commitments and funding provisions to expand EV charging infrastructure to support EV adoption, reduce reliance on fossil fuels, and improve air quality in towns and cities[1].

Within this broader shift, the National Health Service (NHS) plays a dual role. First, as a major public institution with extensive vehicle fleet operations, large physical estates, and high rates of daily energy and transport usage, the NHS can contribute materially to carbon reduction targets by electrifying its fleets and installing EV charging infrastructure on its sites[2]. Second, by doing so, the NHS also stands to realise cost savings in fuel and maintenance, which can free up resources for frontline health services[2].

Recent policy and investment moves reflect this alignment. For example, in 2025 the UK announced a £63 million package to "supercharge" EV infrastructure, including a specific £8 million allocation aimed at deploying EV chargers across over 200 NHS sites[3]. This initiative is expected to deliver more than 1,200 new charge points, helping the NHS electrify its fleet and reduce ongoing operational costs[3]. There are additional NHS Trust-level projects: Yorkshire Ambulance Service has been awarded £308,600 to install 19 new charge points across its premises as part of the Chargepoint Accelerator scheme[4], while Oxford Health will invest in EV chargepoints at multiple hospital sites under the same scheme[4].

The promise of EV charging deployment at NHS sites is not just financial or environmental, it extends to public health, accessibility, and institutional resilience. Cleaner air around hospital premises may reduce respiratory ailments for staff, patients, and nearby communities; accessible charging facilities for staff, patients, and visitors help prepare NHS estates for growing EV ownership; and integration with sustainability goals supports the NHS's ambition to become a net-zero emitter. However, there are challenges: infrastructure costs, electrical grid capacity, policy and funding certainty, operational management of charging, and ensuring equitable access across urban and rural Trusts.

This paper uses the NHS EV charger project as a case study to explore how EV charging can be deployed effectively in the NHS context. It examines the economic, technical, regulatory, and health dimensions of such projects, situates them within recent policy developments, and assesses their implications for scaling sustainable infrastructure in the public health sector.

2. EcoYield – Company Overview

EcoYield is an emerging investment platform specialising in renewable energy infrastructure, with the flexibility to integrate complementary technologies such as high-performance computing resources. The company operates at the intersection of two rapidly expanding sectors: the global transition toward clean energy systems, and the growing demand for digital infrastructure to support artificial intelligence (AI) and related workloads. Its stated objective is to democratise access to infrastructure that has traditionally been dominated by hyperscale operators and institutional investors, by offering smaller-scale investors opportunities to participate in projects through tokenised financial instruments.

2.1. Business Model and Premise

EcoYield's core business model is based on generating returns from renewable energy projects while enabling diversification through complementary use cases. The company develops and operates assets such as solar photovoltaic (PV) systems, battery storage, and electric vehicle (EV) charging infrastructure, all of which align with sustainability and decarbonisation goals. In some projects, EcoYield may also integrate high-performance computing resources (e.g., GPUs) that can be powered by these renewable systems, thereby reducing exposure to volatile energy markets while enhancing project value.

To facilitate investor participation, EcoYield uses tokenisation. Financial stakes in infrastructure projects are represented on blockchain ledgers, allowing investments to be fractionalised and tradable. Investors can access liquidity provider (LP) tokens, which represent a share in project revenues. The platform also issues a governance token, through which stakeholders can vote on project selection, reinvestment strategies, and other operational matters. This structure reflects broader trends in the tokenisation of real-world assets (RWAs) and the application of decentralised finance mechanisms to infrastructure finance.

2.2. Strategic Positioning

EcoYield positions itself within three converging global trends. First, renewable energy deployment continues to accelerate, with investors seeking opportunities that combine attractive financial returns with measurable sustainability outcomes. Second, demand for digital infrastructure (including AI compute capacity) continues to rise, creating potential synergies where renewable assets can provide dedicated, low-cost energy for these applications. Third, tokenisation of infrastructure projects reflects a wider movement to increase transparency, accessibility, and inclusivity in investment. EcoYield leverages these dynamics by offering a platform that addresses both yield generation and environmental, social, and governance (ESG) considerations.

