ELECTRIC MOBILITY FORUM

ENGAGE
Connecting Big Ideas To Action

STANDARDIZING CHARGING OF ELECTRIC VEHICLES

Benefits, Opportunities And Challenges

WRI INDIA
ROSS CENTER

SHAKTI
SUSTAINABLE ENERGY FOUNDATION

Speakers

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Date: 24th May 2019

Speaker: Dr Sajid Mubashir
Host: Miss Shravani Sharma
Moderator: Dr Parveen Kumar

Path to Transformative Mobility

2015-17

FAME-India
(National Mission on Electric Mobility)

2017

7 C's

- Common
- Connected
- Convenient
- Congestion-free
- Charged
- Clean Mobility powered by Clean Energy
- Cutting-edge

2019

- FAME-2
- Phased Manufacturing Program

FAME-2, Type EV: Shared, Connected

Targets for rollout over next 3 years are

10 lakh two-wheelers under ₹1.5 lakh

5 lakh three-wheelers under ₹5 lakh

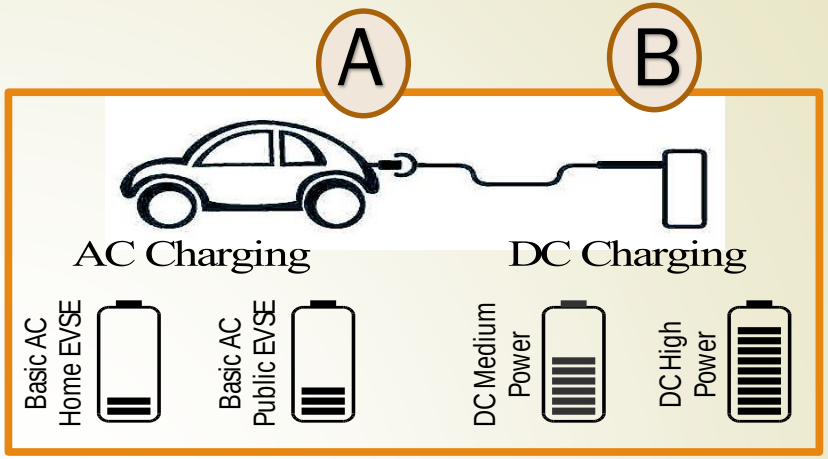
35,000 four-wheelers under ₹15 lakh

20,000 strong & plug-in hybrids under ₹15 lakh

7,090 electric buses priced up to ₹2 crore

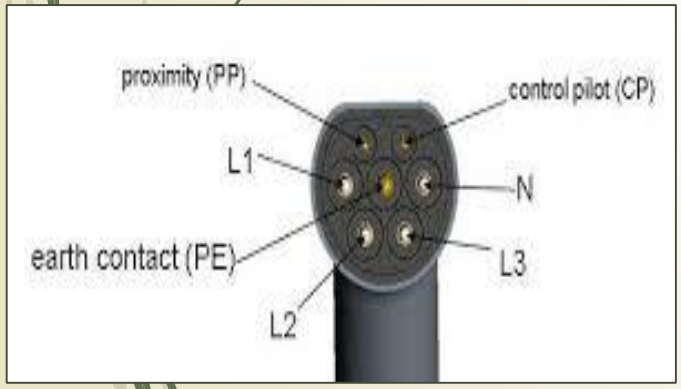
	Top Speed (kmph)	Acceleration (m/s^2)	Range (kms)	Motor peak power (kW)
e-2W (L1 & L2)	40	0.65	80	0.5kW to 1.5kW
e-3W (Rick)	NA	NA	80	1.5kW to 2kW
e-3W (Auto) (L5)	40	0.65	80	4.5kW to 6kW
e-4W (M1) (<4m)	70	1.04	140	20kW to 40kW
e-4W (M1) (>=4m)	70	1.04	140	30kW to 90kW

