

PROJECT REPORT

VISUALIZATION TOOL FOR CHARGE VEHICLE AND RANGE ANALYSIS

INTRODUCTION

Is it not the right time for buying an electric vehicle? Everyone can have their different opinion over this question, but in this article, we brought to you some actual concerning points that can give you a better perception for the question “Challenges with electric vehicles”.

Electric vehicles made their proper debut into the commercial vehicle market in the year 2019 with Revolt RV400 which is still the most loved/preferred electric bike in the market and after RV400, Tata launched their Nexon EV which was the next super hit product in the EV market and after that with the entrance of countless EV making startups (like Ola, Ather, Pure EV, Hero electric) the EV market in India never looked back.

But still, if we see on records only 1.8% population who adopted of EV in India till 20-2021 in India (the report of 2021-22 is yet to come) which is extremely low. However, this percentage of EV penetration is growing at a very high pace (nearly by 200% every year). With this pace of EV adoption, it's expected to achieve 30% of electric vehicles penetration till this decade. Why these numbers are too low in India? Why are other countries like Norway, China are decades ahead of India in terms of EV penetration, what are the limitation with electric vehicles that are stopping electric vehicles from going mainstream? Let's discuss the whole scenario point by point and see disadvantages of electric vehicles in India.

OVERVIEW

Electric vehicle technology has advanced rapidly since its introduction, and today there are many plug-in hybrid and battery electric vehicle options available on the market. But how, exactly, do electric vehicles work and what are their advantages?

Let's start by considering the legacy vehicle technology: the internal combustion engine, or ICE. This vehicle is propelled by a combustion engine that can only be fueled by gasoline.

The technology is conventional, well-established, and reliable, but it consumes large amounts of gasoline—which can be costly in many ways.

Enter the electric vehicle drivetrain! Unlike internal combustion technology—which uses combustion and pressure to propel a vehicle—electric vehicles, or EVs, are propelled by electromagnetism. These vehicles use electricity, typically stored in a battery, to power an electric motor. EV technology is used in hybrid electric vehicles, or HEVs; plug-in hybrid electric vehicles, or PHEVs; and battery electric vehicles, or BEVs.

This enables the vehicle to operate in all-electric mode—in which the vehicle is propelled using only the electric motor—until the battery is mostly depleted. At this point the vehicle operates in hybrid mode until the fuel in the gas tank is depleted. Increasing the battery size and running the vehicle on electricity reduces tailpipe emissions and increases the vehicle's fuel- and energy-efficiency.

The final type of electric vehicle technology is the battery electric vehicle. This vehicle has no internal combustion engine and is powered only by the battery and electric motor. BEVs don't use gasoline and are only charged by EVSE. A BEV has the largest battery of all the vehicle types. It's also the most energy efficient and produces zero tailpipe emissions.

PURPOSE

Transport is a fundamental requirement of modern life, but the traditional combustion engine is quickly becoming outdated. Petrol or diesel vehicles are highly polluting and are being quickly replaced by fully electric vehicles. Fully electric vehicles (EVc) have zero tailpipe emissions and are much better for the environment. The electric vehicle revolution is here, and you can be part of it. Will your next vehicle be an electric one?

RESULT

DATABASE

MySQL Workbench

EV PHY PROJECT

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- Filter objects
- electric_vehicle
 - cheapestelectricars-evadatabase
 - electric_vehicle_charging_statio...
 - electric_vehicle_clean
 - electriccardata_clean
 - evindia
 - Views
 - Stored Procedures
- sakila
- sys
- world

Result Grid | Filter Rows | Export: | Wrap Cell Content: |

```

1 • SELECT * FROM electric_vehicle.cheapestelectricars-evadatabase;
2 • SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list;
3 • SELECT * FROM electric_vehicle.electriccardata_clean;
4 • SELECT * FROM electric_vehicle.electriccardata_clean;
    
```

