

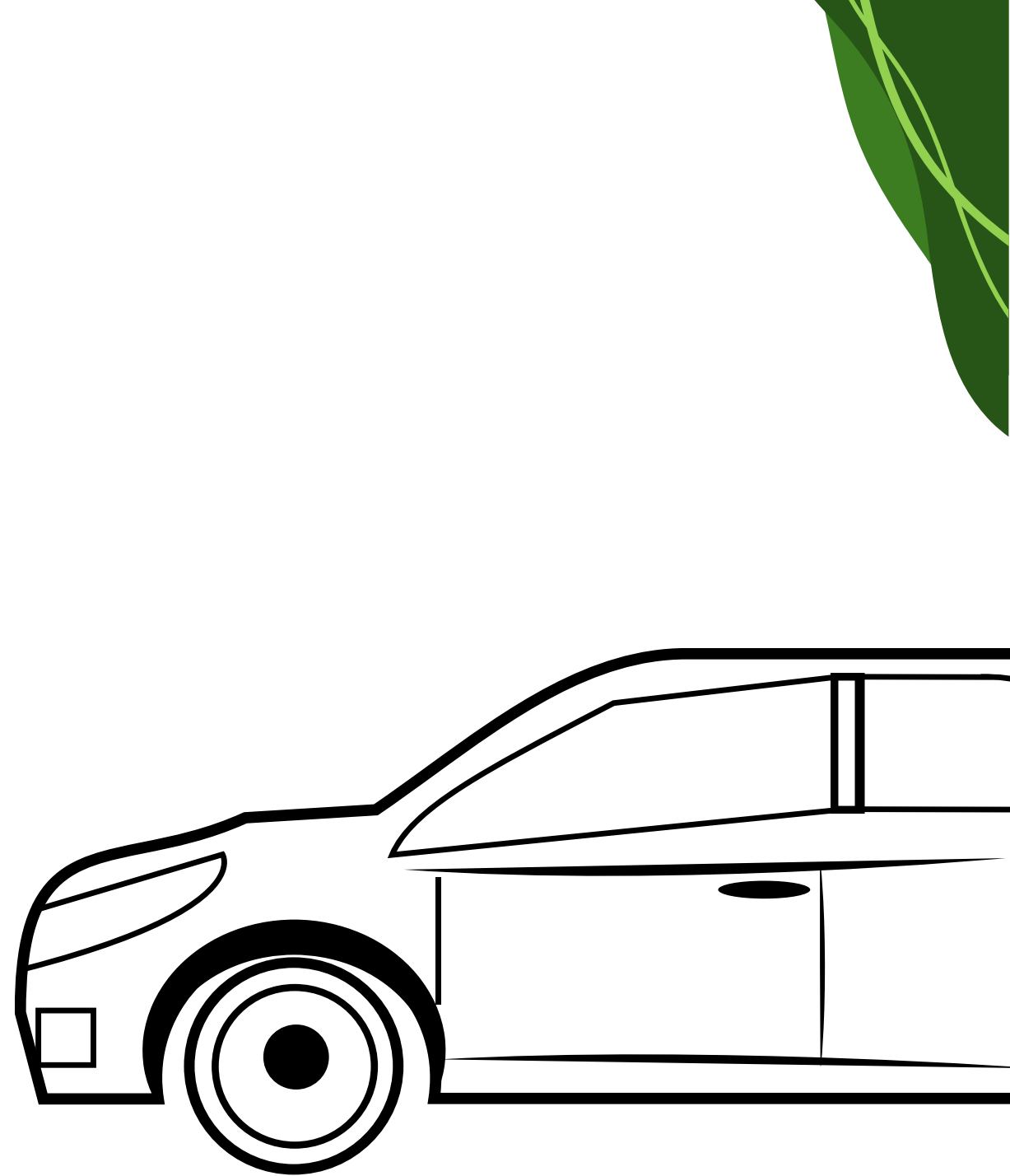
Business Presentation

DS680 MARKETING ANALYTICS AND
OPERATIONS RESEARCH

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Executive Summary

- The company currently operates 10+ refineries and **40,000+** fuel stations across India.
- The company currently controls **50%** of the market share of the petroleum products.
- EV cars account for nearly **95%** of global EV sales, excluding other transportation modes like buses, trucks, and vans.
- As of 2023, China and Europe lead the EV market, with **38% & 21%** of car sales coming from EVs. China accounts for more EV sales than Europe, US and India together.
- Among these countries, charging points numbers have grown exponentially, from **3.2K** points in 2010 to **3.5 million** in 2023.
- India has a relatively small number of EV charging points, with only **10.9K** in 2023.
- APS Scenario predicts **32%** of the car market in India will be electric vehicles (EVs), requiring **607K** charging points to support this shift.
- STEPS Scenario projects **18%** market share in India for EVs, leading to a requirement of **310K** charging points.
- With this proposal, the existing gas stations can provide up to **160K** charging points, which will fulfill at least **25%** of the projected charging point requirement by 2030 as per APS projection or **50%** as per STEPS projection.
- Using existing infrastructure saves about **\$50,000** per 4 chargers, primarily by avoiding land acquisition and extensive construction.
- Scaling this model to 40,000 stations could save around **\$2 billion**, making the transition to EV charging more affordable.


