# Optimal planning of large-scale deployment of charging stations for increasing electric vehicle adoption

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**Abstract**

We present a new strategic multi-period optimization problem for the siting of electric vehicle (EV) charging stations. One main novelty in this problem is that EV adoption over time is influenced by the availability of charging opportunities, as well as by local EV diffusion. Furthermore, to the best of our knowledge, this is the first contribution where the distribution of charging demand is modeled with a combination of node-based - more appropriate for urban or suburban settings - and flow-based approaches - with which we can model the needs of EVs to recharge on intermediary stops on long-haul travels. We propose a mixed-integer linear programming (MILP) formulation for this problem. Our computational experiments show that by simply implementing it in state-of-art MILP solvers, we are unable to obtain feasible solutions for realistically-sized instances. As such, we propose a rolling horizon-based heuristic that efficiently provides provably good solutions to instances based on much larger territories (namely the province of Quebec and the state of California) than those tackled by the methods proposed in the literature for the location of EV charging stations.