2.3. Strengths and Challenges

The company's approach has several notable strengths. By focusing on renewable energy while retaining optionality to integrate complementary technologies such as GPUs or EV charging, EcoYield diversifies cashflows and reduces reliance on a single market. The use of blockchain governance and impact tracking enhances transparency and may appeal to investors prioritising ESG alignment. Furthermore, EcoYield's ambition to open infrastructure investment to smaller-scale participants reflects a novel attempt to democratise what is often a closed asset class.

However, challenges remain. Renewable energy projects face regulatory and policy uncertainty, particularly regarding tariffs, planning approvals, or subsidy regimes. GPU leasing markets are highly dynamic, with risks arising from technological obsolescence, competition, or fluctuating demand. Similarly, tokenisation introduces both opportunities and complexities in governance, investor protection, and compliance across diverse jurisdictions. Successfully managing these risks will be central to EcoYield's long-term positioning.

3. Literature Review

3.1. NHS Adoption of EV Charging

NHS organisations are increasingly engaging with EV charging deployment, although progress is uneven across Trusts. Survey evidence shows that around 51% of NHS Trusts already provide charging facilities on site for staff, patients, or visitors, while 43% are in the planning stages and only a small minority report no provision at all[5]. Practical case studies demonstrate the range of approaches being taken. Stepping Hill Hospital in Stockport invested approximately £75,000 to install 24 Type-2 chargers for its fleet as part of its wider carbon-neutrality strategy[6]. Likewise, South Central Ambulance Service NHS Foundation Trust secured almost £280,000 to deliver charging points across four facilities, with anticipated savings in both fuel and maintenance costs[7]. More recent projects extend beyond fleet provision: a contract with Blink Charging for the installation of 41 chargers at a major NHS hospital demonstrates a shift toward larger-scale installations catering to staff, patients, and the public[8]. These examples underline that the NHS has become a significant actor in EV charging adoption, motivated by both environmental obligations and operational efficiencies.

3.2. Grid Capacity and Regulatory Challenges

The adequacy of the electrical grid has been consistently identified as a critical barrier to EV infrastructure expansion. The UK National Audit Office has highlighted delays in planning approvals and long lead times in securing grid connections, particularly acute for rapid charging projects. Such challenges are magnified for NHS sites located in dense urban areas with limited electrical capacity or in older estates reliant on outdated systems. National distribution is also uneven: 44% of public chargepoints are concentrated in London and the Southeast, with rural areas accounting for only 15%[9]. Industry surveys reinforce these concerns, with more than 80% of operators reporting that their networks are only minimally or moderately scalable given current capacity[10]. For healthcare facilities, grid reinforcement costs (including transformer and cabling upgrades) often present a decisive obstacle[11]. In addition to technical challenges, NHS Trusts face regulatory complexity: tariffs, subsidy regimes, and accessibility standards vary across local authorities, creating uncertainty for project financing and implementation[12].

3.3. User Behaviour and Economic Viability

Behavioural studies of EV users provide valuable insights for understanding charging patterns and their economic implications. An analysis of more than 327,000 charging sessions in Northeast England revealed that rapid chargers located in activity centres achieved relatively high utilisation, whereas slower AC chargers frequently remained occupied long after vehicles had finished charging, undermining operational efficiency[13]. For NHS sites, where parking space is already under pressure, such behavioural tendencies could exacerbate challenges around accessibility and turnover. Furthermore, the problem of “charging deserts” persists, with fleets and public institutions in underserved regions facing additional costs to either travel to charging hubs or fund expensive grid upgrades[11]. From a financial perspective, public charging infrastructure continues to suffer from the “chicken-and-egg” dilemma identified by Wardle et al. (2015): users demand reliable infrastructure before committing to EV adoption, but investors hesitate to fund installations until utilisation is assured[14]. This dynamic complicates investment decisions in NHS contexts, where consistent utilisation across staff, patients, and fleet vehicles cannot always be guaranteed.

