Orchestrating an EV Ecosystem: Ushering a Sustainable Future
India has 14 out of 15 most polluted cities in the world. - WHO*

The percentage of oil imported by India has risen from 57% in 1997 to 85% in 2010 and is expected to reach 92% in 2020: DHI **

Air pollution is responsible for 12.5 percent of all deaths in India. Over 1,00,000 children below the age of five die due to bad air in the country - CSE +

* World Health Organization
** Department of Heavy Industry (Government of India)
+ Centre for Science and Environment
Cars using Internal Combustion Engines (ICE) release billions of tons of carbon dioxide into the atmosphere annually, which is approximately 20% of the world's total emission. Motor vehicles also contribute to 72% of Nitrogen oxides and 52% of reactive hydrocarbons!!!
EV, the Future...

**Efficiency**: 17-21 %
- Efficiency of ICE poor

**High Maintenance Cost**
- 2000 moving parts

**Fuel Cost High**
- Oil & Gas Prices are increasing

**Highly Polluting**
- More than 27 % GHG from exhaust

**Efficiency**: 90-95 %
- 5X more Energy Efficient

**Low Maintenance Cost**
- 18 moving parts (<1 %)
- Infinite Mile warranty !!!

**Fuel Cost Low**
- Electricity rates are lower
- RE sources proliferation

**Almost Zero pollution**
- No tailpipe emission
Electric Vehicles are going to be more cost effective
Why EV?

1. **Less prone to fire**
   - Studies have shown that EVs are less prone (80% less) to fire than conventional Gasoline counterparts.

2. **Stringent Emission Laws**
   - Emission laws are getting more and more stringent and to adhere to them EV is a must.

3. **Charge anywhere**
   - EVs can be charged anywhere from home to public charging stations provided compatible chargers are present.

4. **Better Customer experience**
   - EVs are more quite and smooth to drive owing to the less number of moving parts.

5. **Better Future**
   - There is no Pollution from tailpipe emission in EV. With proliferation of RE sources EVs are the future for a sustainable environment.

6. **Reducing Dependence on Oil**
   - This will significantly reduce oil import & improve our Current Account Deficit.
How Clean is the Electric Vehicle?

**GASOLINE-ONLY**
Convontional cars run on gasoline and tend to be dirtier and more expensive to fuel than EVs.

**PLUG-IN HYBRID ELECTRIC**
Plug-in hybrids use both gasoline and electricity and can be recharged from an outlet.

**BATTERY ELECTRIC**
Battery electric vehicles run on electricity and are some the cleanest and cheapest cars to drive.

*Emission to produce the electricity powering EVs. If only RE sources are present then there will be no emission*

## EV CHARGERS...

<table>
<thead>
<tr>
<th></th>
<th>AC</th>
<th>DC</th>
<th>AC + DC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Power</strong></td>
<td>Up to 22 kW</td>
<td>Up to 400 kW</td>
<td>43 kW AC+400 kW DC</td>
</tr>
<tr>
<td><strong>Charging Rate</strong></td>
<td>Slow Charging</td>
<td>Fast Charging</td>
<td>AC : Slow ; DC : Fast</td>
</tr>
<tr>
<td><strong>Types</strong></td>
<td>Type 1 with Yazaki Socket, Type 2 Mennekes Socket..</td>
<td>CHAdeMO, GB/T (Bharat Chargers)</td>
<td>CCS 1 &amp; CCS 2</td>
</tr>
<tr>
<td><strong>Popularity</strong></td>
<td>Japan, USA, France</td>
<td>Japan, USA, China</td>
<td>Europe</td>
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</tbody>
</table>
EV: A Money Saver?