Company Introduction

Problem Statement

- This project aims to present a proposal to IOCL advocating for its expansion into the electric vehicle (EV) charging market.
- With the rise in EV sales, the demand for oil is expected to decline.
- The proposed solution involves enhancing the capacity of existing gas stations by integrating EV charging points.
- The objective is to secure investment by supporting the strategy with a comprehensive cost analysis.

Company Introduction

IOCL has grown to be a major player in India's energy sector and remains integral to the country's infrastructure and development. The company is an oil and gas company, largest in India by revenue, controls 43% of the retail gas stations.

- Refining & Distribution – Operates 10+ refineries and 40,000+ fuel stations across India.
 - Diverse Product Range – Products include petrol, diesel, lubricants, natural gas, and petrochemicals.
 - Controls **50%** of the market share of the petroleum products.
 - Global Presence – Significant presence in energy markets, both domestically and internationally.
 - The company has been involved in various initiatives in education, healthcare, environment conservation, and rural development. It also contributes to clean energy projects and sustainability.
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Data Summary

Here's a few points about the data

- 1.Source of Data:** The data is sourced from the International Energy Agency (IEA), an autonomous intergovernmental organization based in Paris, established in 1974.
- 2.IEA's Role:** The IEA provides policy recommendations, analysis, and data related to the global energy sector, with a focus on sustainability and energy transition.
- 3.Monitoring EV Market:** The agency has been monitoring the electric vehicle (EV) market for over 15 years, tracking growth, market commitments, and future trends based on current data.
- 4.Data Period:** The observations are based on data from 2010 to 2023.
- 5.Countries Covered:** The data includes insights from 48 countries that are part of the IEA's monitoring.
- 6.Types of Electric Vehicles:** The IEA tracks data across 4 different types of electric vehicles.

Data Source	Data Period	Countries Covered	Types of EVs
International Energy Agency	2010-2023, 2025-2030-2035	48	Cars, Trucks, Vans, Buses

Data Processing

The data was preprocessed for brevity

- **Data Focused on Cars:** Narrowed down the data to electric cars since they account for nearly 95% of global EV sales, excluding other transportation modes like buses, trucks, and vans.
- **Overlap in Regional Data:** Resolved overlap in data by selecting specific regions (such as EU, Europe, and individual European countries) and consolidating the information accordingly.
- **Categorizing Major Players:** Introduced a new column to differentiate major EV markets (China, USA, Europe, India) and grouped the rest of the world under “Remaining world” for easier analysis.
- **Exclusion of "Remaining World":** The “Remaining world” group was removed from the data for the purpose of focused analysis on major markets.
- **Handling Historical Data & Projections:** For comparative analysis, limited the use of projection data (APS and STEPS) and focused only on historical data for clarity and consistency in analysis.

Methodologies Used

- **Comparative Analysis**
- **Trend analysis**
- **Correlation analysis**
- **Predictive Analysis**

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~12.5K

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Trend Analysis of EV Car sales

Analysis and Insights

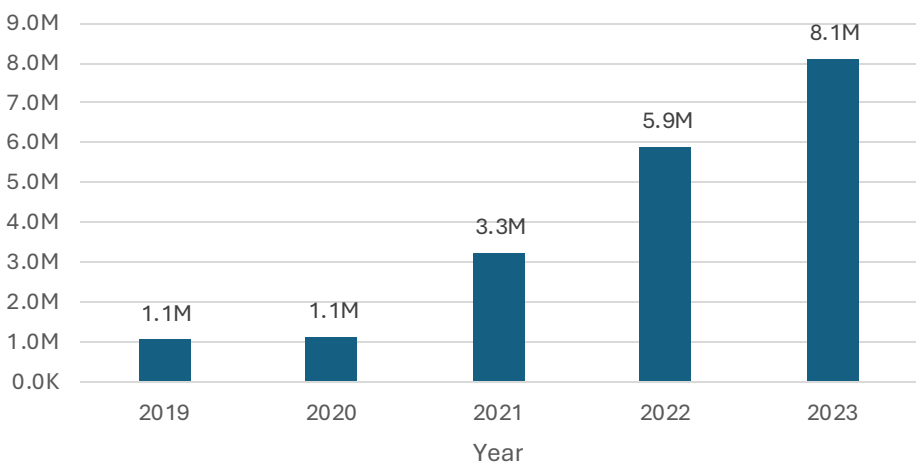
- The absolute numbers show the actual sales volume, the sales percentage helps in understanding **the market share** and **comparative performance** of each region in the global electric vehicle market.

EV Car Sales				
Year	China	Europe	India	USA
2010	1.4K	1.8K	0.5K	1.2K
2011	5.1K	11.4K	1.4K	17.8K
2012	9.9K	28.2K	0.2K	54.0K
2013	15.7K	59.0K	0.4K	97.0K
2014	73.0K	96.0K	1.0K	0.1M
2015	0.2M	0.2M	0.5K	0.1M
2016	0.3M	0.2M	0.7K	0.2M
2017	0.6M	0.3M	0.9K	0.2M
2018	1.1M	0.4M	0.9K	0.4M
2019	1.1M	0.6M	0.7K	0.3M
2020	1.1M	1.4M	3.1K	0.3M
2021	3.3M	2.3M	12.1K	0.6M
2022	5.9M	2.7M	48.0K	1.0M
2023	8.1M	3.3M	82.3K	1.4M
Grand Total	21.8M	11.6M	0.2M	4.8M