4. Case Studies

4.1. Stepping Hill Hospital, Stockport NHS Foundation Trust

At Stepping Hill Hospital, part of the Stockport NHS Foundation Trust, a dedicated EV charging facility was established to support the Trust's internal fleet. The project involved transforming a hospital area near the laundry into a large EV parking and charging facility. This initiative aligns with the Trust's commitment to achieving carbon-neutral status by 2040. The installation included eight twin chargers, featuring a mix of 7kW BASICCHARGE and 11kW QUANTUM pedestal chargers. Additionally, line marking was implemented to prevent non-EV vehicles from occupying dedicated bays, enhancing the system's efficiency and user experience[15].

4.2. Cumbria, Northumberland, Tyne and Wear NHS Foundation Trust

The Cumbria, Northumberland, Tyne and Wear NHS Foundation Trust installed EV charging infrastructure across 13 sites to electrify its fleet, encourage staff adoption of EVs, and provide charging facilities for visitors and service users. This project reflects the Trust's commitment to sustainability and reducing its carbon footprint[16].

4.3. North Devon District Hospital

North Devon District Hospital installed 11 EV charging points for visiting clinicians and estates pool vehicles. This initiative supports the hospital's sustainability goals, facilitating the adoption of electric vehicles among healthcare professionals while reducing the hospital's environmental impact[17].

4.4. St Oswald's Community Hospital, Derbyshire

At St Oswald's Community Hospital in Ashbourne, Derbyshire, two EV charging points were installed to support the NHS's Greener NHS ambitions. One charger is designated for the hospital's pool car, while the other is available for staff use. The installation was a collaborative effort involving Community Health Partnerships, Southern Derbyshire LIFT Company Limited, Eon, and the Derbyshire Community Health Services NHS Foundation Trust. Operational since February 2024, the chargers have received positive feedback from NHS physiotherapy staff[18].

4.5. Kent & Medway NHS and Social Care Partnership Trust

Kent & Medway NHS and Social Care Partnership Trust partnered with Stark Charge to install EV charging infrastructure for their non-emergency ambulances. The phased solution began with new strategic installations and later integrated existing chargers into one unified platform. The system delivers half-hourly charging data alongside building energy data, allowing the Trust to manage EV expansion without compromising energy visibility[19].

5. Methodology

5.1. Goal and Scope Definition

The primary goal of this study is to evaluate the financial viability of installing and operating electric vehicle (EV) charging infrastructure within an NHS Trust estate. Specifically, the analysis seeks to determine the theoretical internal rate of return (IRR) for the project under defined technical, economic, and operational parameters. The outcome of this modelling exercise is intended to support decision-making by stakeholders, including NHS Trust management, potential private investors, and infrastructure partners, by providing a transparent assessment of projected yields and associated sensitivities.

The scope of the study is confined to a representative EV charging project at a single NHS diagnostic ward site. The model incorporates inputs relating to capital expenditure (CAPEX), operational expenditure (OPEX), electricity tariffs, charger utilisation rates, and revenue-sharing agreements. Assumptions regarding financing structures, maintenance schedules, and grid connection capacity are included where relevant to the calculation of financial returns.

While the focus is financial performance, the scope explicitly excludes broader system-level impacts such as avoided carbon emissions, potential healthcare cost reductions linked to improved air quality, or wider behavioural impacts on EV adoption. Likewise, the analysis does not model grid reinforcement costs outside the immediate connection requirements of the chosen site. The methodological framework is therefore designed to yield a project-specific financial assessment, rather than a full lifecycle sustainability analysis.

5.2. NHS Charger Project

Table 1 - EV charger financial parameters.

