UTILITY ANCHORED EV CHARGING PROGRAMS

The Climate Week NYC 2020

Presented by

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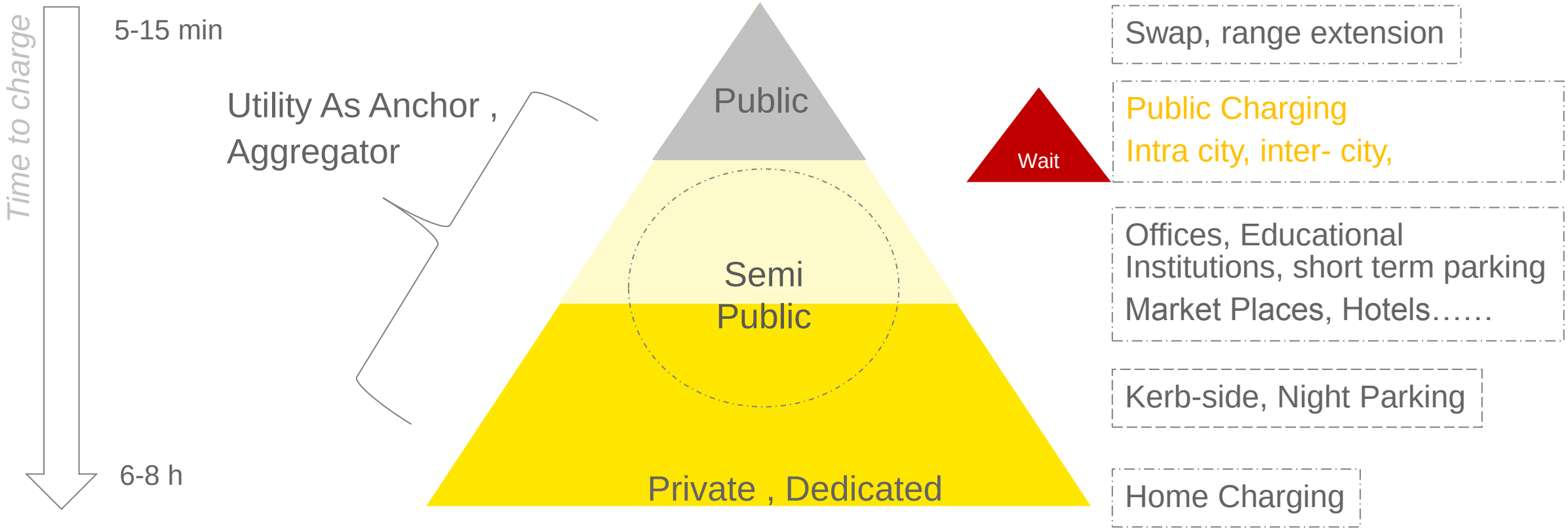
25-Sep-2020

Key ideas from our study

- Customers look up to utilities for their charging infra needs
- Different types of Charging Infra segments
- Charging demand management is a priority right from start
- Utilities can play the role of aggregators
- Business Models- examples

Customers need ‘longer time’ parking + charging no ‘waiting’