Basic & Fast Charging Systems

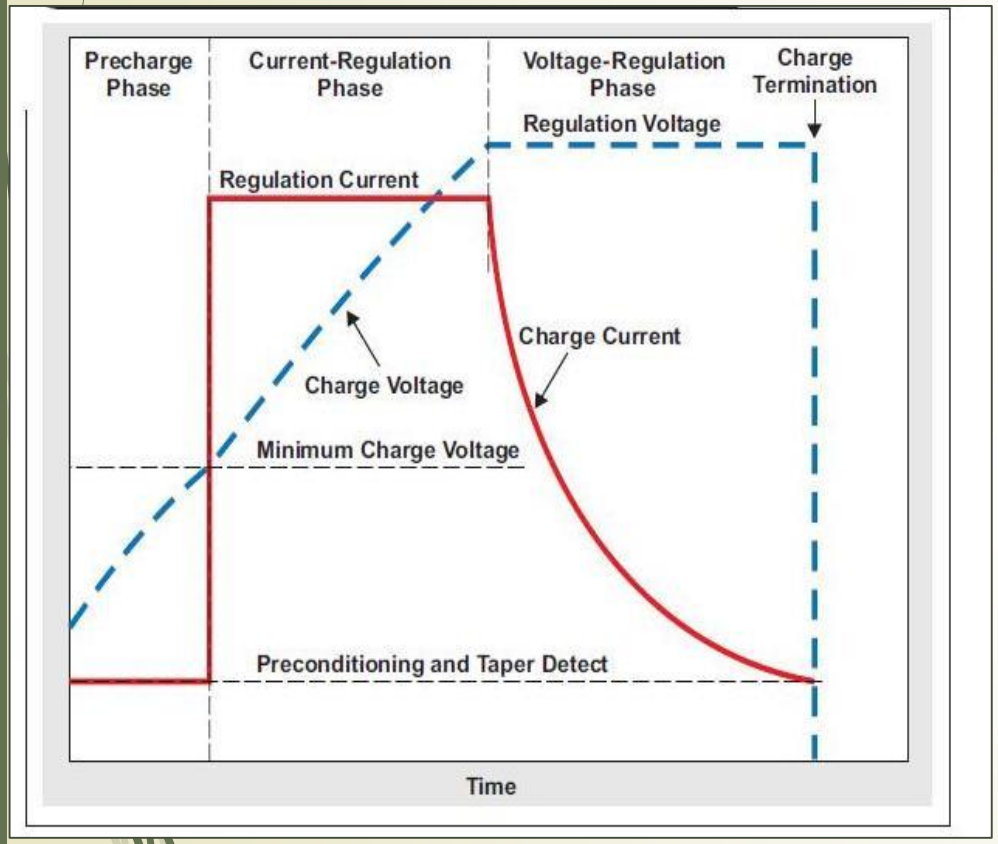


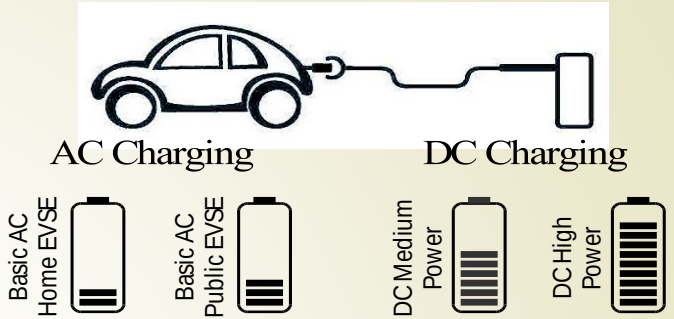
- Charging Systems: Indian Standards IS-17017 series
  - IS-17017 Part-1 : General Principles & Basic Charging
  - Fast Charging Systems: Part 23
  - Digital Communication for Fast Charging:
    - IS 17017-Part 24 : DC only Fast Charging Systems
    - IS 15118: Combined Charging Systems