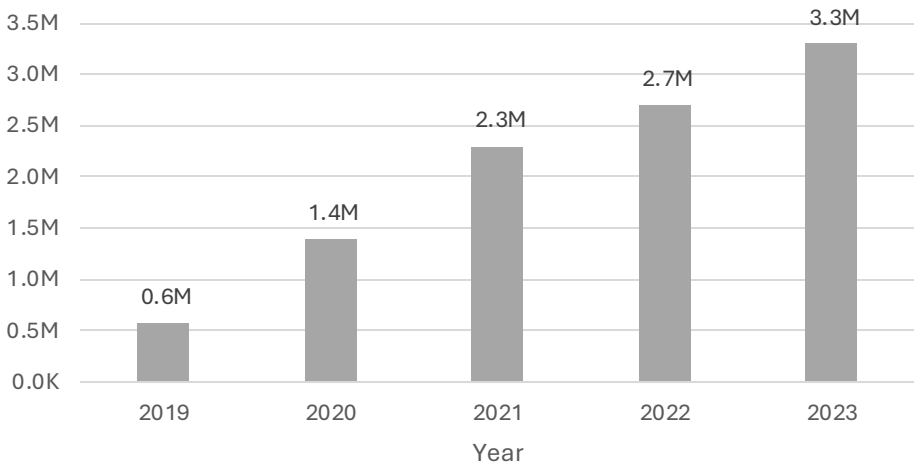
EV Sales Percentage				
Year	China	Europe	India	USA
2010	0%	0%	0%	0%
2011	0%	0%	0%	0%
2012	0%	0%	0%	0%
2013	0%	0%	0%	1%
2014	0%	1%	0%	1%
2015	1%	1%	0%	1%
2016	2%	1%	0%	1%
2017	2%	2%	0%	1%
2018	5%	2%	0%	2%
2019	5%	3%	0%	2%
2020	6%	10%	0%	2%
2021	16%	17%	0%	5%
2022	29%	20%	1%	7%
2023	38%	21%	2%	10%

Analysis and Insights

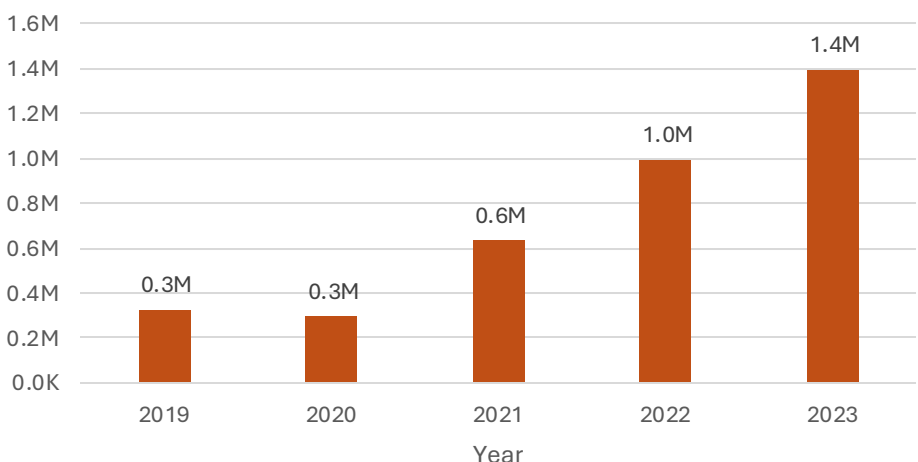
Car Sales in China(5 Years)



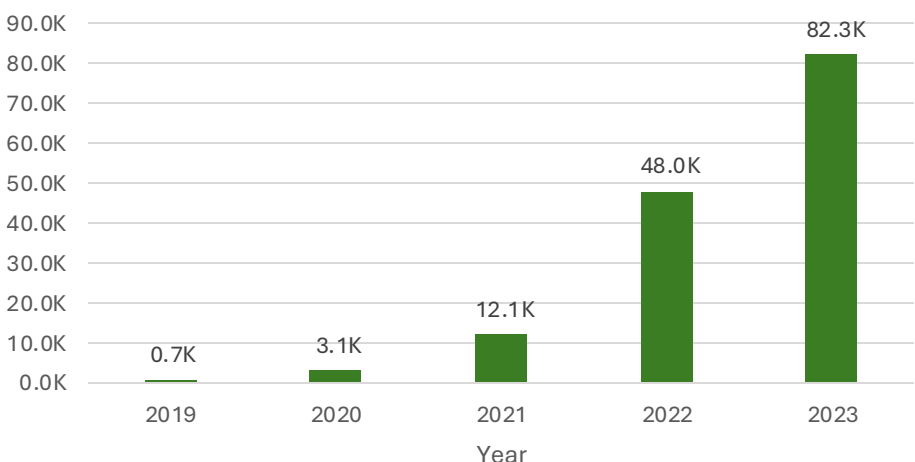
Car Sales in Europe(5 Years)



Car Sales in the USA(5 Years)

