

South Asia Energy Series

Accelerating EV

Charging in South Asia

11 March 2021

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USAID SPARC Program Overview



USAID SPARC Program: **An Overview**

A three year U.S.-India bilateral initiative aimed at supporting modernization of electricity distribution through reforms and deployment of smart power systems



Program Period

September 2018 – September 2021

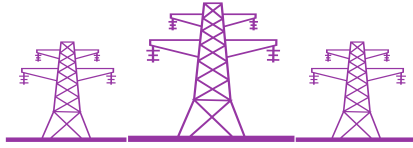
Program Partners

- Ministry of Power
- Energy Efficiency Services Ltd.
- National Smart Grid Mission
- POWERGRID Corporation of India
- Select State DISCOMs

Implementing Agency

KPMG Advisory Services Pvt. Ltd.

Key Components of the USAID SPARC Program



Distribution sector investment planning

1. Distribution franchisee models for enhanced private sector participation
2. Investment analysis tool for utility modernization projects



DISCOM operations improvement & modernization

1. Support for national rollout of prepaid smart meters
2. Enhancing customer centricity in electricity distribution sector
3. Design and deployment of public charging infrastructure for Electric Vehicles (EVs)



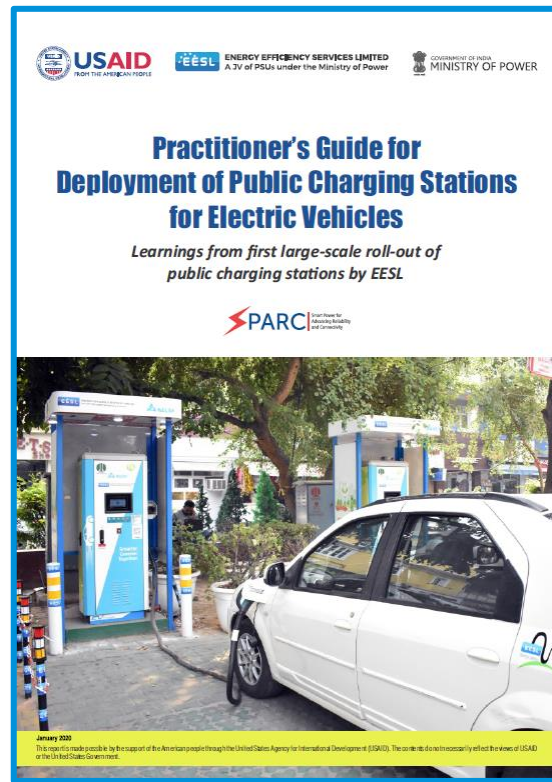
Institutional strengthening, capacity building & outreach

1. Concept note on strategic roadmap for the Smart Grid Knowledge Center (SGKC)
2. Roadmap development and handholding support to the SGKC for roadmap implementation
3. Outreach, international conferences, and study tours

Partnerships and Alliances

Knowledge Dissemination: Practitioner's guide on EV PCS

Top Delegates from South Asian Countries released the Practitioner's Guide



Key learnings from the deployment of public charging stations in India was synthesized into the “*Practitioner's Guide for Deployment of Public Charging Stations for Electric Vehicles*” which was released during “**Workshop on Regional Cooperation for Modernization of Power Distribution in South Asia**” in January 2020 (Attended by representatives from the U.S., India, Bangladesh, Bhutan, Nepal, Sri Lanka & Maldives).



**Evolving
Global
Ecosystem for
EVs
Deployment**

Asian Governments are promoting EV adoption

Various Asian countries are looking at creating an enabling eco-system for deployment.

Bangladesh

- Drafting auto industry policy with target of **>15%** of vehicles to be powered by “environment-friendly electricity” in 2030

Bhutan

- Targets **70%** reduction in **fossil fuel imports** by 2020

Nepal

EV Adoption Target:

- 2025: **25%** among private vehicles and **20%** in all 4W public passenger vehicles
- 2030: **90%** among private vehicles and **60%** in all 4W public passenger vehicles

Singapore

- Announced the ambitious target of **phasing out** ICE vehicles entirely by **2040**
- Introduced an EV Early Adoption Incentive, providing a rebate of **up to 45%** on the Additional Registration Fee for purchases of EV cars and taxis from 2021 to 2023

Sri Lanka

- Plans to **scrap state-owned ICE vehicles by 2025** & **ban** private fossil fuel vehicles by **2040**

Thailand

- Set a goal to domestic **EV production to 30%** of total annual car production by **2030**
- Introduced an EV roadmap with the aim of **producing 250,000 EVs** and developing an **ASEAN EV hub by 2025**

EV Ecosystem – Challenges and Interventions

High upfront cost

Demand incentive programs are already addressing this



Limited EV models

No. of OEMs launching new models (in view of the policy direction)



Lack of charging infrastructure

Viability of Public Charging Stations (PCS) a key challenge – key variables

- Upfront costs*
- Utilization
- Operational cost **
- Provision of Land



Today's Focus

**Cost of EV Supply Equipment and related infrastructure such as canopy structure, barricading, meter and meter box, and accessories such as canopy, LED screens, CCTV camera*