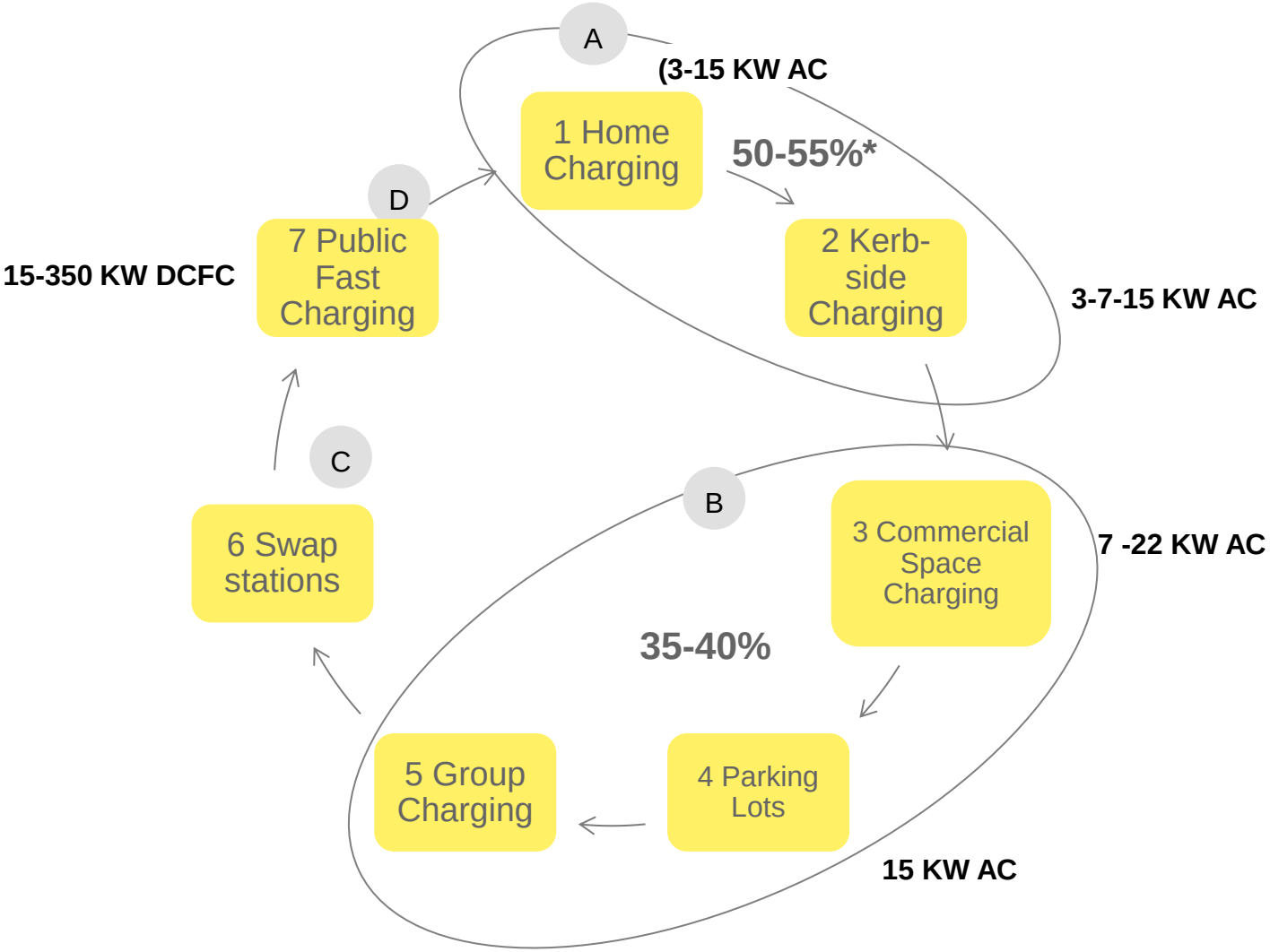


Customers look for DISCOM engagement and are Open to Time Of Use (TOU) Tariffs

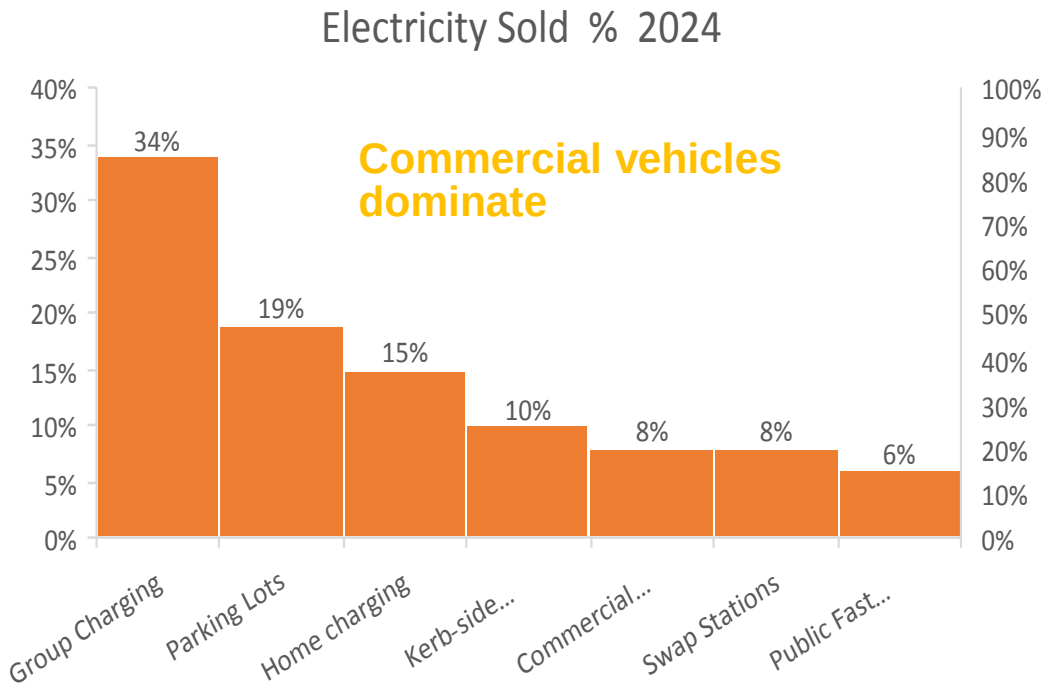