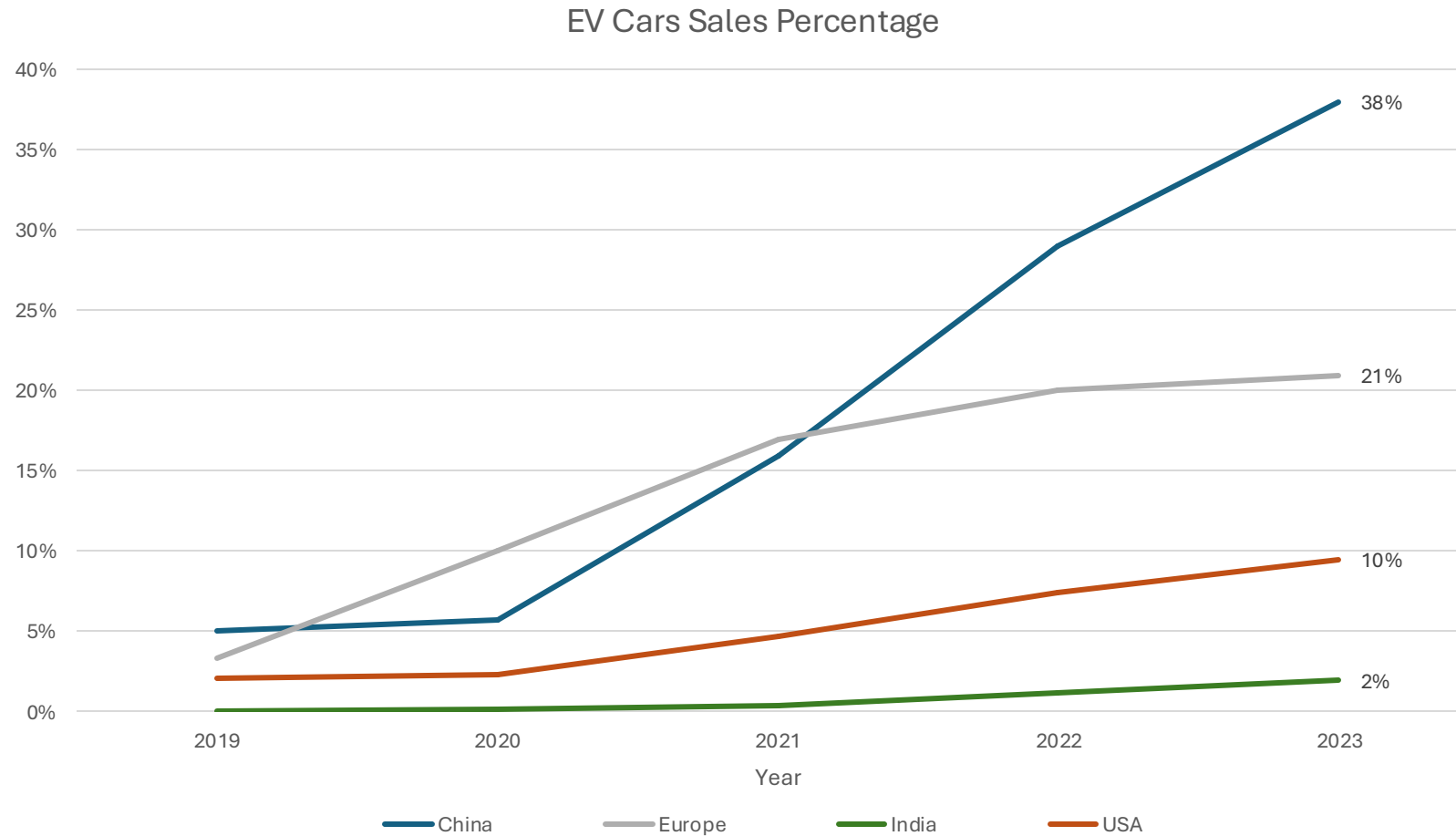


Car Sales in India(5 Years)



Analysis and Insights

- China and Europe seems to be leading the pack, **with 38 %& 21% of car sales coming from EVs.**
- China accounts for more EV sales than Europe, US and India together.
- India on the other hand is just starting with just **2% contribution coming from EVs.**



Trend Analysis of EV Charging Points

Analysis and Insights

- Among these countries charging station numbers have grown exponentially, from **3.2K** points in 2010 to **3.5 million** in 2023.
- **India** has a relatively small number, with only **10.9K** in 2023, indicating the **slower expansion** of infrastructure in these regions compared to China and Europe.

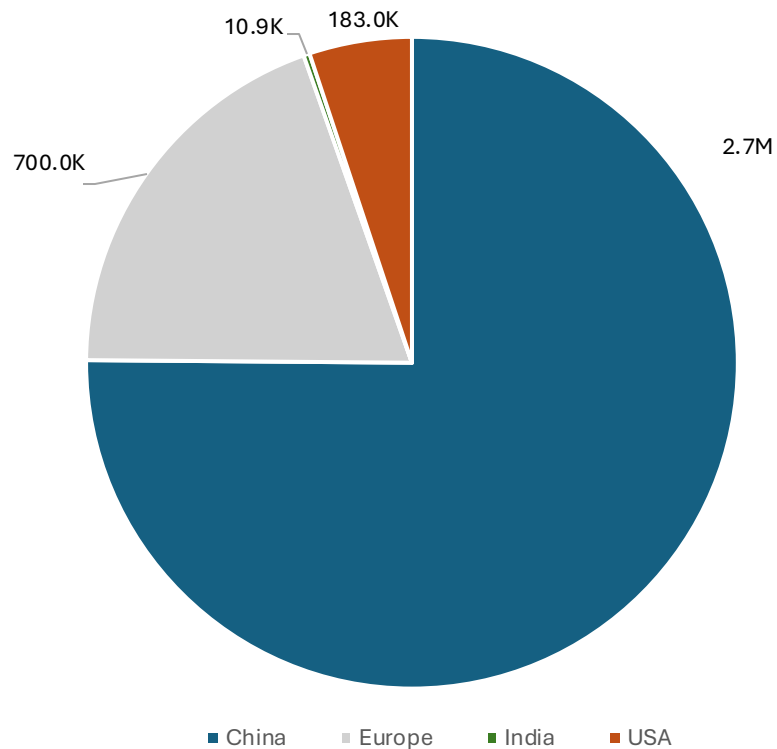
Charging Stations				
Year	China	Europe	India	USA
2010		3.2K		0.5K
2011		6.1K		3.9K
2012		16.2K		12.0K
2013		25.8K		15.0K
2014	30.0K	38.4K		20.0K
2015	59.0K	62.8K		31.5K
2016	141.0K	99.7K	0.0K	38.1K
2017	213.0K	119.3K	0.2K	43.4K
2018	270.0K	143.0K	0.4K	54.2K
2019	510.0K	190.0K	0.4K	77.0K
2020	810.0K	250.0K	0.4K	99.0K
2021	1.2M	353.0K	0.9K	114.0K
2022	1.8M	508.0K	10.9K	128.0K
2023	2.7M	700.0K	10.9K	183.0K

