*Case Study*

# BMW UK Plant Electric Vehicle Charger Deployment

AIH GROUP

# BMW UK Plant Electric Vehicle Charger Deployment: Feasibility Study and Economic Analysis

**Project Name:**

BMW UK Plant Electric Vehicle Charger Deployment – Feasibility Study.

**Client:**

BMW Group UK.

## Short Description of the Challenge

BMW UK sought to assess the feasibility of implementing electric vehicle charging infrastructure across four of its UK manufacturing plants (Oxford, Swindon, Hams Hall, and Goodwood). The goal was to support the company's ambitious target of reducing CO2 emissions by 30% by 2030, with a focus on providing sufficient charging facilities for employees and visitors.


**Source:** Ramboll, 2022. (LeCarpenter, C.) *Mini Plant, Oxford Power to Heat Electrical Strategy Feasibility Report.*

## Objectives

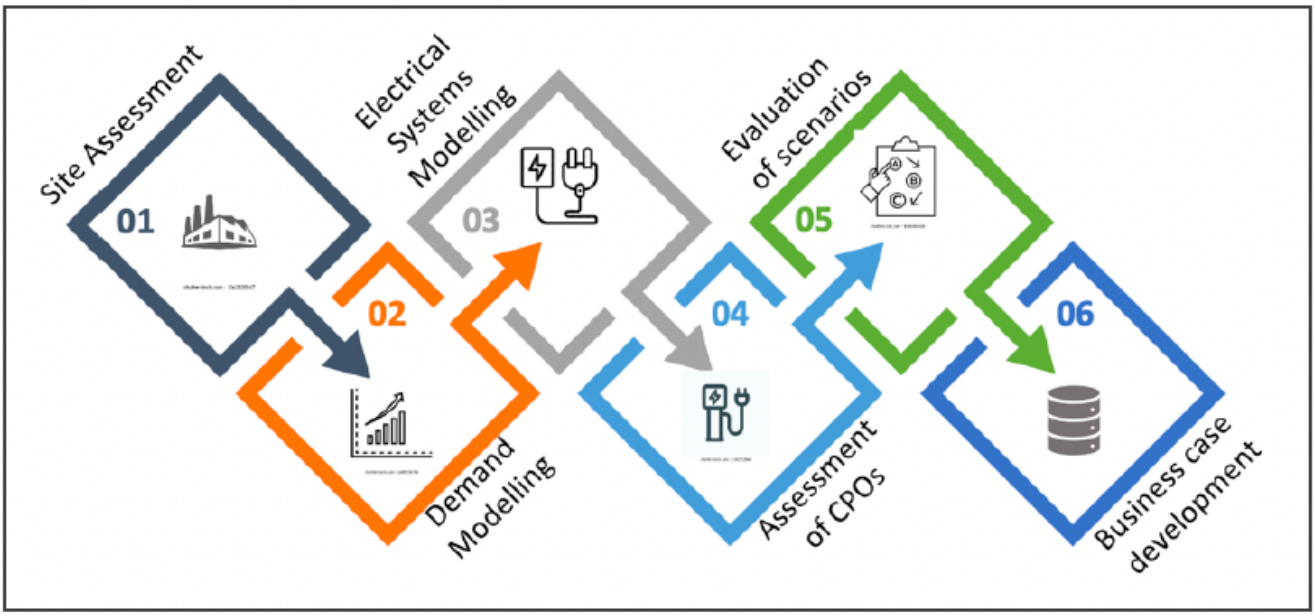
The objectives of the study are:

- Determine the feasibility of two EV charging scenarios: using existing electrical capacity or providing additional capacity.
- Assess the financial and economic viability of the proposed EV charging infrastructure deployment over a 10-year period.
- Determine the technical feasibility of the EV charger deployment and associated infrastructure requirements.

- Analyse the market demand for EV chargers from BMW staff and visitors.
- Assess the environmental and social benefits of the EV charging infrastructure deployment, including carbon reduction and potential cost savings for staff through lower charging rates.

## Implementation

A detailed feasibility study was conducted, encompassing technical, financial, and economic analyses. This involved gathering data on existing infrastructure, projected EV adoption rates, energy consumption, and cost projections.




The study was structured following the Royal Institute of British Architects (RIBA) stages, ensuring a methodical and comprehensive approach.