EV-Bay; Charging every time EV is parked



Fast Charging Systems

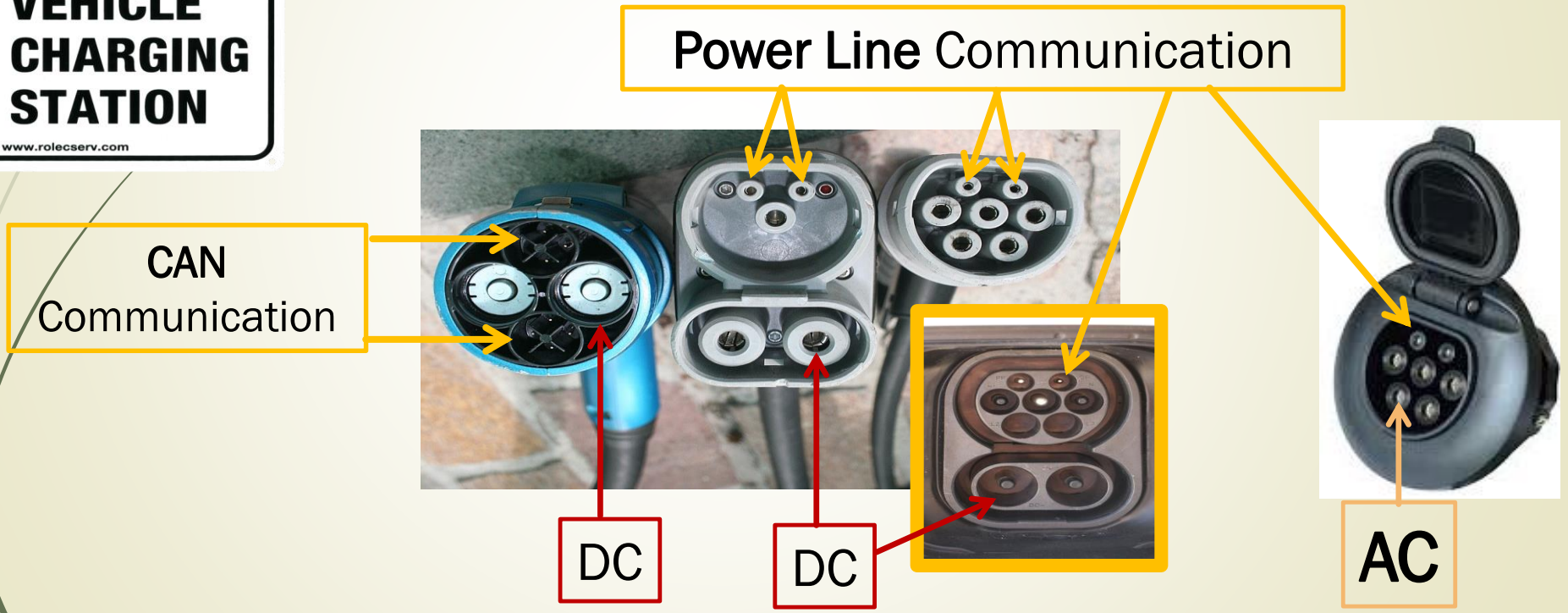




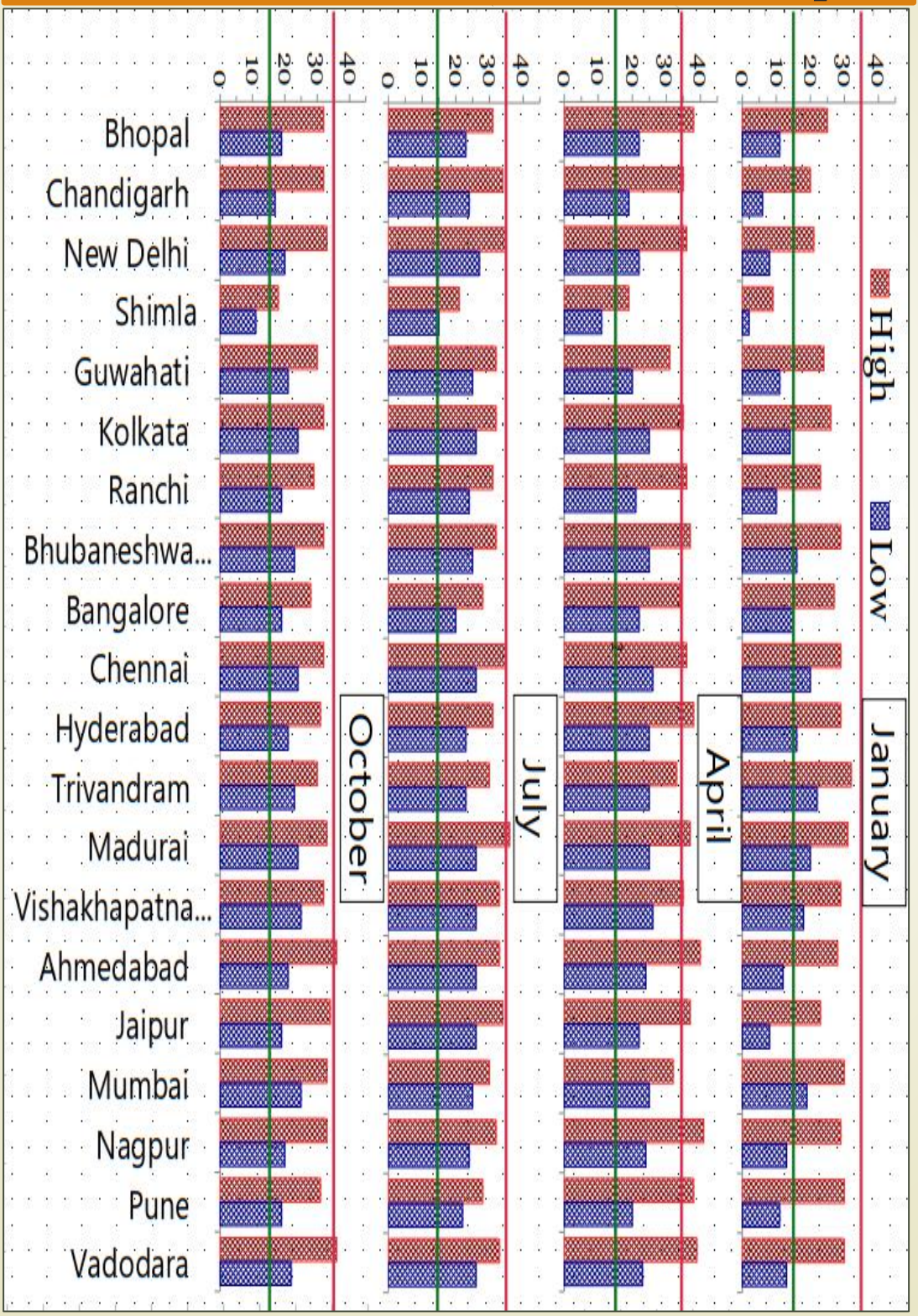
- Chademo
  - DC Only
  - Communication : CAN protocol
- Combined Charging System
  - AC & DC