Charging Points (Adjusted for population and area)				
Year	China	Europe	India	USA
2010		1.1K		0.4K
2011		2.0K		2.9K
2012		5.4K		9.0K
2013		8.6K		11.3K
2014	5.8K	12.8K		15.0K
2015	11.4K	20.9K		23.7K
2016	27.2K	33.2K	0.0K	28.6K
2017	41.1K	39.8K	0.1K	32.6K
2018	52.1K	47.7K	0.2K	40.8K
2019	98.5K	63.3K	0.2K	57.9K
2020	156.4K	83.3K	0.2K	74.4K
2021	222.0K	117.7K	0.6K	85.7K
2022	339.8K	169.3K	6.5K	96.2K
2023	521.2K	233.3K	6.5K	137.6K

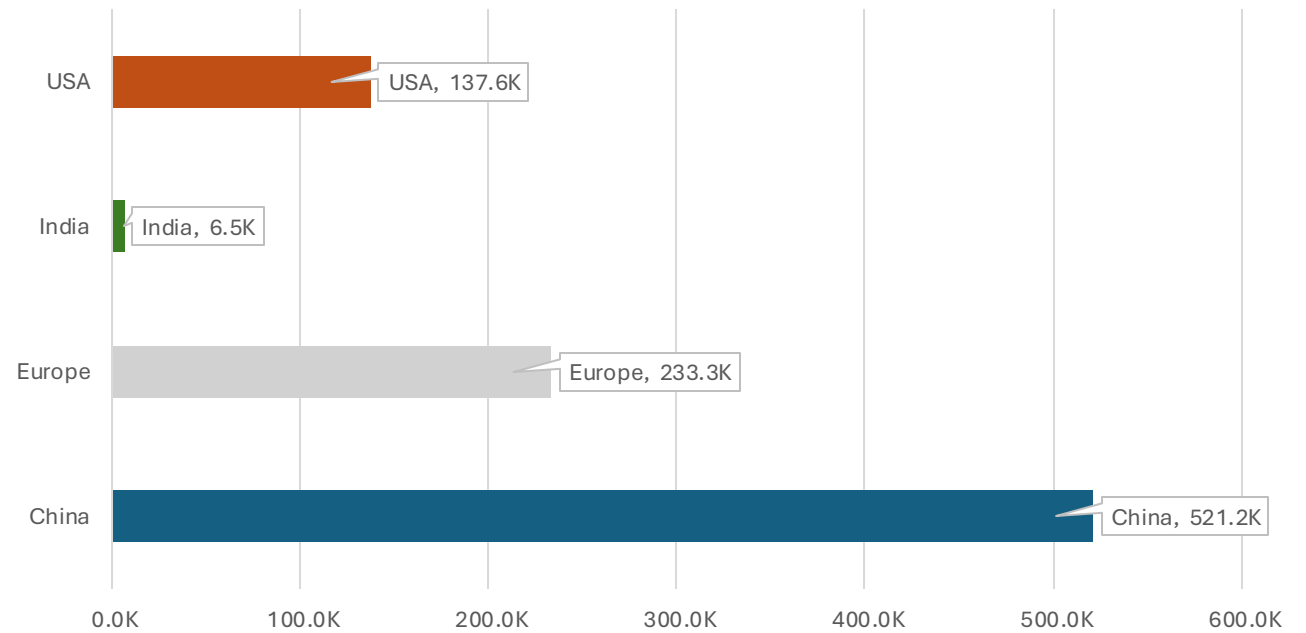
Analysis and Insights

- China leads by a significant margin in terms of charging stations.
- By 2023, China had over **2.7 million** charging stations, accounting for over **35%** of global charging points.
- Europe is the second-largest region, with **700K** charging stations in 2023

