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Marine Policy Seminar
October 3rd, 2013

Electric Vehicle Charging Stations: Identifying & Selecting Placement for Range Extension

Electric Vehicle (EVs) will play a critical role in the diversification of the current American transportation system and have the potential to provide grid services that can further encourage the adoption of renewable energy generation. This research addresses one of the major barriers to adoption of EVs – availability of charging stations that enable longer trips in an EV. The need for a strategic plan in developing networks of charging stations is critical because of the following factors: 1) limited range of vehicles currently on the market, and 2) to utilize public funds most efficiently in efforts to provide range extending charging stations. A three-step method is used to identify and provide criteria for selecting critical placement of charging stations. Step one: Generate a map of trip origin, destinations and common routes based on Population, Employment and Annual Average Daily Travel (AADT). Step two: Using 50 miles to represent worse case range of EVs currently on the market, map the sections within a trip where the vehicle will require a recharge. Rank these areas based on number of overlap sections. Step three: Provide a metric to measure qualitative attributes of locations within sections where an EVSE may be installed.