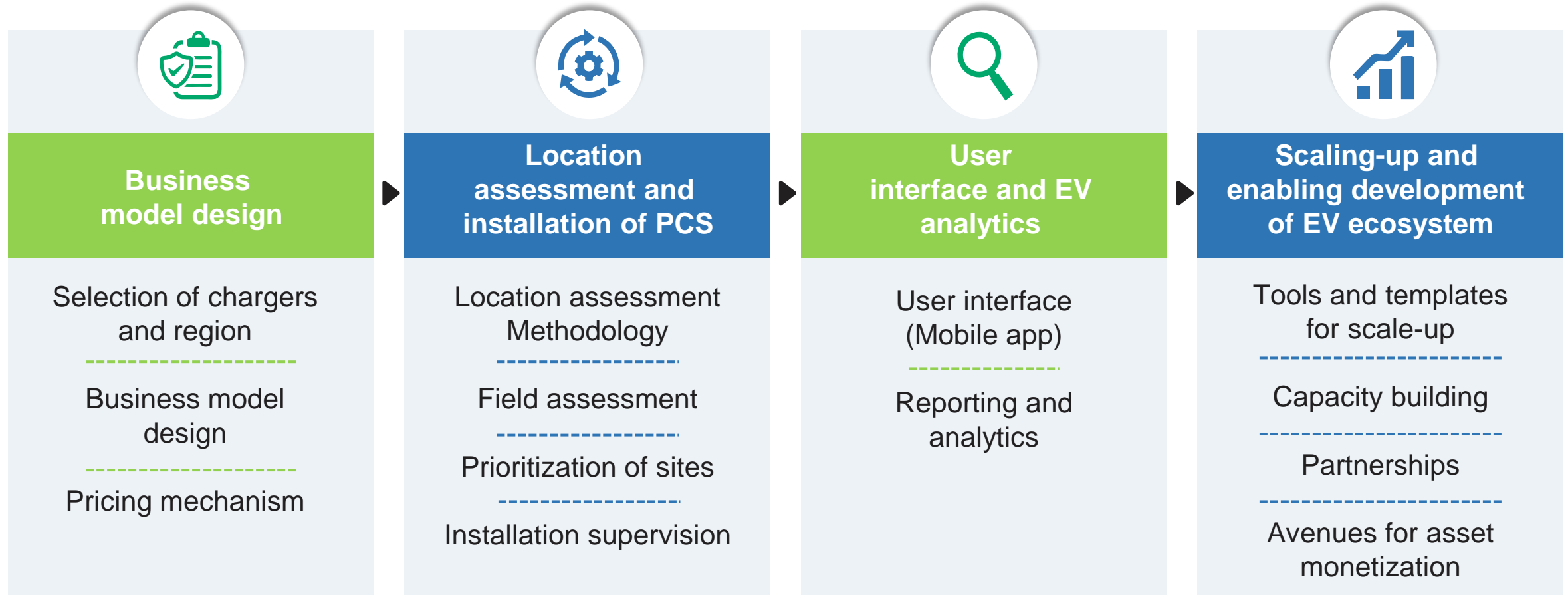
*** Gateway charges, parking charges, insurance premium*



Deployment of Public Charging Stations (PCS)

Steps for installation of EV chargers

- ✓ USAID SPARC Team assisted EESL in development of a scalable business model for installation/ deployment of Public Charging Stations (PCS) across India
- ✓ Overall approach followed in the support is as mentioned below

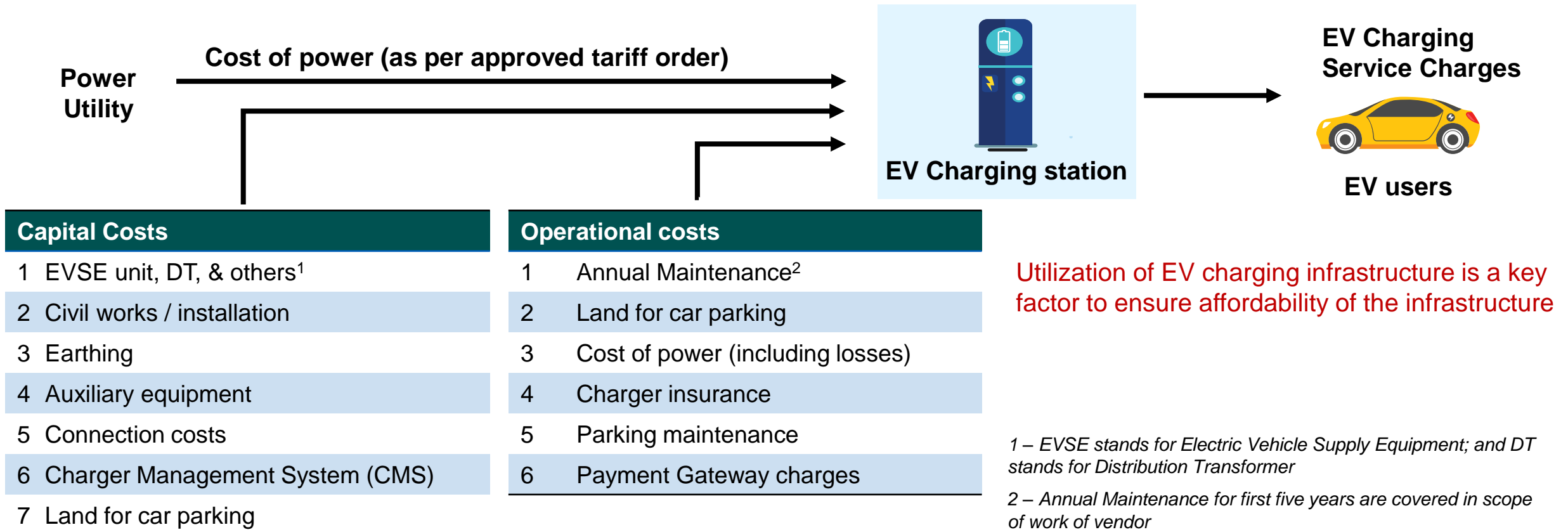




Business Model Design

Pricing for PCS should recover CAPEX and OPEX of PCS

PCS service charges should be reflective of capex and opex in addition to the cost of Input Power for business sustainability as evident from international case references