Setting up Charging Infra	Control of EV Charging	TOU tariff
I	I	I
FO	FO	FO
CS	CS	CS

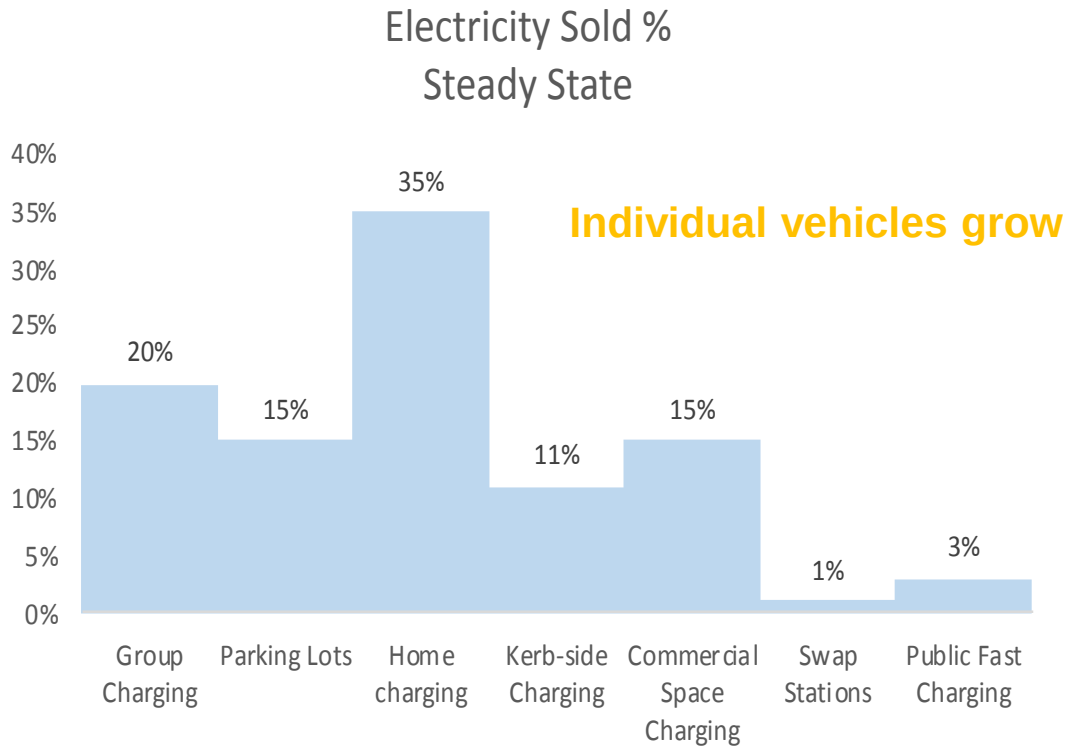
I	Individuals
FO	Fleet Operators
CS	Commercial Spaces