  - Power Line COmmunication

Fast Charging Station

- Chademo - Japan
- Combined Charging System - Europe

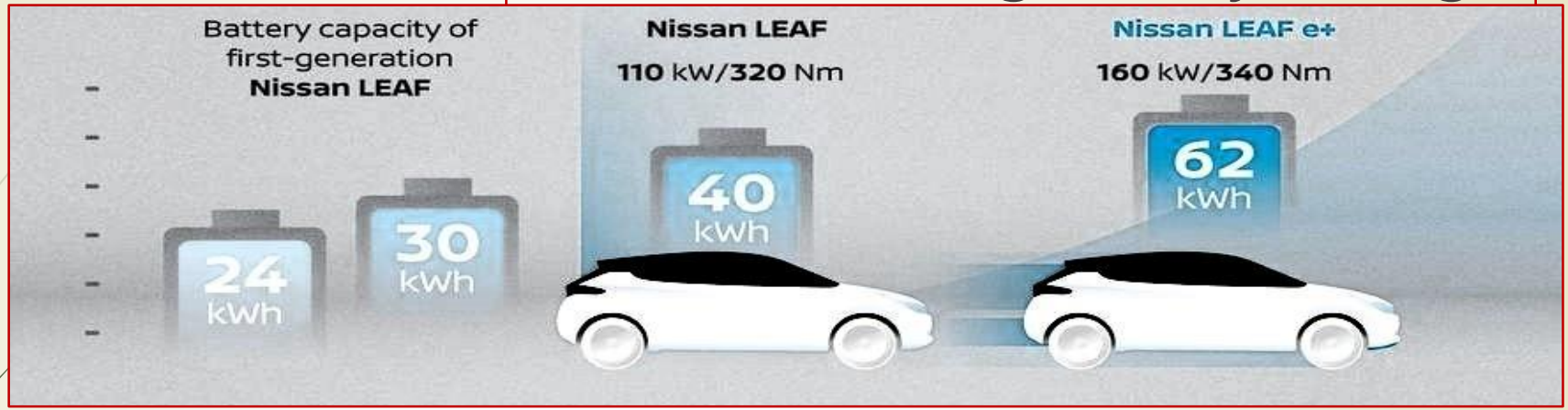


Temperature tolerance of Lithium ion Battery



EV Trends

Global: increasing battery & range



Indian:

- Small EV
- Cars
- Buses

Targets for rollout over next 3 years are

- 10 lakh two-wheelers under ₹1.5 lakh
- 5 lakh three-wheelers under ₹5 lakh
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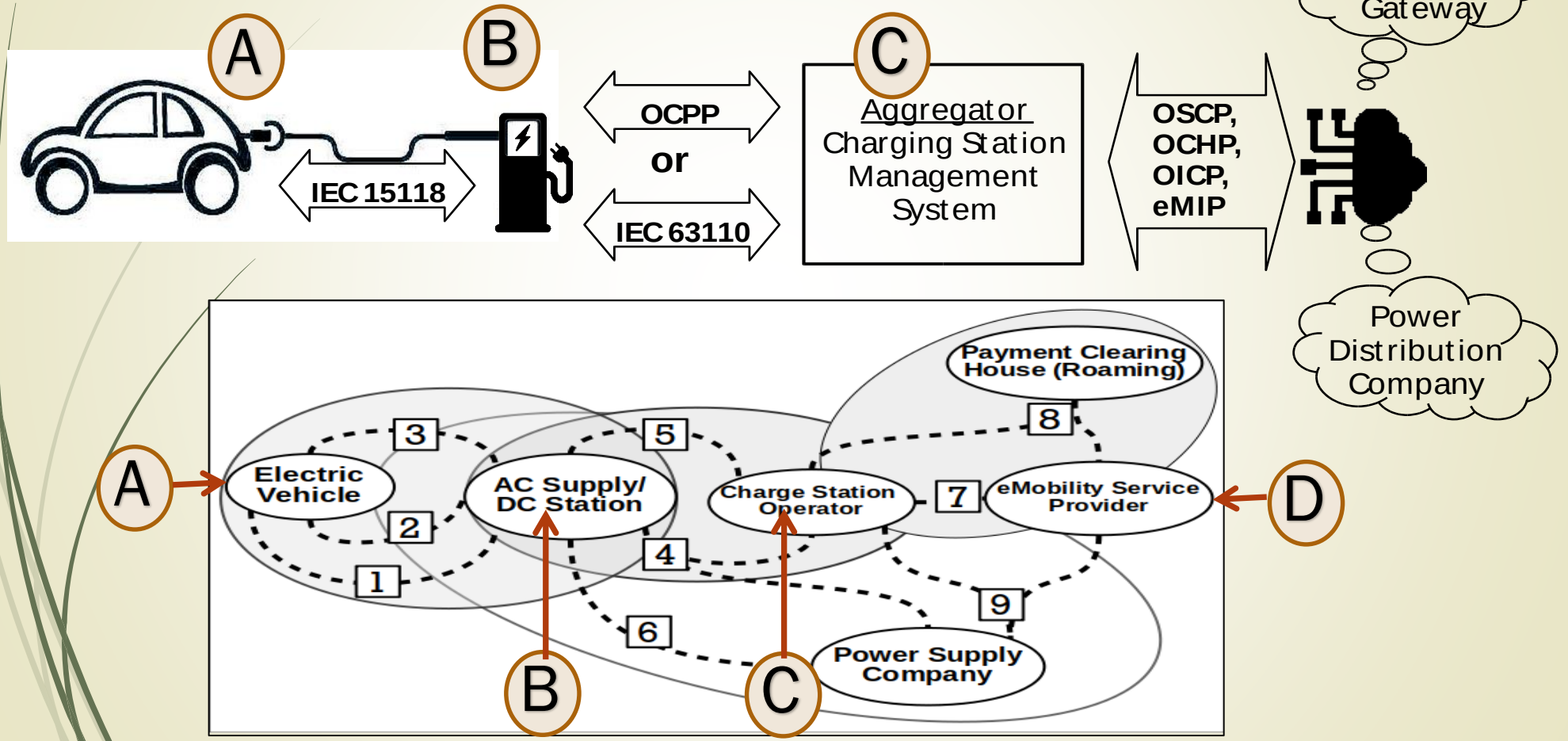
Scope of Standards