There is more to EV Charging Service Charges from Public Charging Stations than the cost of power

Second part in the series will cover the costing, and financial analysis in detail

Selection of Type of Chargers to be deployed

SN	Charger Connector	Power Output (kW)	Rated Voltage (V)	Charging Speed ²	Charging Speed is critical for selecting locations for charging infrastructure
1	CCS	Min 50 kW	200-750V or higher	75 km / 15 minutes	
2	CHAdeMO	Min 50 kW	200-500V or higher	75 km / 15 minutes	
3	Type-2 AC	Min 22 kW	380-415V	33 km / 15 minutes	
4	Bharat DC001	15 kW	48V or higher	25 km / 15 minutes	
5	Bharat AC001 ¹	10 kW	230V	05 km / 15 minutes	

1 - Bharat AC001 has three guns of 3.3 kW each

2 – Assuming mileage of 6 km per kWh

- a) At the time of project, **EVs available in the market**, were compatible with Bharat DC001 and Bharat AC001 chargers only.
- b) Bharat AC001 chargers are more suitable for parking where vehicle stops for long-durations. These can be workplaces or homes. Hence, EESL decided to focus on Bharat DC001 chargers only.
- c) Considering Auto OEMs have recently launched vehicles with high capacity chargers, EESL is also planning to deploy high end chargers. For the same, EESL has already 200 high capacity chargers with procurement of around 1,000 chargers under process.

This topic shall be covered in detail in other webinars of this series

Selection of Region for the roll-out

EESL selected **New Delhi's NDMC region** for the roll-out of the PCS project

Why New Delhi?

- 1. MOP Guidelines:** Cities with population of **4 million+** to be prioritized
- 2. Vehicle Penetration:** New Delhi has highest number of vehicles registered in a single city in India
- 3. EESL's EV deployment base:** EESL has already deployed maximum of EVs and captive chargers in New Delhi

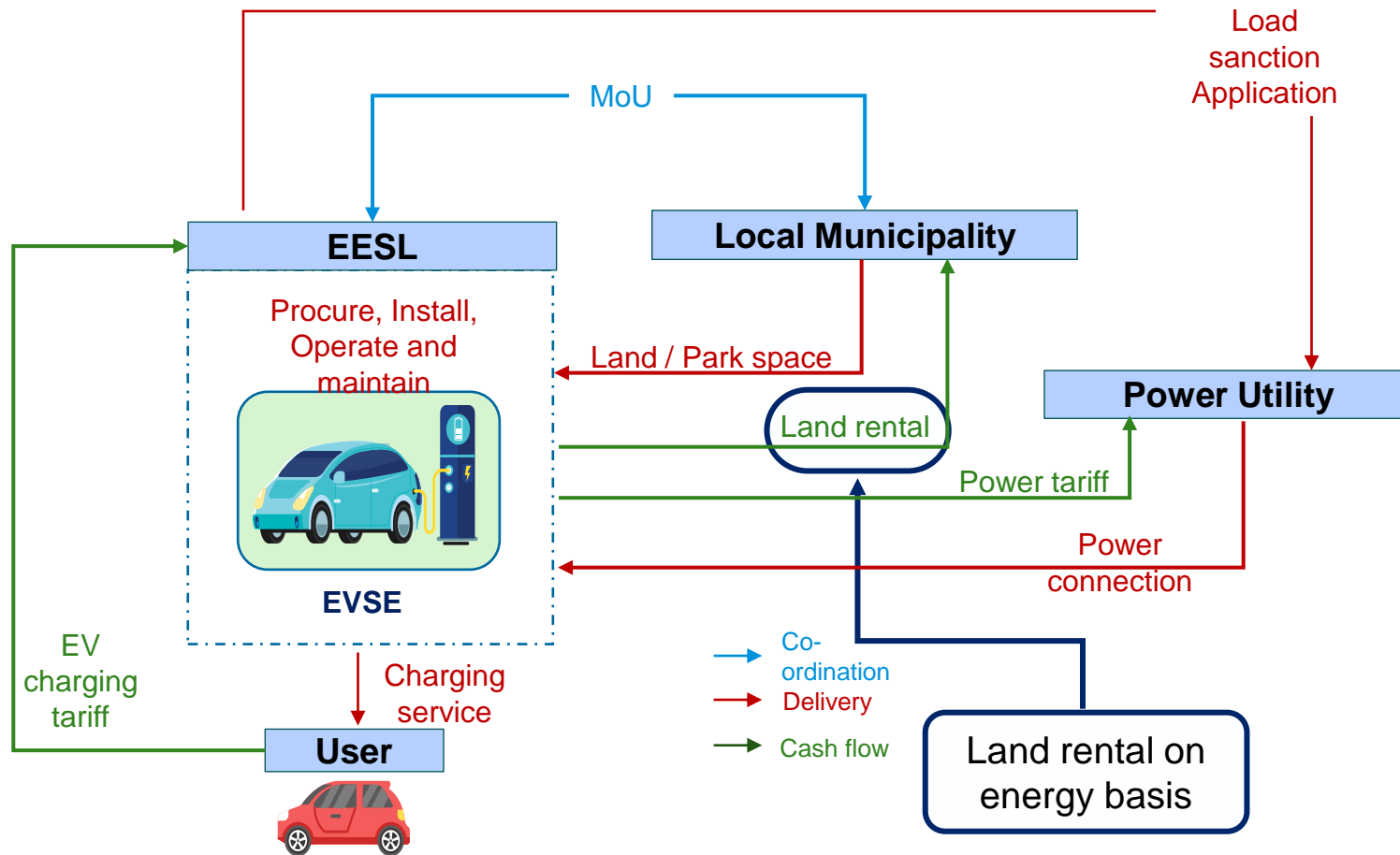
Why NDMC?