Home, Kerb-side, Commercial space charging would be predominant modes



Modeling of Energy Consumption





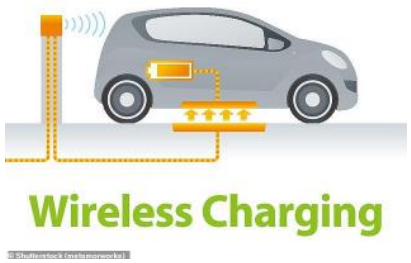
- With time, Home, Kerb-side and Commercial Space charging will increase in share.
- Group charging will remain important (20%-34%)
- Public Charging will retain the small yet important share (3-6%)
- Swap may decline as battery costs fall and energy density increase

Globally, Kerb-side charging is an important need

Armadillo (embedded in pavement)

‘Connected Kerb’

Gecko
(Pole mounted)



Wireless Charging

Typical Features Of Kerb-side Charging Programs

Site Selection	Sites for kerb-side chargers are selected based on community initiated/approved requests
Parking Rules	All existing parking rules followed EVs have priority. Violations attract fine.
Rates	Special EV rates apply.
Billing & Collection	Utility or the Aggregator collects based on Charge Cards
Infrastructure	Roadside electric poles can be used to feed the charging stations. One pole may feed 2 chargers. Infra upgrade costs socialized

Potential for a Phone- Booth Model? (2 Wh, 3 Wh)

Problems of ‘access’ and ‘high electricity charges’ for private EV charging points

Cost of Increased Sanction Load

For a residential consumer

- EV charging may mean significant system upgrade costs as average sanction load is 3-5 KW & EV cars may require 15-22 KW charger
- Difficult to get Resident Welfare Associations (RWA) permissions
- Similar problems in commercial buildings

Demand Charges

For charging which happens once in a week (normally, for a car), demand charges of ~ 3 times (5KW→ 15KW) may be a very high burden to carry. Applies to Home, Office Charging

Peak Hour Charges

Peak-hour charging rates high compared to off peak rates.*

** Delhi policy allows private charging points to also benefit from special EV charging rates*

TOU Tariff and DR Needed from the beginning

With DR agreement

- No Demand Charges even for Private Chargers
- Special EV tariff, with TOU features, also applicable for private chargers

TOU Tariff

- Peak: Off peak rates = 2-6

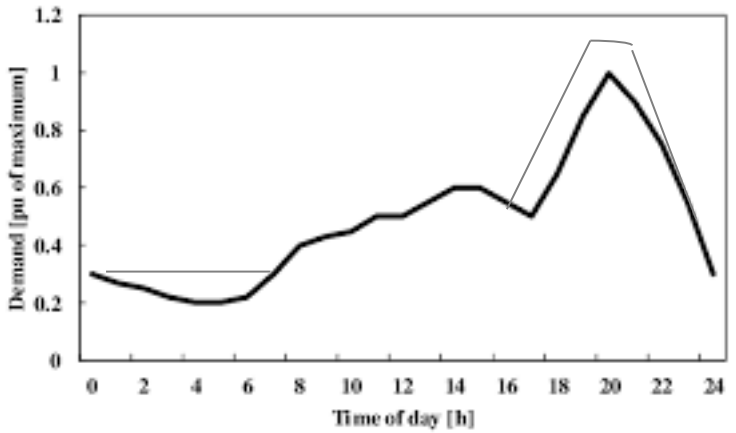
Higher the ratio=increased use of PV + ESS

DR

- Control to flatten the loads
- Schedule and adjust charge rate
- Opt –Out (limited) schemes work better

V2G

- This may be the last step to optimize the grid.
- EV's provide grid optimization services