Networking for Load Management

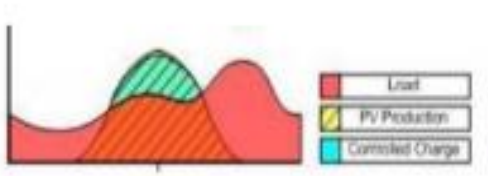


Figure 1: Controlled Charging

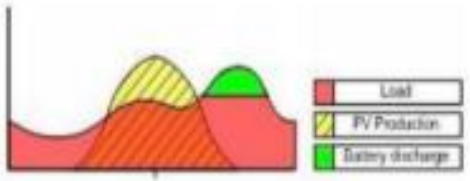


Figure 2: Peak Shaving

All public EVSE (AC & DC) to have digital communication with EV, to implement Grid Support functions

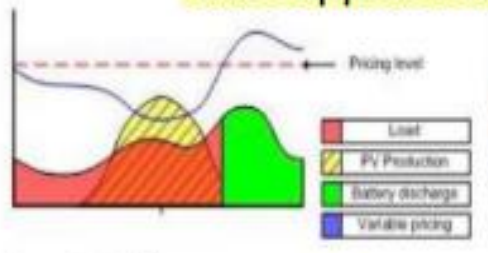


Figure 3: Pricing

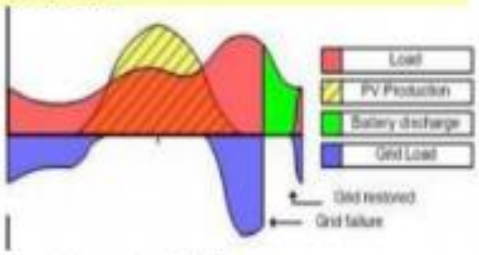
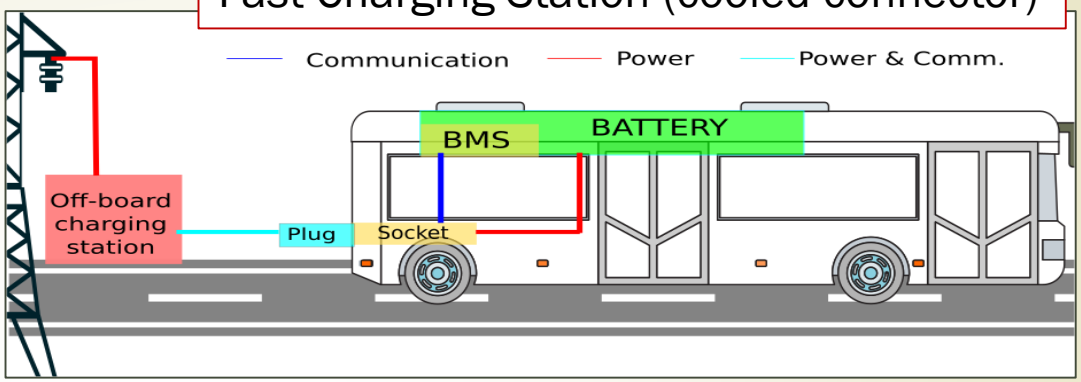


Figure 4: Grid Support

- AC EV-Bay: can help load management
  - If connected via PLC to distribution utility system
  - Standards: OCPP/ Smart Meter? / IEC 63110
- Both Fast Charging Systems have V2G capability

EV Buses

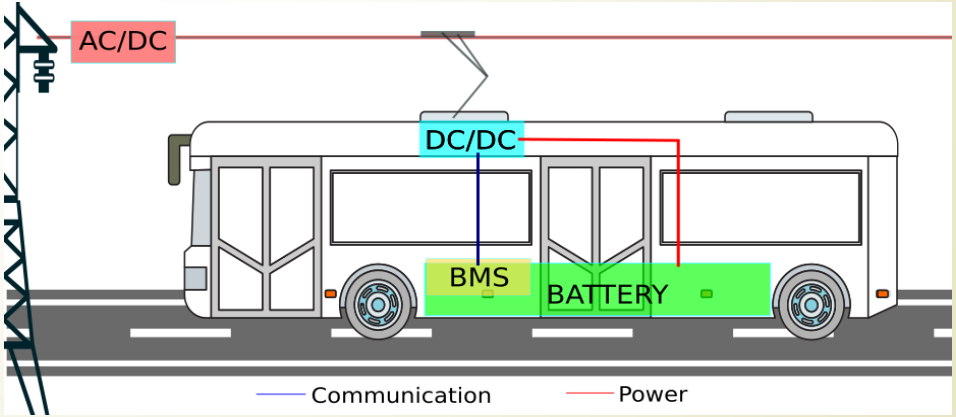
Fast Charging Station (cooled connector)