- 1. High Traffic and footfall:** Secondary assessment indicated that NDMC region has high traffic and footfall which means higher utilization and better business sustainability
- 2. Ease of coordination:** NDMC is both a power distribution utility and a municipal body (bulk land-owner)
- 3. Complementing the Smart Cities Mission:** NDMC is one of first 20 smart cities selected

Details provided in following slides

Business Model Design for PCS

- ✓ EESL ties-up with local municipality to install PCS
- ✓ EESL owns and operates PCS over their life-time (~10 years)



Win-win value proposition for EV users

Unique mechanism of land leasing from local municipality



Demand aggregation enabling bulk procurement



Low cost financing used by EESL



Affordable PCS services for the end-consumers

Second part in the series will cover the costing, financial analysis, and other business models in detail



Location Assessment

Location Assessment Methodology

- Location assessment for PCS (especially if rolling out for the first time in the country) is critical to ensure that charging infrastructure is accessible and affordable to general public and has potential to lead to demonstration effect leading to further EV adoption
- Various regions in NCR are first prioritized based on the expected footfall in the regions (as explained in Step 1 and 2 below)
- Top regions are then further prioritized based on convenience and availability of parking space (as explained in Step 3 below)

1

Assessment of footfall in NCR was done by plotting various public points on map using QGIS v3.4

2

Whole NCR region is then divided into grid of 3km X 3km and number of public points in one 3 km X 3 km block was used as proxy to assess relative footfall among various blocks

3

Top blocks are selected out all blocks for deeper analysis based on Point of Interests (POIs) including

- (i) Municipality area
- (ii) Metro stations (with parking spaces)
- (iii) Petrol pumps
- (iv) Municipality owned public parking area.

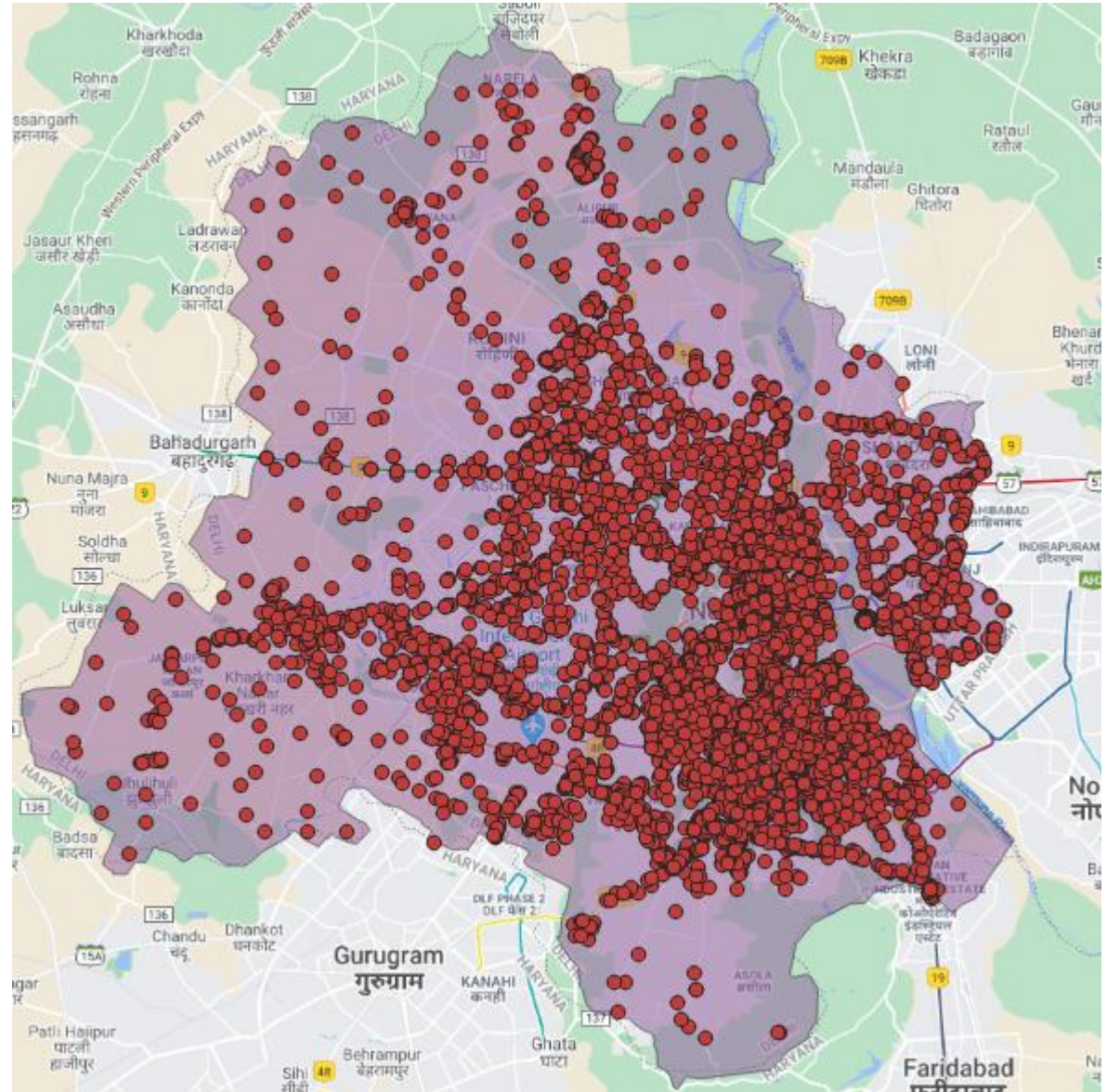
Step-1: Plotting the public points - Data capturing