ROLES A UTILITY CAN PLAY

- Aggregation
- Permissions
- Implementation
- Operation

Utility can play an important role as an aggregator

Checks network availability

Interacts with charging infra - Billing, load control

Utility

Provides public spaces for charging infra

May charge based on INR/m or share of electricity

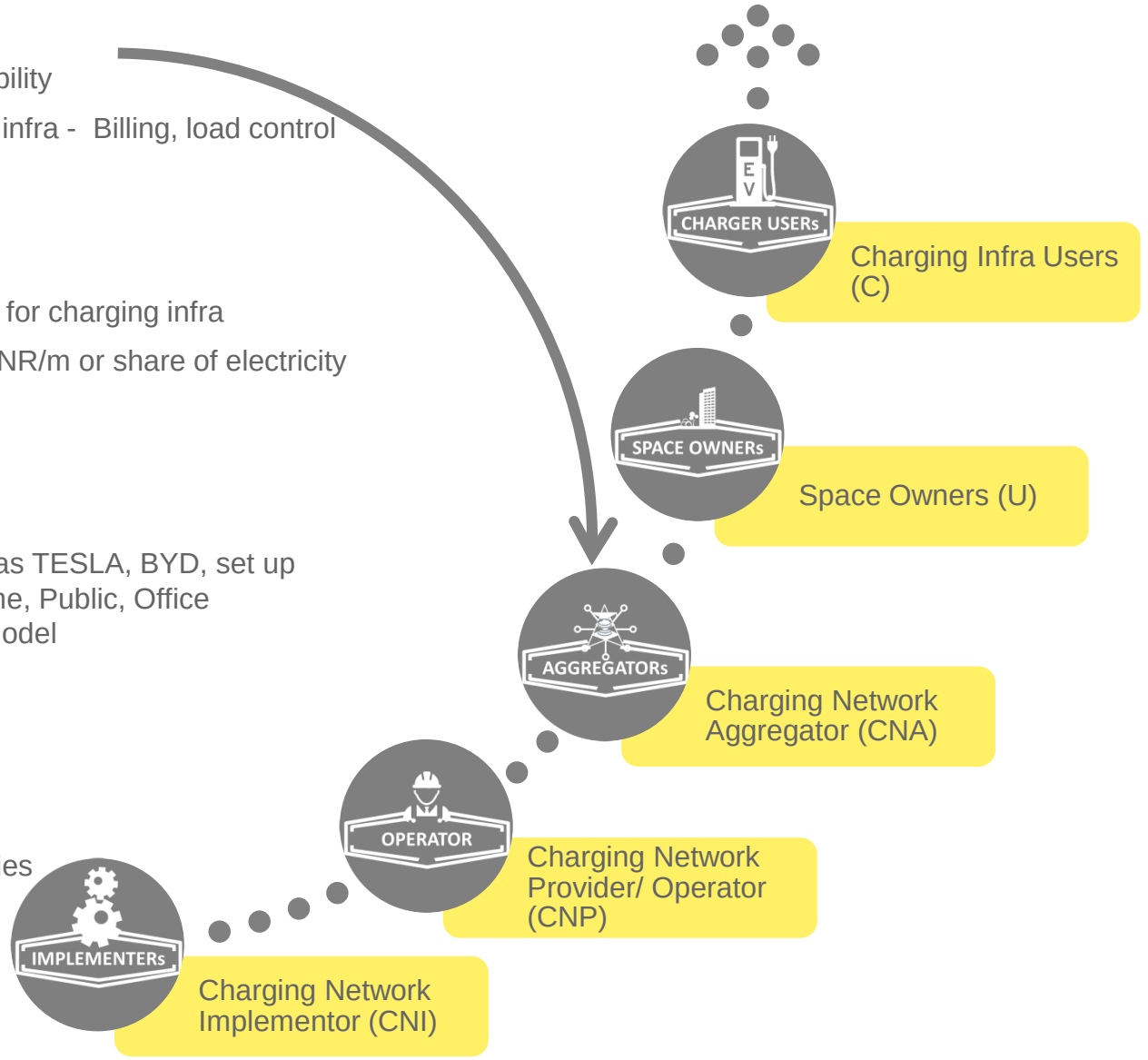
Municipal Body

Auto Companies such as TESLA, BYD, set up their own network. Home, Public, Office spaces. Subscription model