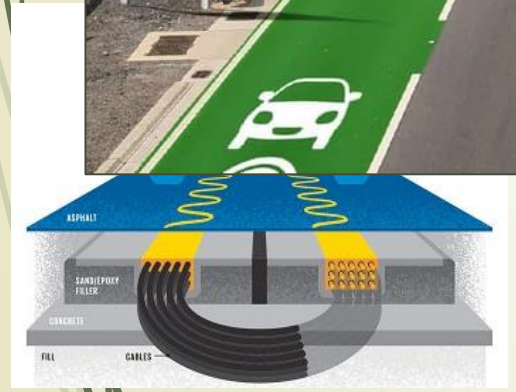
Other Methods

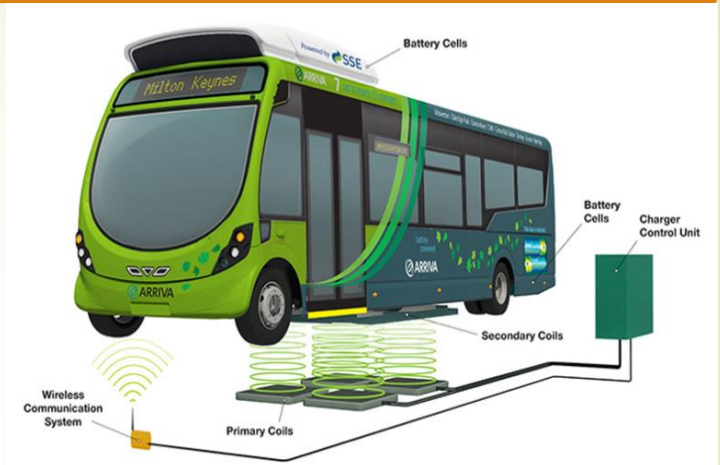
Automated Charging Pantograph For Per-Trip Fast Charging Station

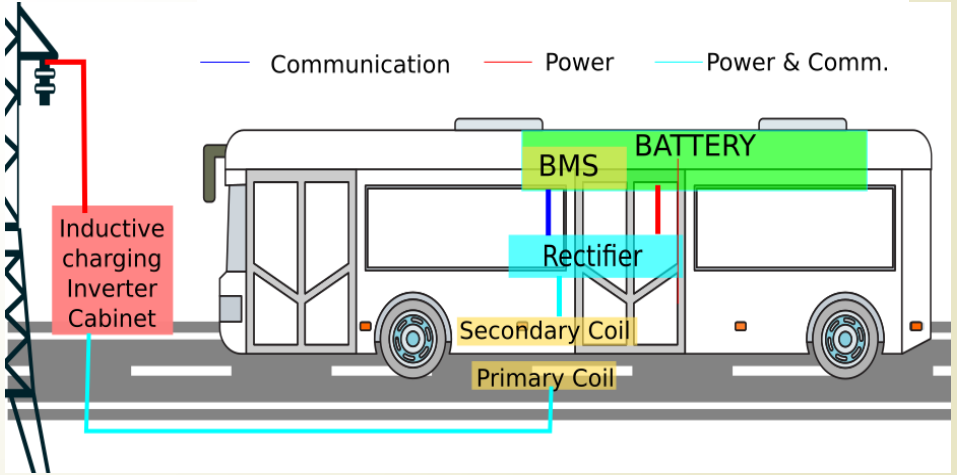
Bus Rapid Transport Corridors can use Battery Swapping or Power lines



“Electric” Roads for induction charging







- Indian Standards by Bureau of Indian Standards (BIS)
  - Electro Technical Division, Subcommittee no.51 (BIS ETD-51)
- International Electrotechnical Committee – International Stds
  - IEC Technical Committee 69 (TC-69)
  - IEC Technical Committee 23 (TC-23) .....
- India must participate in IEC Committees
  - Develop & offer Light EV / Battery Swapping Standards
  - Common Battery Component Standards?
  - Influence International Standards development

Thank you for listening!