Charging Stations Distribution in 2023



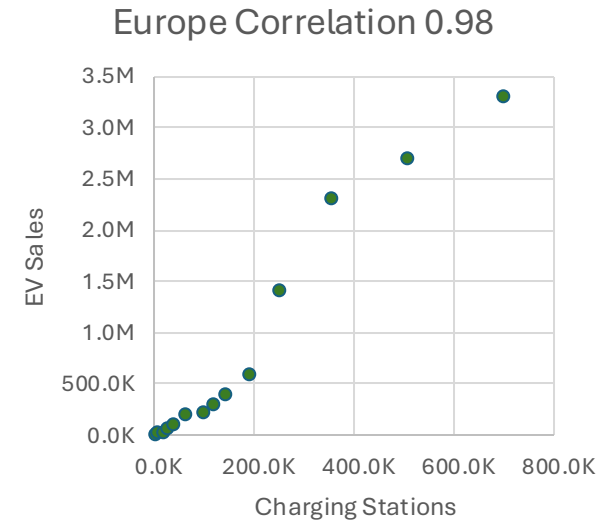
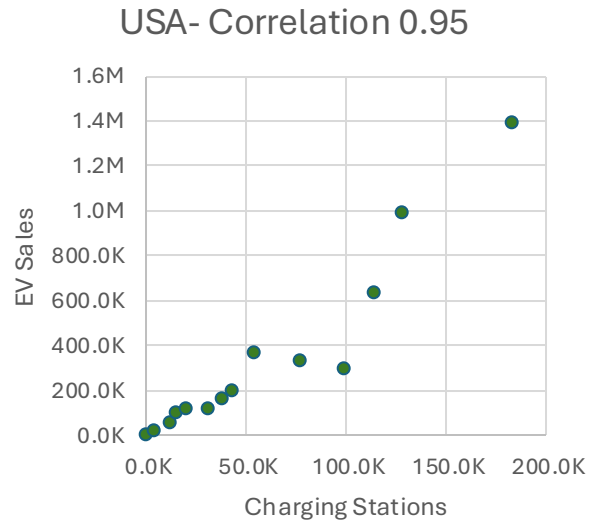
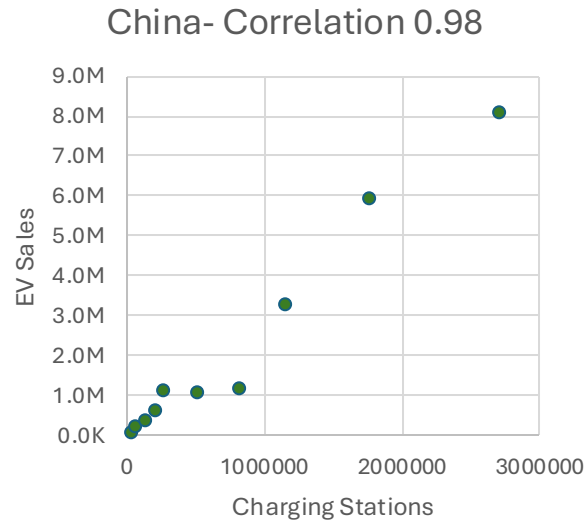
Charging Stations/person x sqmiles in 2023



Correlation Analysis

Analysis and Insights

- In most cases, there is a **positive correlation** between EV sales and the number of charging points. This means that as the number of charging points increases, the sales of electric vehicles are also likely to increase.
- The availability of charging stations can lead to an **increase in demand** for EVs, but the reverse is also true: an increase in EV sales can encourage the expansion of charging infrastructure as more consumers adopt EVs, requiring more charging options.
- Regions where governments heavily invest in charging infrastructure (e.g., subsidies, incentives, etc.) often see a simultaneous increase in EV adoption. This shows how **public policy** can drive both the adoption of EVs and the expansion of charging networks.



Projections

Analysis and Insights

- The early years show limited EV penetration, but a steady increase is projected from 2025 onwards, with significant growth by 2035.
- The APS projection model assumes faster growth than the Historic projection, reflecting more aggressive adoption forecasts in the coming years.

APS Projection for 2030					
Parameter	Buses	Cars	Trucks	Vans	Grand Total
EV charging points					607.0K
EV sales	61.2K	1.8M	12.0K	162.9K	2.1M
EV sales share	34%	32%	2%	31%	
Grand Total	61.2K	1.8M	12.0K	162.9K	

STEPS Projection for 2030					
Parameter	Buses	Cars	Trucks	Vans	Grand Total
EV charging points					310.0K
EV sales	61.3K	1.0M	10.4K	52.9K	1.1M
EV sales share	34%	18%	2%	9%	
Grand Total	61.3K	1.0M	10.4K	52.9K	

95%

*EV Cars market share within
the Global EV market*

Analysis and Insights

- The APS projection takes account of governmental pledges hence it reflects Indian government's pledge to have 30% EVs by 2030
- The STEPS projection is driven by ongoing changes in technology, policy incentives, and infrastructure improvements like charging stations. Albeit slower, it shows a promising adoption too.