Auto Companies

Build branded charging network in their properties

Real Estate Companies



Charging Infra Users (C)

Uses the charging Infra and pays in various modes

- Owns (capex, O&M)
- Rentals (INR/m, INR/h)
- INR/Kwh

Space Owners (U)

Owns the space and provides it for charging infra for a charge (INR/h or INR/m) or revenue share

Charging Network Aggregator (CNA)

Aggregates demand and get the charging infra built; *may or may not invest*

Charging Network Provider/ Operator (CNP)

Invests in Charging Infra and charges the user/aggregator for usage

Charging Network Implementor (CNI)

Sets up charging infra as a system integrator/ OEM

Maintains the charging infra if needed

Why Utility Anchored Charging is ‘Value Creating’

Customer Connect

- Customer Trust
- Regulated

Existing Infrastructure

- Existing processes of metering, billing, payments etc.

Single Point Offering

- Management of permissions, infra creation, maintenance, billing etc.
- → Full bouquet of Charging Infra

Backward Integration Benefits

- Integrate EV as grid resources
- Attractive offers for DR, V2G services
- Offers for renewable resources
- Can provide on bill financing

Aggregation Benefits

- Speed of penetration
- Lowered costs and improved quality
- Payment assurance to service providers
- Ease-including dealing with regulators, Distribution of subsidies
- Management of ICEV Scrap Programs

BUSINESS MODELS

Business Models: Kerb-side Charging

7-15 KW AC chargers

4 WH Owners

- User doesn't own the parking space. Parks on the street.
- CNP owns and implements the charging infra
- Payment
  - INR/kwh, INR/m

3 WH Owners

- CNP sets up the charging infra around normal parking places of Autos (DMRC, Mohalla points). Used on priority for charging and not for parking
- Day time- top up charging
- Payment
  - INR/kwh

Utility Role

Aggregation

Aggregates demand from customers. For 3 WHs, carries out customer survey and selects site.

Empanels vendors /CNPs

Gets terms/ rates for charging fixed, through bids

Permissions

Gets load assessment, permissions etc.