**2-Wheelers**
- Battery Capacity: 0.5 – 3 kWh
- Charging Time: 2-3 hrs.
- Range (Full charge): 70 km
- Cost / km: Less than 20 p/km, 5 times cheaper than petrol bikes

**3-Wheelers**
- Battery Capacity: 3-8 kWh
- Charging Time: 5 hrs.
- Range (Full charge): 80 km
- Cost / km: 50 p / km

**4-Wheelers**
- Battery Capacity: 14 kWh- 17 kWh (India)
- Charging Time: 8-10 hrs. (AC charger), 0.5-2 hrs. (DCFC)
- Range (Full charge): 110-140 km (India)
- Cost / km: 80 p – ₹ 1.2 / km (600% cheaper than petrol cars !!!)

Electric Vehicles are Surely Cheaper to Run
More Affordable
EV battery prices reducing by 10% year on year

Charging made quick
EVCS: Fast Chargers are gradually entering the Indian Market

Now drive more
With Oil Prices increasing running cost of EVs are 5-6 times lesser.

Future is Bright
E-vehicles industry to create 10 million jobs

What are you waiting for?
More Good News...

1. Goods and services tax (GST) on electric vehicles to 5% from 12% has been proposed by GoI.
   (GST for traditional vehicles: 28%)

2. Electric Vehicles (all types) in India to be Exempted from Registration Fees

3. GST rate slashed to 12% on EV chargers from earlier 18%

4. Government Proposes No Road Tax For Electric Cars

Still in doubt? What should you trust to make a decision?

Taking a Closer Re-look

Gasoline Car  Electric Car
“Where will I charge my EV? Hardly any Charging Infrastructure”!

- Only a **15 A** Socket at Home is enough
- Charge **Over-night**, drive throughout the day in peace...
  *Just Like your mobile phone....*
- Charge at cheap tariff

Time: **00** Hrs
Worried about Travel Range??
Let’s check Facts

- 140-170 km in a ‘Single Charge’
- Absolutely no problems for Intra-city Commutation
- EV stations planned every 25 km on Highways

A good 75% of Indian commuters travel less than 1,000 km (or roughly less than 35 km a day)...
-----Times of India

Start
50 km 100 km 140 km 150 km 170 km 250 km 350 km 550 km
(Most cars in India) (Some cars internationally)

1 -day Charge equivalent to 3- days travel within the city
Fastidious about Battery life? Replacement?

Brands promise Battery life of 8-10 yrs.
“Owners today are changing their cars faster: from 7-8 years earlier to 4-5 years now…”

Manufactures now giving warranty of 8 yrs./ 1.6 Lakh kms
“In Kms, an average petrol car can easily be run till 1.10 Lakh Kms and Diesel car can run till 1.5 Lakh kms”

International Brands offer Unlimited-Miles warranty too !!!
“EVs are as Slow as Golf Carts!!”

Myth busted...

- Electric vehicles are generally **quicker** than their gasoline-powered counterparts.
- The electric motor in EV **generates 100% of its available torque instantly.**
- When you push the accelerator pedal, **the transition from stationary to speed is almost instantaneous.**
- Newer models in India clocking top speed of **135 km/hr** with **0-100 km/h** in under **11 sec**
- How much “**Fast**” do you want?..... Don’t want a speeding ticket? .....Do you? 😊
“How about Maintenance??”

EVs have only 1% moving parts compared to Conventional Cars

No Spark Plugs, Valves, Fuel Tank, Muffler/Tailpipe, Distributor, Starter, Clutch, Drive Belts, Hoses...

EVs don’t require regular oil changes or tune-ups

Less Moving parts → Less Wear & Tear → Less Maintenance

Still if required .... Service Centres growing throughout the city...

EVs are dirt cheap to run....
“What about Safety ?”

- Electric vehicles are safer than gasoline/diesel-powered vehicles.
- Reports: EVs are less prone to catch fire.
- EVs undergo the same rigorous Safety Testing and meet the same Safety Standards required for Conventional Vehicles.
- One thing we can’t control: Your driving, remember pedestrians can’t hear you coming..