Various public locations (called Point Of Interest or POI) were plotted using data available in public domain:

- **Metro station:** Based on information provided by DMRC (<http://www.delhimetrorail.com/DMRC-Google-Earth-pro.aspx>)
- **Petrol pumps:** Location of all petrol pumps in NCR (Noida, Gurgaon and Delhi) was taken from Google maps
- **Railway station/airport:** Location of railway stations and airports in NCR was taken from Google maps
- **Parking:** Location of major parking areas is extracted from goggle maps. List of metro stations with parking is taken from DMRC http://www.delhimetrorail.com/Parking_Details.aspx. List of authorised public parking places is taken <https://delhitrafficpolice.nic.in/public-interface/authorized-parking-area/>
- **Other public places:** Location of major markets and other public places was taken from Openstreet maps. Please note that location information on Openstreet maps is not exhaustive in nature. The attributes plotted include:
 - Archaeological
 - Arts centre
 - Artwork
 - ATMs
 - Attraction
 - Bakery
 - Bank
 - Bar/Pub/Night clubs
 - Beverages
 - Bus station
 - Butcher
 - Cafe
 - Car dealership
 - Castle
 - Chemist/Pharmacy
 - Cinema
 - Clothes
 - College/ University
 - Community centre
 - Computer shop
 - Convenience
 - Courthouse
 - Department store/ Supermarket
 - Doctors
 - Embassy
 - Fast food
 - Fire station
 - Florist
 - Food court
 - Golf course
 - Greengrocer
 - Guesthouse
 - Hairdresser
 - Hospitals
 - Hostel
 - Jeweller
 - Kindergarten
 - Laundry
 - Library
 - Mall
 - Memorial
 - Monument
 - Museum
 - Shops
 - Park
 - Pitch
 - Playground
 - Police
 - Post office
 - Public building
 - Religious places
 - Restaurant/Hotel/ motel
 - Ruins
 - School
 - Shelter
 - Sports centre
 - Stadium
 - Stationery
 - Swimming pool
 - Theatre
 - Travel agent

Step-1: Plotting the public points – QGIS mapping

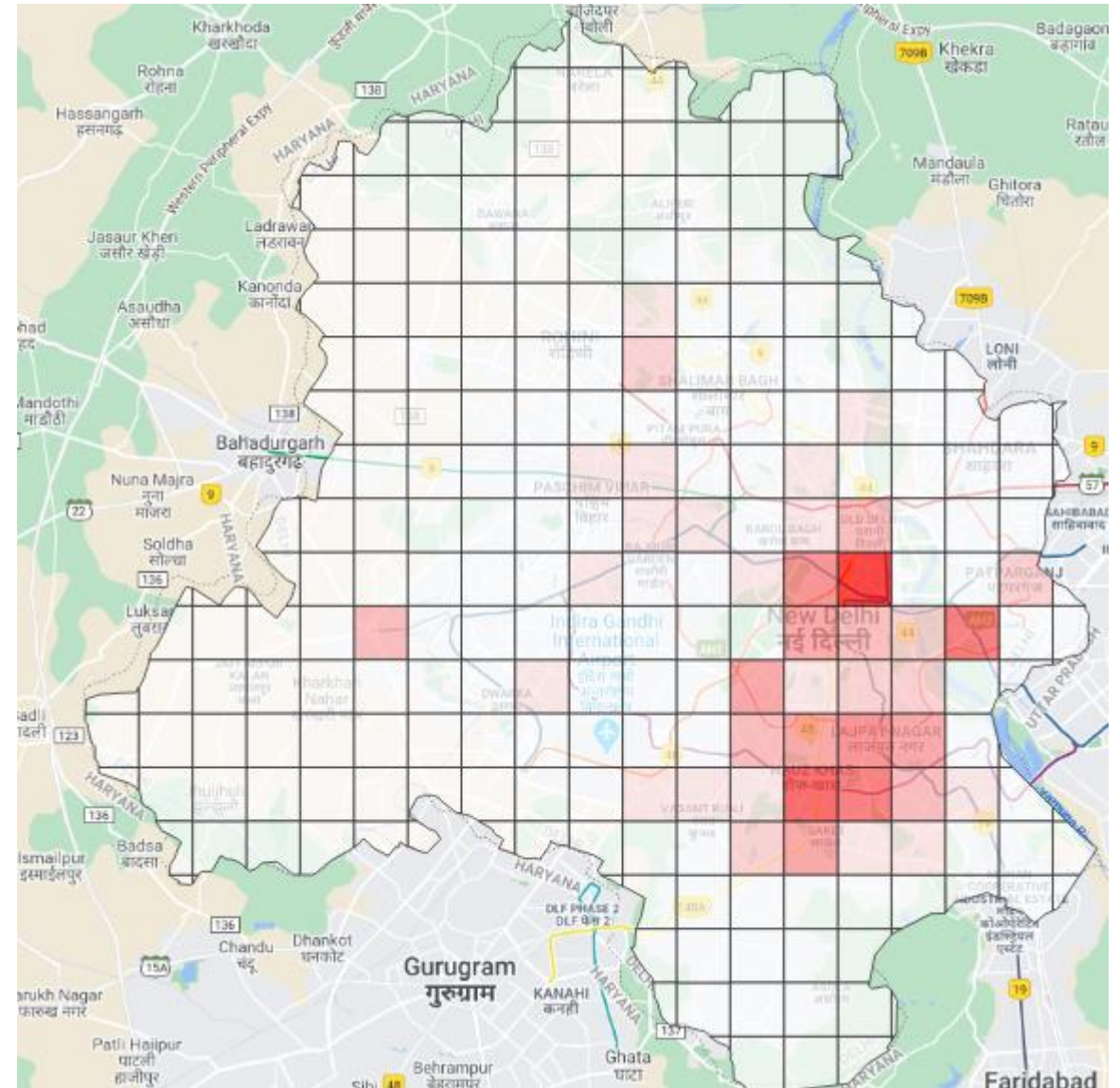
1. All public points in NCR region were plotted using open source tool QGIS v3.4
2. The output is shown in the adjoining figure



Map is for graphical indicative/depiction purposes only. It does not represent a legal boundary.