May coordinate kerb-side charging permissions

Project Implementation

Assures quality of implementation

Manages subsidy disbursal

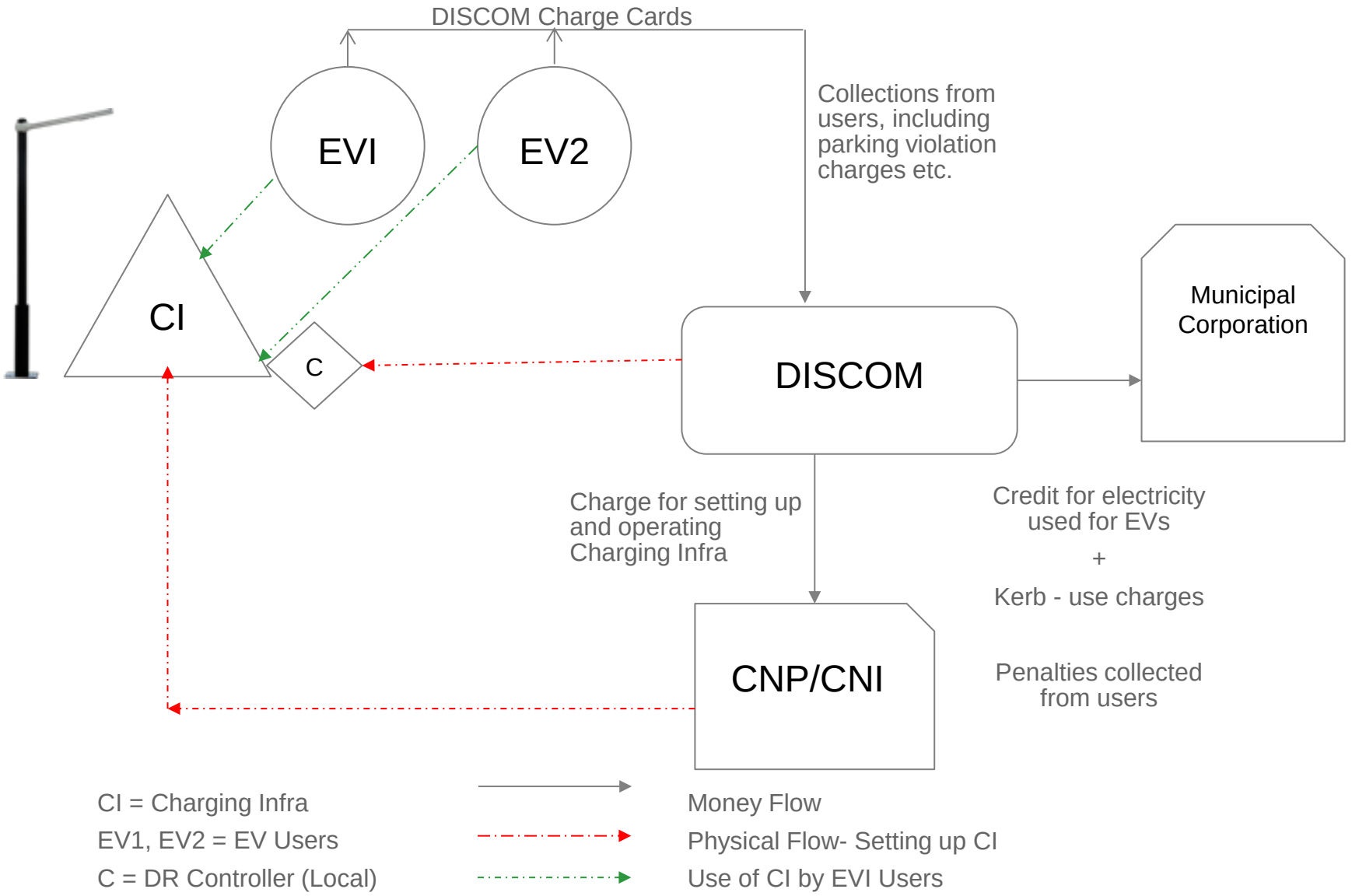
Operations

Customer billing may be aggregated by utility. A utility EV card may be used. Utility pays the CNP based on energy use or time

Electricity charges are directly settled by the utility.

Share the charging point infra on an app.

Kerb Side Charging Model



Contracts:

Users apply for Kerb-use, with local community approvals

For allocated users: Charging User Agreement (USER, DISCOM), includes DSM/DR arrangements.

Kerb-Charging Service Agreement (CNI/CNP, DISCOM)

Kerb-space User Agreement

(DISCOM, Municipal Body, User)

Charge Basis

- INR/kWh

Business Models: Home Charging

3-15 KW AC chargers

Home - Dedicated

- User owns the parking space at home, condos
- CNI Implements the Charging Point and also maintains it.
- Payment
  - INR (Capex)
  - INR/m (Rental)

Home- shared

- User owns the parking space, but shares the charging infra
- CNP owns and implements charging infra for a defined period.
- Charges
  - INR/m (Rental)

    INR/kwh (Energy Charge)

Utility Role

Aggregation

Aggregates demand from customers

Empanels vendors

Gets terms/ rates fixed, through bids

Permissions

Gets load assessment done

Grants connectivity permissions

Enters into DR contract with the owners to manage the EV charging according to overall grid load conditions