Region Address Aux Address Latitude Longitude Type Power Service

NDMC	Prithviraj Market, Rabinda Nagar, New Delhi-110003	Electric Vehicle Charger, Prithviraj Market, Rabinda Nagar, New Delhi-110003	28.6007255	77.226524	DC-001	15 kW	Self Service
NDMC	Prithviraj Market, Rabinda Nagar, New Delhi-110003	Electric Vehicle Charger, Prithviraj Market, Rabinda Nagar, New Delhi-110003	28.6007255	77.226524	DC-001	15 kW	Self Service
NDMC	Outside RWA Park, Jor Bagh Market, Jor Bagh ...	Electric Vehicle Charger, Outside RWA Park, Jor Bagh Market, Jor Bagh ...	28.583031	77.2176972	DC-001	15 kW	Self Service
NDMC	Opposite Dory Pharmacy, Khanma Market, Aligarh ...	Electric Vehicle Charger, Opposite Dory Pharmacy, Khanma Market, Aligarh ...	28.5826538	77.2200872	DC-001	15 kW	Self Service
NDMC	Opposite God Opticals, Khanma Market, Aligarh ...	Electric Vehicle Charger, Opposite God Opticals, Khanma Market, Aligarh ...	28.584486	77.2203116	DC-001	15 kW	Self Service
NDMC	Dhama Marg, Block Y, Diplomatic Enclave, M-Block, ...	Electric Vehicle Charger, Dhama Marg, Block Y, Diplomatic Enclave, M-Block, ...	28.6023562	77.1866178	DC-001	15 kW	Self Service
NDMC	Dhama Marg, Block Y, Diplomatic Enclave, M-Block, ...	Electric Vehicle Charger, Dhama Marg, Block Y, Diplomatic Enclave, M-Block, ...	28.6023562	77.1866178	DC-001	15 kW	Self Service
NDMC	Near NDMC Office, Fire Brigade Lane, Aligarh ...	Electric Vehicle Charger, Near NDMC Office, Fire Brigade Lane, Aligarh ...	28.6308882	77.2255578	DC-001	15 kW	Self Service
NDMC	Near Bikanervala, Yashwant Plaza, Chhawanya ...	Electric Vehicle Charger, Near Bikanervala, Yashwant Plaza, Chhawanya ...	28.5938828	77.163908	DC-001	15 kW	Self Service
NDMC	Khan Market, Rabinda Nagar, New Delhi-110003	Electric Vehicle Charger, Khan Market, Rabinda Nagar, New Delhi-110003	28.600333	77.268889	DC-001	15 kW	Self Service
NDMC	Outside Devender Collections, Shankar Market, ...	Electric Vehicle Charger, Outside Devender Collections, Shankar Market, ...	28.613677	77.2339479	DC-001	15 kW	Self Service
NDMC	Opposite HDFC Bank, M-Block, Connaught Pla... ...	Electric Vehicle Charger, Opposite HDFC Bank, M-Block, Connaught Plaza, New Delhi-110003	28.6325843	77.2229787	DC-001	15 kW	Self Service
NDMC	Outside Oriental Bank, Radial Road No. 7, Rock... ...	Electric Vehicle Charger, Outside Oriental Bank, Radial Road No. 7, Rock ...	28.6117794	77.2771076	DC-001	15 kW	Self Service

Output

Action Output

#	Time	Action	Message	Duration / Fetch
30	21:41:07	SELECT * FROM electric_vehicle.cheapestelectricars-evadatabase LIMIT 0, 1000	180 row(s) returned	0.032 sec / 0000 sec
31	21:42:19	SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list LIMIT 0, 1000	202 row(s) returned	0.000 sec / 0000 sec
32	21:42:48	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.015 sec / 0000 sec
33	21:43:57	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.000 sec / 0000 sec
34	21:46:30	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.000 sec / 0000 sec
35	21:49:15	SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list LIMIT 0, 1000	202 row(s) returned	0.000 sec / 0000 sec

Object Info Session

Type here to search

MySQL Workbench

EV PHY PROJECT

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- Filter objects
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 - cheapestelectricars-evadatabase
 - electric_vehicle_charging_statio...
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Result Grid | Filter Rows | Export: | Wrap Cell Content: |

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34	21:46:30	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.000 sec / 0000 sec
35	21:49:15	SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list LIMIT 0, 1000	202 row(s) returned	0.000 sec / 0000 sec

Object Info Session

Type here to search

MySQL Workbench

EV PHY PROJECT

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas

SCHEMAS: electric_vehicle

Tables: cheapelectriccars-evdatabase, electric_vehicle_charging_station_list, electriccardata_clean, evdata, view, stored_procedures, functions, sakila, sys, world

SQLAdditions: Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

```

1 • SELECT * FROM electric_vehicle.`cheapestelectriccars-evdatabase`;
2 • SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list;
3 • SELECT * FROM electric_vehicle.electriccardata_clean;
4 • SELECT * FROM electric_vehicle.electriccardata_clean;