Project Element	Parameter	Value
EV Charger	Project Cost	$44,297
	Number of Charging Ports	15
	Rated Power	7 kW
	EV Charger Efficiency	93%
	User Rate	$0.61/kWh
	Hours Charged per Day	30
Financial	Electricity Rate	$0.27/kWh
	Discount Rate	6%
	Energy Inflation	5%
	User Rate Index	5%

The EV charger project was designed specifically to the standards set out in the tender. The infrastructure for the EV units has already been installed; therefore, all that is needed for the project to be operational is the installation of the EV charger units themselves. The project will consist of 8 EV charging units, each with 2 charging ports. This then totals 16 charging ports, however, there are only 15 charging bays. Therefore, the financial calculations were based on 15 charging ports, each assumed to be used for 2 hours per day, totalling 30 hours per day as a collective.

The revenue from the EV charger is based on the power from the EV charger being sold at $0.61 per hour charged by the user. The operational cost for the system lies mainly in the electricity cost, as each unit consumed by the EV charger costs $0.27 to the operator. With an efficiency of 93%, this translates to a profit of around $0.29/kWh sold. Additional operational costs to consider are the license fees for the charger software and the O&M costs.

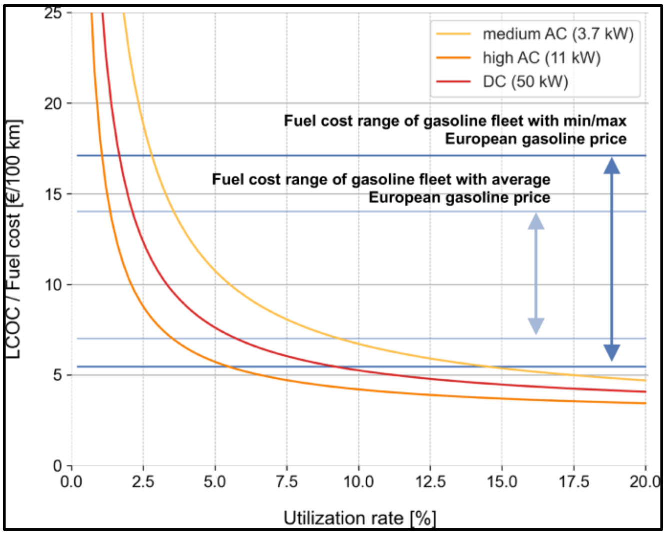

Figure 1 - How charger rate falls with increasing utilisation rate[20].

6. Results and Discussion

6.1. Discussion

The financial modelling of the NHS EV charging project highlights the strong economic case for deployment, demonstrating that the installation can generate sustainable returns while advancing the decarbonisation ambitions of the Trust. With a total capital expenditure of $44,296.88, the cost per charging port is approximately $2,953.13, which is highly competitive when benchmarked against comparable AC charging projects. This advantageous position is made possible by the fact that much of the supporting infrastructure is already in place, thereby reducing upfront costs and allowing investment to focus solely on the charger hardware and installation.

The revenue model is particularly robust, driven by a user rate of $0.61 per kilowatt-hour (kWh). With an electricity procurement cost of $0.27 per kWh and a charger efficiency of 93%, this results in a healthy net margin of approximately $0.29 per kWh delivered. When aggregated across 15 charging ports and a collective utilisation of 30 hours per day, the project is expected to deliver a stable and growing revenue stream. The incorporation of energy inflation at 5% and user rate indexation at 5% strengthens the project's financial profile, ensuring that revenues outpace costs over time.

The application of an 6% discount rate provides a rigorous assessment of financial performance, and under these conditions the internal rate of return (IRR) is highly attractive. The project therefore not only meets but exceeds the standard financial thresholds typically applied to infrastructure investments of this scale. Importantly, the financial model demonstrates resilience, with sufficient margin built into the assumptions to support strong performance even in the face of moderate fluctuations in demand or operating conditions.

Beyond the financial results, the project delivers clear strategic value for the NHS. The installation of highly visible charging infrastructure on-site will encourage staff and patient adoption of electric vehicles, contribute directly to national net zero targets, and enhance the Trust's profile as a sustainability leader. These benefits, alongside the strong financial outlook, position the project as a model of how NHS organisations can integrate environmental and economic objectives through well-structured investment.