Project Implementation

Assures quality of implementation

Manages subsidy disbursal

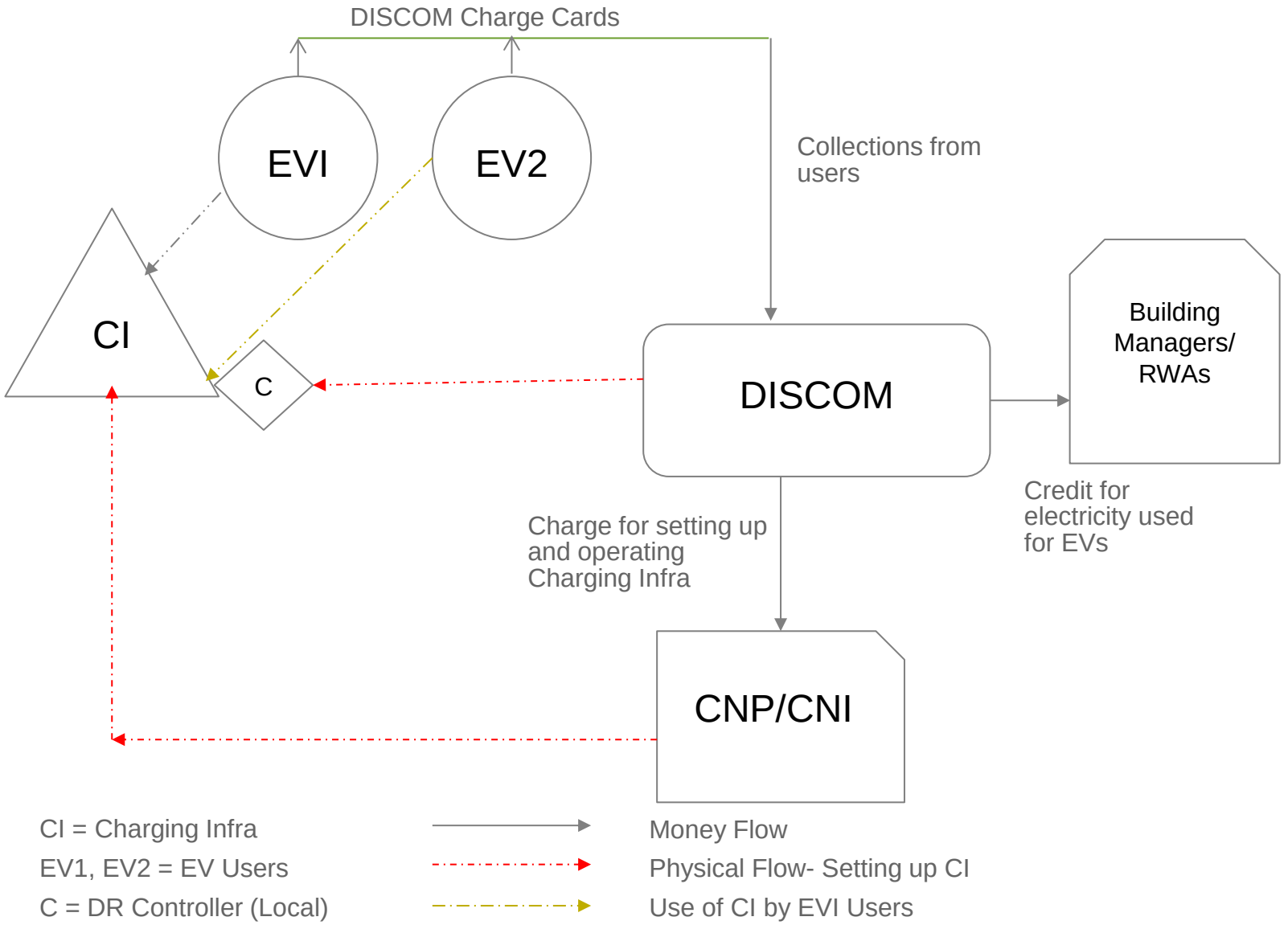
Operations

Subscription /rental models, the utility may carry out customer billing and pay the CNP.

Utility implements DR to control load. Manages EV charging (timing, scheduling)

Share the charging point information on app, if available for public charging.

Home Charging Model



Contracts:

Home Charging Agreement (USER, DISCOM), includes DR arrangements.

Home Charging Service Agreement (CNI/CNP, DISCOM)

Charge Basis

In case of capex-based installation= Capex

In Case of Monthly Service

- INR/m
- + INR/Kwh

Electricity charges are paid by the building manager, and DISCOM credits the electricity consumed equivalent amount from collections from the user

THANK YOU

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