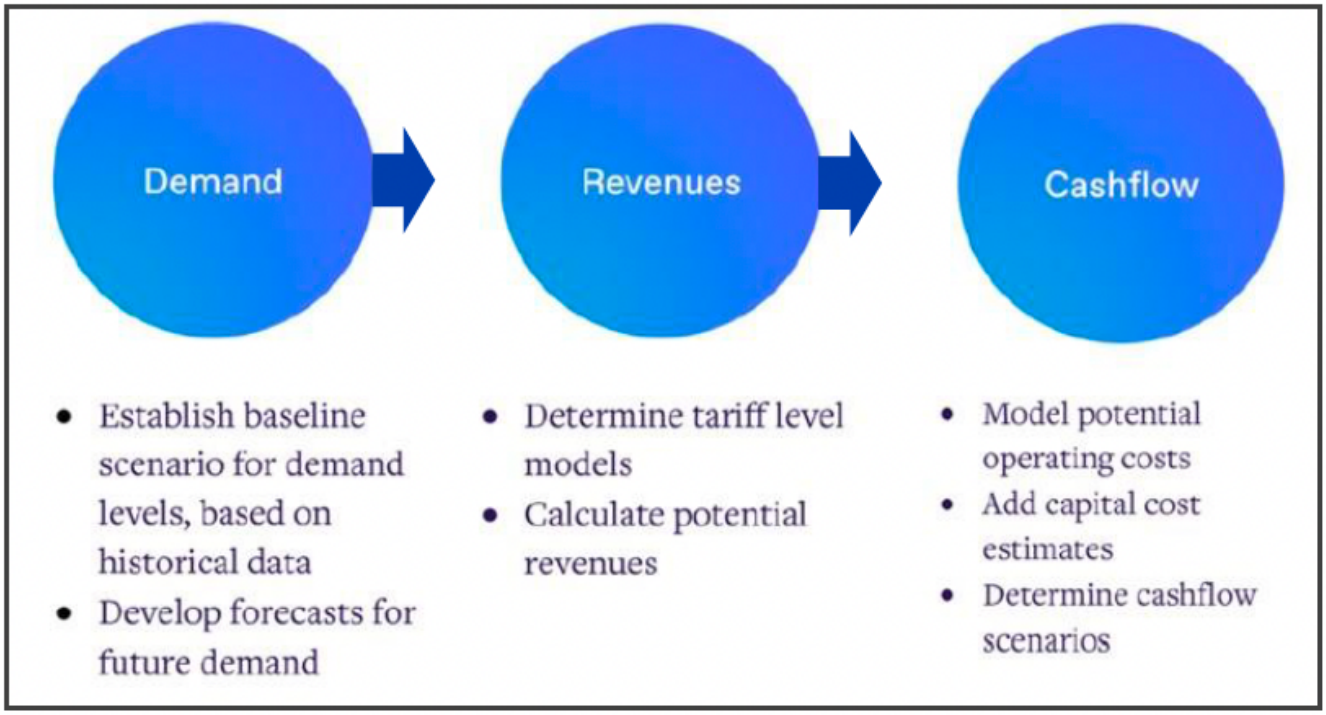
A detailed methodology was employed, incorporating various assumptions and metrics related to electricity consumption, EV charger deployment, staff growth, and carbon emissions. This included factors like average EV range, charging times, and carbon emission rates for both gasoline and electric vehicles.

## Approach/Methodology Adopted

The study incorporated a two-scenario approach, considering both scenarios A (using existing capacity) and B (providing additional capacity). This enabled a comparative assessment of the costs and benefits associated with each scenario.

Comprehensive financial and economic modelling was utilized, including discounted cash flow (DCF) analysis to calculate the Net Present Value (NPV) and Internal Rate of Return (IRR) of the project. These metrics provided a robust evaluation of the project's financial viability.

The project employed an evidence-based approach to determining the market demand for EV chargers, considering factors like staff growth, EV ownership trends, and charging habits. This involved analysing historical data, conducting surveys, and consulting with relevant experts.




The environmental and social benefits were assessed by quantifying the carbon reduction potential and potential cost savings for staff through reduced charging rates. This included evaluating the impact on greenhouse gas emissions, the reduction in fossil fuel consumption, and the potential for cost savings for employees.

## Challenges

During the study, several challenges were encountered that had to be overcome. The main challenges are summarised below.

- Ensuring accurate data collection and reliable projections for future EV demand, staff growth, and electricity consumption. This was a significant challenge due to the rapid pace of change in the EV market and the evolving nature of employee demographics.
- Reconciling potential discrepancies between estimated EV demand and available charging capacity. This involved careful planning and consideration of the available electrical infrastructure at each site and the potential need for upgrades or expansion.
- Ensuring the financial model accurately reflected the costs and benefits of the project, including operational expenses and the potential for future modifications. This involved factoring in potential cost increases due to inflation, maintenance, and potential upgrades to the charging infrastructure.
- Addressing the challenges related to securing necessary electrical capacity and obtaining approvals from relevant authorities. This included navigating the regulatory environment and securing the necessary permits and approvals from local energy providers and government agencies.
- Quantifying the social and environmental benefits of the project, such as carbon reduction, with an emphasis on ensuring a clear understanding of the potential impact on staff. This involved careful analysis of the carbon emission reductions associated with the project and the potential impact on employee morale and satisfaction.

## Outcomes

The main outcomes are noted below.

- The feasibility study concluded that the proposed EV charging infrastructure deployment is financially viable across the four BMW plants, with an average payback period by year 9. This indicated that the project was expected to generate a positive return on investment within a reasonable timeframe.
- The study identified the need for additional electrical capacity at certain plants to meet projected EV demand. This highlighted the importance of conducting thorough capacity assessments and ensuring that sufficient power is available to meet future needs.
- The analysis highlighted significant financial and economic benefits.

## Lessons Learned

The main lessons learned are noted below.

- The success of EV charging infrastructure deployment requires a comprehensive approach that considers the technical, financial, and economic aspects, as well as environmental and social considerations.
- Accurate data collection, realistic projections, and robust modelling are crucial for assessing the viability of such projects.
- Continuous communication with stakeholders, including staff, is essential to ensure support and understanding of the project's goals and potential impact.
- The adoption of EV charging infrastructure is a complex undertaking, requiring collaboration with diverse stakeholders, including local authorities, energy providers, and construction companies.
- The study highlighted the importance of considering the broader economic and societal benefits of EV charging infrastructure, including carbon reduction and its potential to promote sustainability and employee well-being.

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