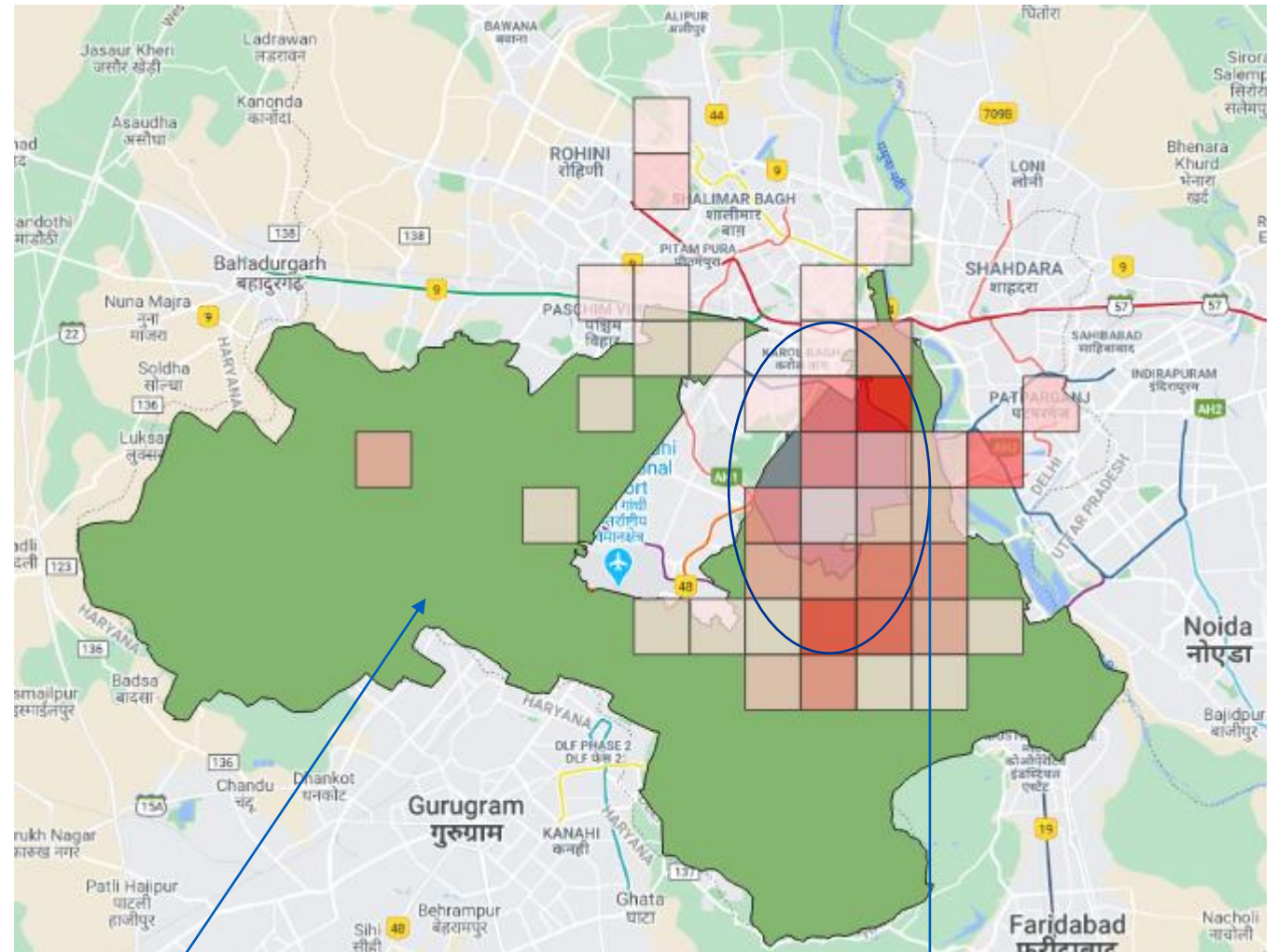
Step-2: Assessing the footfall in 3 km X 3km grid

1. The whole grid is then divided into a grid of 3 km X 3 km as stipulated in the Government of India's draft policy on charging infrastructure for EVs
2. For each grid block, number of points in the block was then analysed and a heat map was generated



Step-3: Top blocks – Second level analysis

1. Most of POIs lie under the administration of two municipalities in Delhi
 1. New Delhi Municipal Council (NDMC)
 2. South Delhi Municipal Corporation (SDMC)
2. Considering NDMC is land and power Utility, NDMC area was selected for the pilot project








SDMC Area

NDMC Area

Map is for graphical indicative/depiction purposes only. It does not represent a legal boundary.