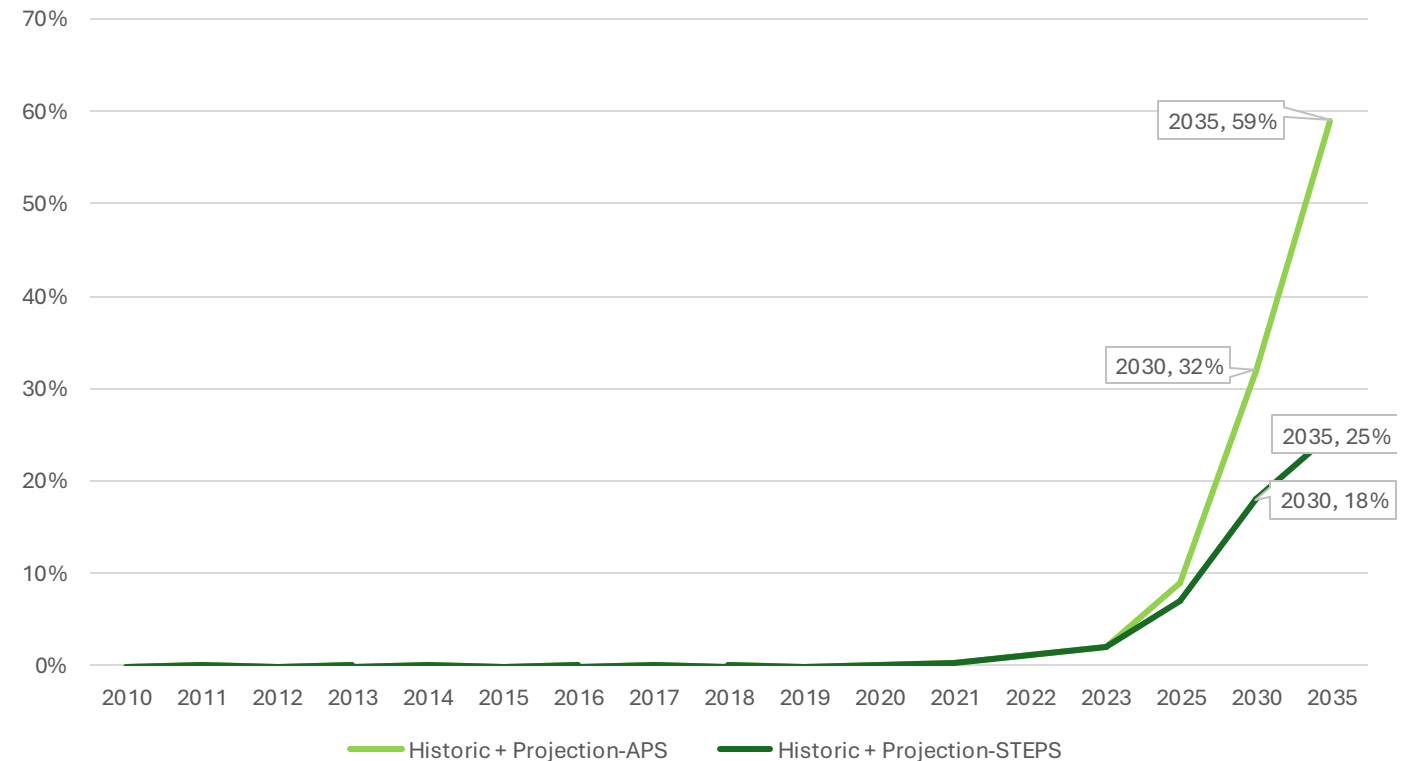
32%

*APS Projected(2030) EV Cars
market share within total Car
sales in India*

18%

*STEPS Projected(2030) EV Cars
market share within
total Car sales in India*

EV Car Market Share in India: Historic + Projection



Business Potential

Crunching Numbers

- APS Scenario predicts 32% of the car market will be electric vehicles (EVs), requiring 607K charging points to support this shift.
- STEPS Scenario projects 18% market share for EVs, leading to a requirement of 310K charging points.
- As the percentage of traditional (gas-powered) vehicles declines, the revenue from gas stations will also decrease, emphasizing the need for a shift towards EV charging services.

~600K

*APS Projected EV charging
points needed in India by
2030*

25%

*Of APS projected
Requirement of EV charging
points can be*

~310K

*STEPS Projected EV charging
points needed in India by
2030*

~50%

*Of STEPS projected
Requirement of EV charging
points can be*



Business Potential

How does it benefit the company



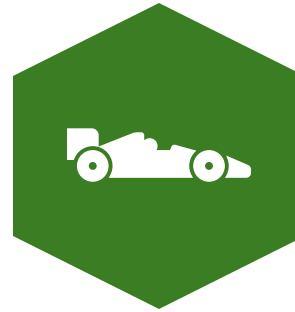
Cost Efficiency

Existing gas stations already have essential infrastructure, reducing the need for large-scale investments compared to new locations.



Leveraging Existing Operations

Use current employees and facilities for operations and maintenance, minimizing overhead costs.



Faster Rollout

Adding charging stations to existing sites allows for quicker deployment, avoiding construction and regulatory delays.



Marketing Costs

Gas stations already have a loyal customer base, ensuring immediate use of the new EV charging points.