```

Result Grid: electriccardata_clean 5 x

Brand	Model	AccelSec	TopSpeed_KmH	Range_Km	Efficiency_WhKm	FastCharge_KmH	RapidCharge	PowerTrain	PlugType	Box
Tesla	Model 3 Long Range Dual Motor	4.6	233	450	161	940	Yes	AWD	Type 2 CCS	Sed.
Volkswagen	ID.3 Pure	10	160	270	167	250	Yes	RWD	Type 2 CCS	Hatch
Polestar	2	4.7	210	400	181	620	Yes	AWD	Type 2 CCS	Lift
BMW	iX3	6.8	180	360	206	560	Yes	RWD	Type 2 CCS	SUV
Honda	e	9.5	145	170	168	190	Yes	RWD	Type 2 CCS	Hatch
Lucid	Air	2.8	250	610	180	620	Yes	AWD	Type 2 CCS	Sed.
Volkswagen	e-Golf	9.6	150	190	168	220	Yes	FWD	Type 2 CCS	Hatch
Peugeot	e-208	8.1	150	275	164	420	Yes	FWD	Type 2 CCS	Hatch
Tesla	Model 3 Standard Range Plus	5.6	225	310	153	650	Yes	RWD	Type 2 CCS	Sed.
Audi	Q4 e-tron	6.3	180	400	193	540	Yes	AWD	Type 2 CCS	SUV
Mercedes	EQC 400 4MATIC	5.1	180	370	216	440	Yes	AWD	Type 2 CCS	SUV
Nissan	Leaf	7.9	144	270	164	770	Yes	FWD	Type 2 CCS	Hatch

Information: Schema: electric_vehicle

Action Output:

#	Time	Action	Message	Duration / Fetch
29	21:40:53	DEALLOCATE PREPARE stmt	OK	0.000 sec
30	21:41:07	SELECT * FROM electric_vehicle.`cheapestelectriccars-evdatabase` LIMIT 0, 1000	180 row(s) returned	0.032 sec / 0.000 sec
31	21:42:19	SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list LIMIT 0, 1000	202 row(s) returned	0.000 sec / 0.000 sec
32	21:42:42	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.015 sec / 0.000 sec
33	21:43:57	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.000 sec / 0.000 sec
34	21:43:50	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Type here to search

MySQL Workbench

EV PHY PROJECT

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas

SCHEMAS: electric_vehicle

Tables: cheapelectriccars-evdatabase, electric_vehicle_charging_station_list, electriccardata_clean, evdata, view, stored_procedures, functions, sakila, sys, world