Primary Assessment – Parameters for survey

Parameters for the primary assessment were constructed basis discussion with **all relevant stakeholders** to ensure the **affordable and accessible** charging infrastructure can be deployed within **a short interval of time**

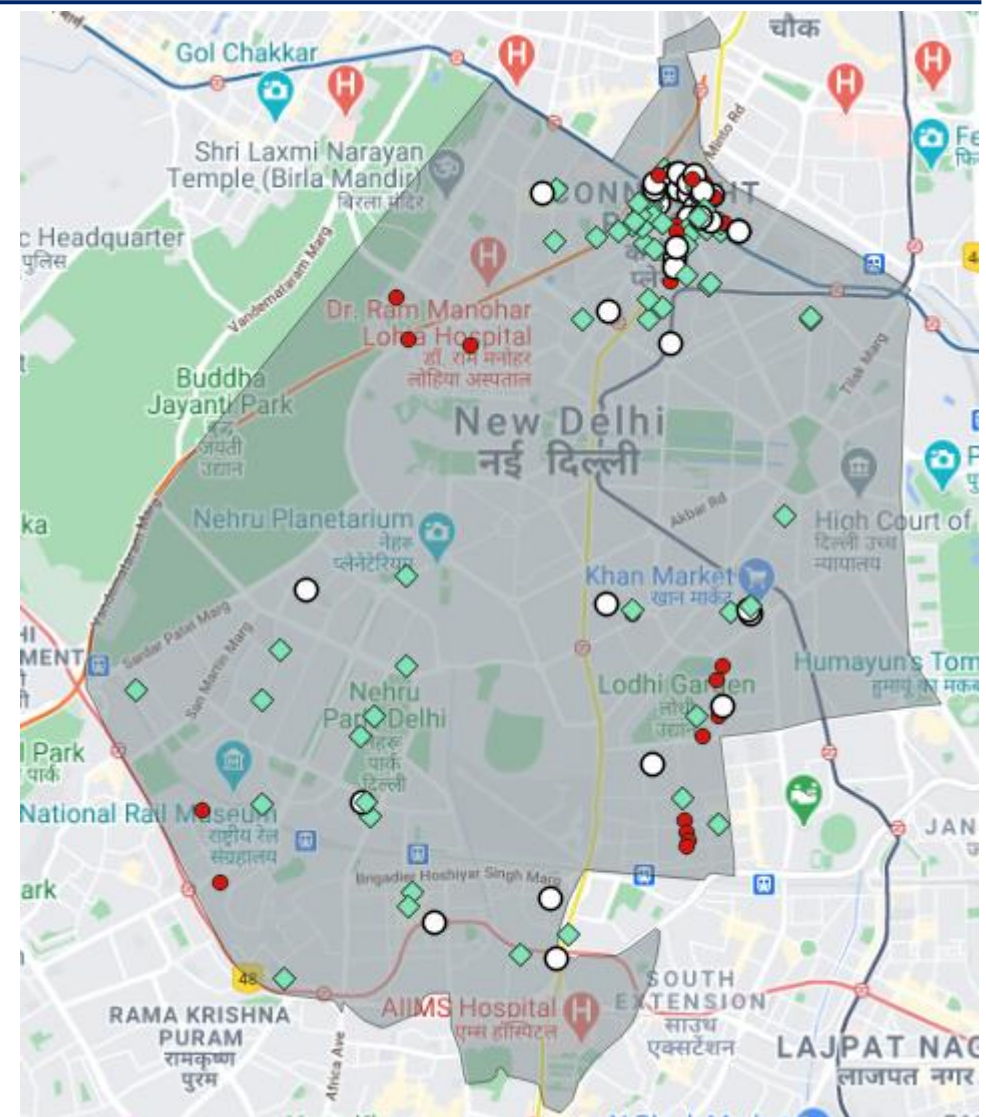
1	Availability of parking space (bus stop/metro/railway station), petrol pumps, restaurants and the ease of parking the vehicle at such places	
2	Load availability, distance from feeder pillar, etc. at identified location	
3	Visibility of the site to moving traffic/pedestrians	
4	Footfall around the site based on presence of market, shopping malls, commercial places, etc. in the vicinity	
5	Civil works required (interlocking/concrete/road) for charger installation such as cabling, foundation, etc.	

Joint Survey Team with representations from all relevant stakeholders can help in identifying suitable locations for public chargers

Prioritization of Sites

Prioritization of Sites for Installation of Chargers

- 1** Sites where charger installation can be carried out with minimum cost and interventions
- 2** Sites where charger installation would require minor interventions
- 3** Sites where charger installation is difficult / sites which require major interventions for installation of chargers