SAFE DRIVE, SAVE LIFE

https://www.energy.gov/eere/electricvehicles/electric-car-safety-maintenance-and-battery-life
“Prices are too high now”

Yep.. We agree but not that much as you think

- Newer affordable models are with price tags at around ₹ 6.5 lacs in the anvil
- Good news: Prices are coming down drastically.. Battery price decreasing by 10 % year-on-year
- 5 % GST on EV, down from earlier 12 % .. Prices will fall further... (28 % GST apply for conventional cars)
- Govt. Incentives, Registration tax exemption.. And more to come
- An Running cost is 5-6 times less than conventional cars...

EVs are still out of your reach??
The Norwegian Parliament decided that all new cars sold by 2025 should be zero-emission (electric or hydrogen).

They are world leaders in electric vehicle implementation with respect to market share.

In 2019 electric cars outsold gas and diesel accounting 58.4% of all vehicle sales.

Government has generously awarded incentives, Tax/VAT exemptions to both EV manufacturers and customers.

Car prices depend on emission level. EVs are cheaper and more sustainable.

Norway is the market leader in renewables with 98% electricity production from RE sources.

Norway: The success story
What clicked for China?

01. **Govt. Incentives**
   Government has offered generous tax incentives & subsidies to EV Manufacturers & EVCS owners

02. **Rewarding Customers**
   EV Customers are highly incentivised coupled with tax exemption

03. **Research & Development Programs**
   High investments in R & D has produced many domestic EV manufacturers reducing price

04. **Cross Country EVCS Infrastructure**
   Charging infrastructures built across the country through private-public partnerships

05. **Discouraging ICE Vehicles**
   Levying higher taxes and placing restrictions on the sales and use of gasoline cars

Lesson: Government Initiatives are must for the growth of EV ecosystem

Shenzhen is the world’s only city to have 100% electric buses
Indian Government too is very serious about building an EV ecosystem to support you...
EV Roadmap: India’s Ambitious Mission towards E-mobility

2012-13
National Electric Mobility Mission Plan (NEMMP) 2020

2014
Deen-Dayal scheme: Financing and procurement of the battery rickshaws in the country

2015
FAME India (Phase 1)
Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles

2018
National E-Mobility Program

2019
FAME India (Phase 2)

2020
FAME India (Phase 2)
Other Initiatives

01
Taxi Aggregators like Uber & Ola to convert 40% of their fleet of cars to Electric by April 2026 in phased manner

02
All New commercial cars, motorcycles to be EV from 2026

03
All cars sold are EVs by 2030

https://indiacsr.in/overview-indias-2030-vision-electric-vehicle/
The Ministry of Power (MoP) has published fresh guidelines and standards to expedite the e-mobility revolution by developing country wide Charging infrastructure:

- **No separate Supply Licence** required for setting up public charging stations
- Private charging at residence/offices: **Permitted**
- **Prioritisation of Rollouts**: Mega cities (>4 million population) in **Phase 1**
- Public Charging Stations to be set up in all existing **Expressways & Highways**
- Charging station every **25 km** on highways, 1 PCS in a grid of 3 km x 3 km
- **Phase 2**: Big cities like State capitals & UT head quarters to be targeted

**Our City of Joy is in the Phase 1 of Rollout**
We too are ready...

EV charging facility at CESC House

Charging Panel

One of our EVs being charged

Charging Socket
“We are holding talks with CESC and will soon come up with electric vehicle charging stations in spaces under flyovers or parking lots, wherever there will be availability of space. Our aim is to encourage the citizens to use electric vehicles. The vehicular pollution is on the rise in the city and if people use electric vehicles, pollution will be reduced...”

Walking the Talk...

New Charging Stations are being set-up at:

- Park Circus (Below MAA flyover)
- Beckbagan (Beneath AJC Rd Flyover)
- Dhakuria (Near Lake PS)

Future plan: More Charging Stations throughout our licenced area
It’s time we bid “GOOD BYE” to the Polluters
And “WELCOME” the Saviours

“The Future Is Electric” : We Must Embrace It From Now
“Healthier World, Healthier Country”