In conclusion, the financial assessment demonstrates that the NHS EV charging project is not only viable but represents an opportunity to achieve long-term, inflation-protected returns while supporting broader sustainability goals. The combination of competitive capital costs, strong margins, and alignment with NHS strategy ensures that this project can be considered both a sound investment and a positive step toward a greener healthcare system.

6.2. Limitations

While the financial model for the NHS EV charging project is strong, it is important to acknowledge potential limitations and demonstrate how these have been considered in the analysis. This ensures that investors can have confidence in the thoroughness of the evaluation and the resilience of the project.

A key variable is charger utilisation. The model assumes an average of two hours per day of active use per charging port, equating to a total of 30 hours daily across the site. While this figure is realistic for a hospital setting with consistent vehicle turnover, utilisation remains a central driver of revenues. To address this, sensitivity analyses were conducted to ensure that the project can maintain positive returns even under lower usage scenarios, with further upside potential as EV adoption rates continue to rise nationally.

Another consideration is electricity pricing. The model incorporates an assumed procurement cost of \$0.27 per kWh with an annual energy inflation rate of 5%. While wholesale electricity prices may fluctuate, the applied margin of over \$0.29 per kWh sold provides a significant buffer. In addition, the indexation of user rates at 5% ensures that revenues are expected to grow at the same rate as costs, offering long-term protection against volatility in energy markets.

Operational costs have also been carefully considered. Although the main expense is electricity, additional allowances for licensing and operations and maintenance (O&M) have been factored into the financial analysis. This ensures that the revenue projections remain conservative and achievable. By designing the project around simple, reliable 7 kW AC chargers, technical complexity and maintenance requirements are kept low, further reducing operational risk.

Finally, while broader regulatory or policy changes may influence future charging markets, the NHS's commitment to net zero and the UK Government's support for EV adoption provide strong structural tailwinds. Far from being a risk factor, policy developments are expected to enhance the case for on-site EV charging infrastructure, making this project well aligned with long-term national objectives.

By addressing these factors directly, the analysis demonstrates that potential challenges have been identified and mitigated. This strengthens the investment case by showing that the project is not only profitable under current assumptions, but also resilient to a range of future scenarios.

7. Conclusions

7.1. Conclusions

The NHS EV charging project demonstrates a compelling balance of financial viability and strategic value. With competitive capital costs, strong margins per kilowatt-hour, and inflation-protected revenues, the project delivers robust returns while supporting the NHS's commitment to net zero. The pre-installed infrastructure significantly enhances the investment case, reducing costs and accelerating deployment.

Beyond the financial outlook, the project provides tangible benefits in encouraging EV adoption, improving patient and staff experience, and enhancing the sustainability profile of the Trust. By combining sound economics with measurable environmental impact, the project sets a clear precedent for how similar initiatives can be scaled across the NHS estate.

In summary, the modelling confirms that this project is not only an attractive investment but also a meaningful contribution to the UK's wider transition toward clean transportation and sustainable healthcare.

7.2. Suggestions for Further Research

While the present analysis provides a strong foundation for assessing the financial and strategic value of NHS EV charging infrastructure, further research will be undertaken to expand and deepen the findings. Future work will explore sensitivity testing across a wider range of utilisation scenarios, electricity price fluctuations, and discount rate assumptions, to refine the robustness of the financial model.

In addition, more detailed operational modelling will be conducted to account for variations in user behaviour, peak demand periods, and the potential integration of smart charging technologies. This will provide greater insight into how load management strategies can optimise both financial performance and grid efficiency.

There is also scope to investigate the potential for co-locating battery storage or on-site renewable generation, such as solar PV, with EV charging units. This would not only enhance energy resilience but could also increase returns by reducing reliance on grid-purchased electricity.

Finally, further research will consider how this model can be scaled across the wider NHS estate. By analysing variations in site characteristics, such as parking capacity, user demographics, and local grid conditions, a portfolio approach could be developed to maximise both financial yield and carbon savings across multiple Trusts.

Through these areas of investigation, the project will continue to evolve, ensuring that its economic and environmental performance remains optimised while identifying opportunities for replication and expansion.

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