

1. Preface

Kolhapur City is implementing programs such as the PM E-Bus Seva Scheme, which attempts to incorporate electrically powered buses into the public transportation system, to create more environmentally friendly and sustainable transportation systems. In order to improve the reliability of electric bus operations in Kolhapur City, this thesis evaluates the current state of charging infrastructure, identifies obstacles to its implementation, and suggests workable solutions. The critical challenge of a lack of public electric vehicle (EV) charging stations along bus routes is addressed. By employing geospatial analysis methods, the research finds the best spots to put solar panels, encouraging the utilization of renewable energy for powering charging stations for electric vehicles and lessening dependency on the conventional power grid. Furthermore, to ascertain the optimal locations for public EV charging stations, the research utilizes the Analytical Hierarchy Process (AHP) as well as Weighted Overlay tools. This ensures that these sites optimize accessibility and effectiveness for bus routes. An open-source Python script is also created to help with emergency management and real-time operational planning by analyzing and locating the closest charging stations. This research aims to substantially contribute to the long-term sustainability of Kolhapur City's public transportation system, by making sure electric buses can operate reliably, by offering a thorough geospatial structure for the strategic placement of solar panels & EV charging stations, accompanied by reliable analytical methods and workable coding solutions.