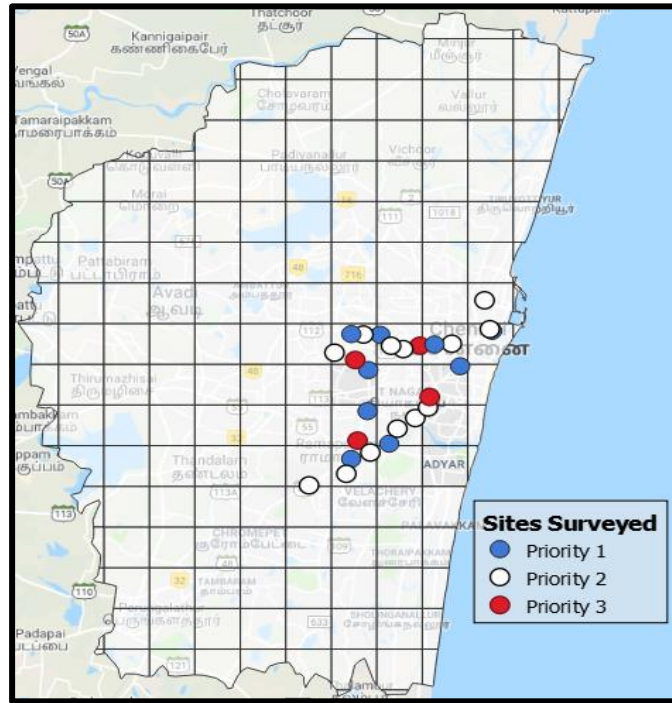


○ Priority 1 ● Priority 2 ◆ Priority 3

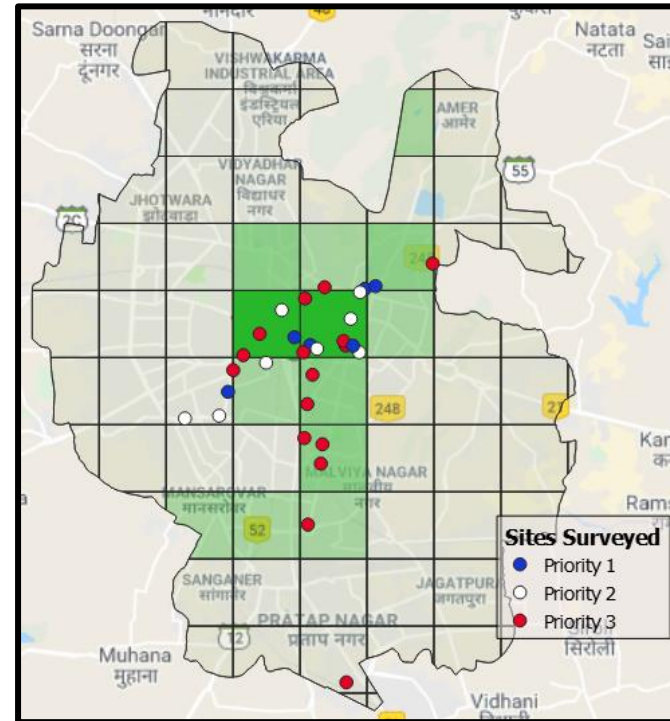
Map is for graphical indicative/depiction purposes only. It does not represent a legal boundary.

Prioritization of Sites – Other Cities (Selected)

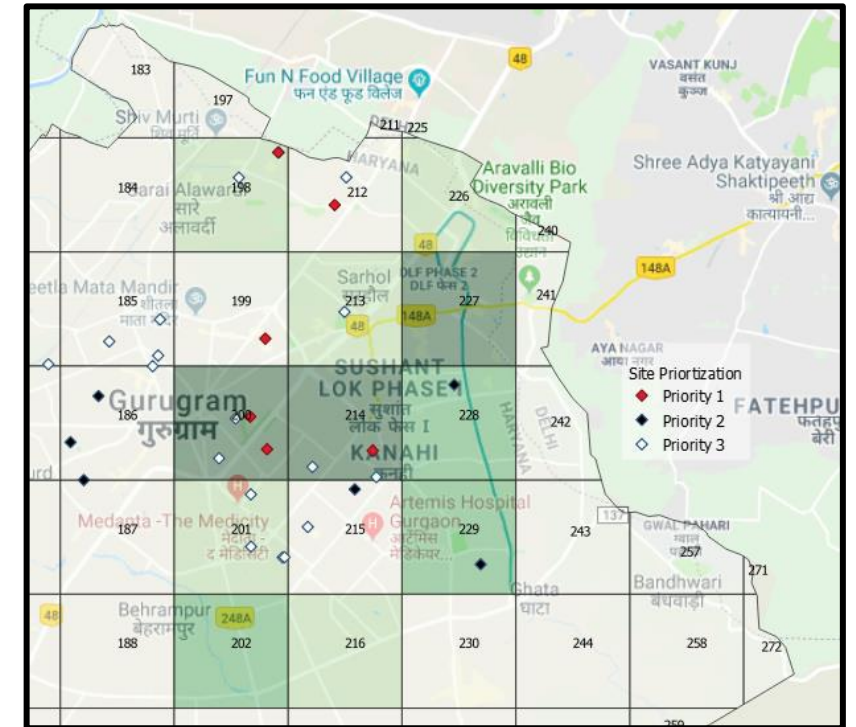
Chennai



Jaipur



Gurugram



Key learnings from Location Assessment

Load Availability

In few sites, enough **load is not available** in **existing feeders / transformers** for supply of power to PCS.

Augmentation or **installation** of new feeders / transformers may be required to provide the required load for PCS.

In such cases, the overall cost for installation and operation of PCS is expected to increase significantly, resulting in increase in PCS service fee.

Civil Works

In some sites, civil works such as construction of ramps, etc. may be required to ensure easy accessibility of PCS to EV users.

This may lead to significant increase in investment required to establish charging stations.

Land Availability

In addition to availability of power, availability of land is a key parameter for installation of PCS.

Governments need to facilitate the land for installation of PCS for cohesive development of PCS network.



Role of Government Agencies

Role of Government Agencies

Policy Makers

- a) Provide a **clear direction** to EV adoption and charging infrastructure for the country
- b) Create **enabling framework** to promote **private investment** in creation of charging infrastructure (de-licensing charging infrastructure business, clarifications on tax related issues, if any, etc.)

Land-related Agencies

- a) Provide **long-term lease** for EV charging infrastructure on revenue sharing mechanisms or other mechanisms which **does not add** to significant additional **CAPEX or OPEX**
- b) Ensure **right of way** for EVs

Distribution Companies

- a) For initial few years (till the market matures), provide electricity at not more than **average cost of supply**
- b) As market matures, **different pricing models** such as time of day can be explored to ensure that EVs load doesn't add to grid related issues
- c) Power distribution companies to **upgrade** the grid wherever required for installation of charging stations

Thank You

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About USAID's SPARC program

USAID launched the “Smart Power for Advancing Reliability and Connectivity (SPARC)” Program in partnership with the Ministry of Power, Government of India in 2018. SPARC is a three-year (September 2018-September 2021) initiative with the objective of supporting the transformation of operational and financial performance of electricity distribution utilities and facilitating an enabling environment for EVs in India. The implementing partner of the SPARC Program is KPMG Advisory Services Pvt. Ltd.

