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**BangaloreMirror**

## Power to the people

Bangalore Mirror Bureau / May 5, 2022, 06.00 AM IST



### Highlights

IISc model suggests 200 optimal charging points for EVs based on citizens' choices, resource constraints and grid impact  
1,000 potential EV buyers, 5,000 households surveyed

### By Garima Prasher

A data-driven analysis of various travel-related parameters, people's choices of locations and grid-related aspects can guide government agencies to plan electric vehicle (EV) charging infrastructure in the city, according to research.

The Indian Institute of Science (IISc) has developed a graphical user interface (GUI) tool to optimally plan these locations in Bengaluru Metropolitan Region (BMR). As per the analysis, amongst the 2,030 possible locations in the city that came up, 200 are optimal.

Kengeri bus terminal, ISKCON temple, Gopalan Arcade mall, BESCOM's JP Nagar office, Jayanagar Metro station, NIMHANS, Orion mall, Majestic railway station, Mantri Square mall, Garuda mall and MG Road Metro station are some of the suitable locations thrown up by the model.

"We conducted a behavioural and travel survey of 1,000 potential EV buyers and 5,000 households in BMR to develop the tool. The tool generated an optimum solution that includes the exact location of the proposed charging points and their geocodes. We have mapped all the potential locations where possible charging stations can be set up in the city. While we deduced as many as 2,030 possible locations, the optimisation model filtered out 200 optimum locations on GUI," said Dr Ashish Verma of the Sustainable Transportation Lab at IISc.

The tool has been developed under the IISc's Innovating for Clean Air (IfCA) programme, which is a joint initiative between India and the UK to pilot air quality improvement initiatives in Bengaluru. The programme also focuses on supporting the government of India's FAME scheme to accelerate the adoption of electric vehicles.



The GUI tool takes parameters such as resource constraints, grid impact and people's demands into consideration to generate the location data. It also gives insights into the impact of various charging station attributes such as charging time, charging cost, waiting time and accessibility on the choice of location.

"A list of all the potential locations, which included shopping malls and other major commercial centres, office areas, petrol stations and such in the city was developed. This list was then updated based on the origin and destination points from the travel patterns. Outputs from behavioural and travel surveys were then fed as inputs to the optimisation model, which then churned out the list of optimal locations," Dr Verma told BM.

Although Karnataka was the first state in India to introduce an electric vehicle policy, the transformation towards electric mobility in the state has been relatively slow.

According to the IISc researchers, organisations such as BESCOM and BBMP, that have long been planning to help increase the adoption rate of EVs, can benefit from the tool.

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— Dr Ashish Verma, IISc

"The major roadblock to the transformation towards EVs is the lack of charging infrastructure. This tool will help stakeholders like BESCOM to better

plan for the infrastructural requirements, thereby facilitating their adoption and leading to a more sustainable transportation system in Bengaluru. All this can be achieved while reducing greenhouse gas emissions and improving the air quality,” added Dr Verma.

Researchers stressed the project has the potential to save critical government resources that can be otherwise allocated to provide quality public services such as health, water and education.

“The tool has the potential to reduce premature mortality, health conditions caused by poor air quality alongside improving the overall health and wellbeing of citizens. The spiking oil prices affect not only the vehicle owners, but its worst economic impacts are on the farmers and poorest citizens in the country,” added Dr Verma.