New Revenue Stream

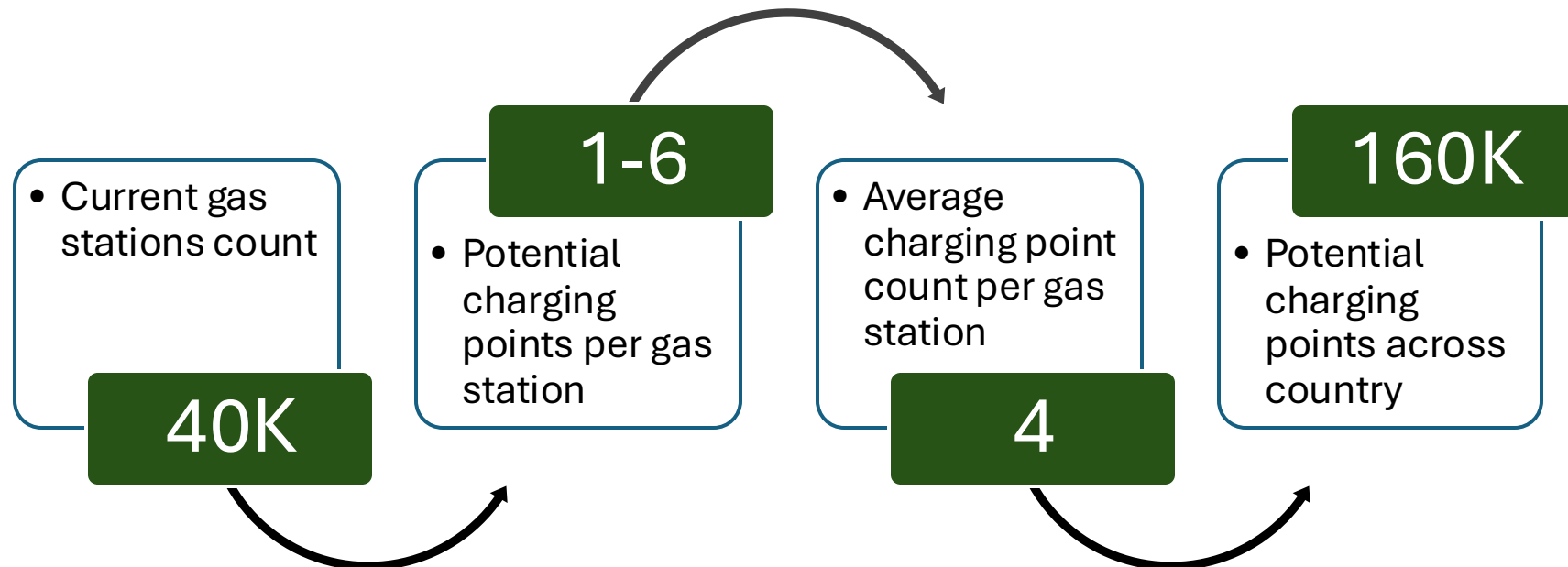
EV charging points provide gas station operators with additional revenue to offset declining fuel sales.

Recommendations

- The transition to EVs presents an opportunity for existing gas stations to repurpose their infrastructure, adding charging points and transitioning into the energy market.
- The company operates 40K gas stations across India, each capable of hosting 1-6 charging points. Let's consider that on average, 4 charging points can be installed per station:

$$40k \times 4 = 160k$$

- With this setup, the existing gas stations can provide up to **160K** charging points, which will fulfill at least **25%** of the projected charging point requirement by 2030 as per APS projection or **50%** as per STEPS projection.



Cost Savings

Utilizing existing infrastructure can result in savings of approximately 30%.

Expense Category	What's Covered in This Category	From Scratch (per 4 charger)	At Existing Gas Station (per 4 chargers)
Land & Site Setup	Land acquisition, site clearing, leveling, zoning, land permits	\$40000 (land acquisition & preparation)	\$4000 (use of existing land, minimal modifications)
Infrastructure & Construction	Construction of shelters, electrical rooms, parking spaces, or any other buildings required for the setup.	\$20000 (construction of shelters, electrical rooms, etc.)	\$12000 (minor changes for charger integration)
Electrical & Utilities	New electrical grid connections, transformers, high-voltage lines, and cabling.	\$20000 (new utility setup, transformers, etc.)	\$16000 (upgrades to existing electrical systems)
Charger Hardware & Additional Costs	The cost of the EV charger hardware (fast/ultra-fast chargers), installation, cabling, and additional permits required for the charging station's operation.	\$80000 (EV charger purchase, distribution, permits, etc.)	\$80,000
Total		\$160,000	\$110,000
Across 40k Stations		\$6.4 B	\$4.4 B

Cost Savings

Utilizing existing infrastructure can result in savings of approximately 30%.

- **Cost Savings:** Using existing infrastructure saves about **\$50,000 per 4 chargers**, primarily by avoiding land acquisition and extensive construction.
- **Large-Scale Impact:** Scaling this model to **40,000** stations could save around **\$2 billion**, making the transition to EV charging more affordable.

\$50K

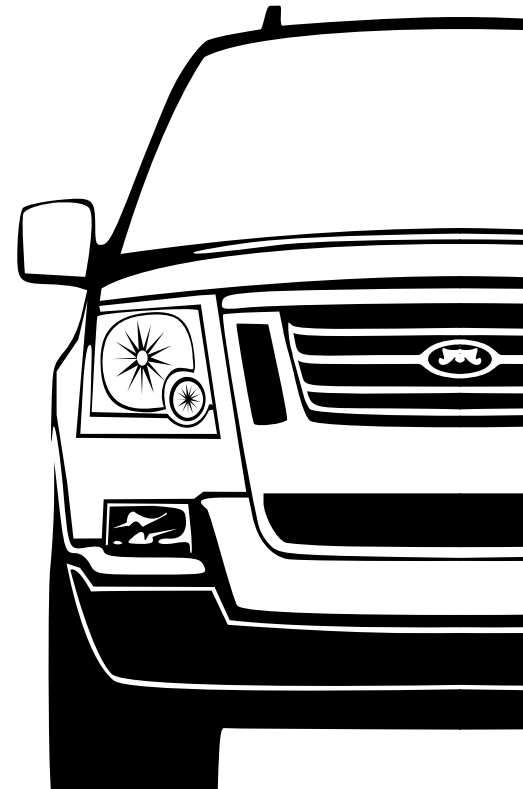
Cost Saving per 4 Chargers

\$2B

*Large Scale Impact in cost
Saving across the country*

~30%

*Cost Saving when utilizing
existing infrastructure.*



Thank you

Open to Questions

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