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2 • SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list;
3 • SELECT * FROM electric_vehicle.electriccardata_clean;
4 • SELECT * FROM electric_vehicle.electriccardata_clean;

```

Result Grid: electriccardata_clean 4 x

Brand	Model	AccelSec	TopSpeed_KmH	Range_Km	Efficiency_WhKm	FastCharge_KmH	RapidCharge	PowerTrain	PlugType	Box
Tesla	Model 3 Long Range Dual Motor	4.6	233	450	161	940	Yes	AWD	Type 2 CCS	Sed.
Volkswagen	ID.3 Pure	10	160	270	167	250	Yes	RWD	Type 2 CCS	Hatch
Polestar	2	4.7	210	400	181	620	Yes	AWD	Type 2 CCS	Lift
BMW	iX3	6.8	180	360	206	560	Yes	RWD	Type 2 CCS	SUV
Honda	e	9.5	145	170	168	190	Yes	RWD	Type 2 CCS	Hatch
Lucid	Air	2.8	250	610	180	620	Yes	AWD	Type 2 CCS	Sed.
Volkswagen	e-Golf	9.6	150	190	168	220	Yes	FWD	Type 2 CCS	Hatch
Peugeot	e-208	8.1	150	275	164	420	Yes	FWD	Type 2 CCS	Hatch
Tesla	Model 3 Standard Range Plus	5.6	225	310	153	650	Yes	RWD	Type 2 CCS	Sed.
Audi	Q4 e-tron	6.3	180	400	193	540	Yes	AWD	Type 2 CCS	SUV
Mercedes	EQC 400 4MATIC	5.1	180	370	216	440	Yes	AWD	Type 2 CCS	SUV
Nissan	Leaf	7.9	144	270	164	770	Yes	FWD	Type 2 CCS	Hatch

Information: Schema: electric_vehicle

Action Output:

#	Time	Action	Message	Duration / Fetch
28	21:40:49	PREPARE stmt FROM INSERT INTO `electric_vehicle`.`cheapestelectriccars-evdatabase` (Name)`Subtit...	OK	0.000 sec
29	21:40:53	DEALLOCATE PREPARE stmt	OK	0.000 sec
30	21:41:07	SELECT * FROM electric_vehicle.`cheapestelectriccars-evdatabase` LIMIT 0, 1000	180 row(s) returned	0.032 sec / 0.000 sec
31	21:42:19	SELECT * FROM electric_vehicle.electric_vehicle_charging_station_list LIMIT 0, 1000	202 row(s) returned	0.000 sec / 0.000 sec
32	21:42:48	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.015 sec / 0.000 sec
33	21:43:57	SELECT * FROM electric_vehicle.electriccardata_clean LIMIT 0, 1000	98 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Type here to search

Tableau - Book1

File Data Server Window Help

Connections Add

localhost MySQL

Database electric_vehicle

Table cheapestelectriccars-evdatabase+ (electric_vehicle)

cheapelectriccar...

Connection Live Extract Filters 0 Add

Need more data?
Drag tables here to relate them. [Learn more](#)

cheapelectriccars-evda... 43 fields 492 rows

Name	Subtitle	Acceleration	Top Speed	Range
Opel Ampera-e	Battery Electric Vehicle	7.3 sec	150 km/h	335 km
Renault Kangoo Maxi ZE 33	Battery Electric Vehicle	22.4 sec	130 km/h	160 km
Nissan Leaf	Battery Electric Vehicle	7.9 sec	144 km/h	220 km
Audi e-tron Sportback 55 qu...	Battery Electric Vehicle	5.7 sec	200 km/h	375 km
Porsche Taycan Turbo S	Battery Electric Vehicle	2.8 sec	260 km/h	390 km
Nissan e-NV200 Evalia	Battery Electric Vehicle	14.0 sec	123 km/h	165 km

Data Source Sheet 1

Tableau - Book1

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Data Analytics

cheapelectriccars-ev...

Search

Tables

- Acceleration
- address
- aux address
- BaseModel
- BodyStyle
- BootSpace
- Brand
- Capacity
- Car
- Drive
- Efficiency
- Fast Charge Speed
- Model
- Name
- PlugType
- power
- PowerTrain
- Pricein Germany
- Pricein UK
- Range
- RapidCharge
- region
- Segment
- service
- Style
- Subtitle
- TableName

Pages

Marks

Columns

Rows

Sheet 1

Drop field here

Drop field here

Drop field here

Select or drag data
Use the Shift or Ctrl key to select multiple fields

Data Source Sheet 1

Tableau - Book1

File Data Server Window Help

Connections Add

localhost MySQL

Database electric_vehicle

Table cheapstelectriccars-evdatabase

electric_vehicle_charging_station_list

electriccardata_clean

evinda

New Custom SQL

New Union

New Table Extension

electric_vehicle_charging_station_list (electric_vehi...)

Connection Live Extract Filters 0 Add

electric_vehicle_charging...

Need more data?
Drag tables here to relate them. [Learn more](#)

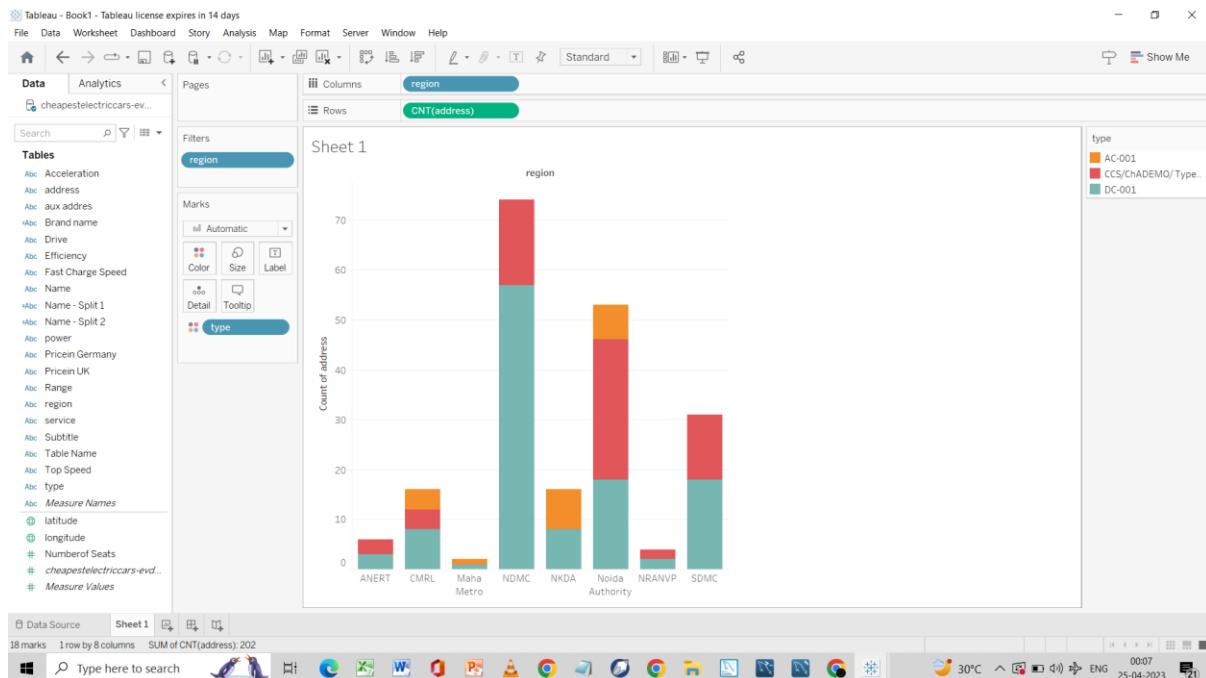
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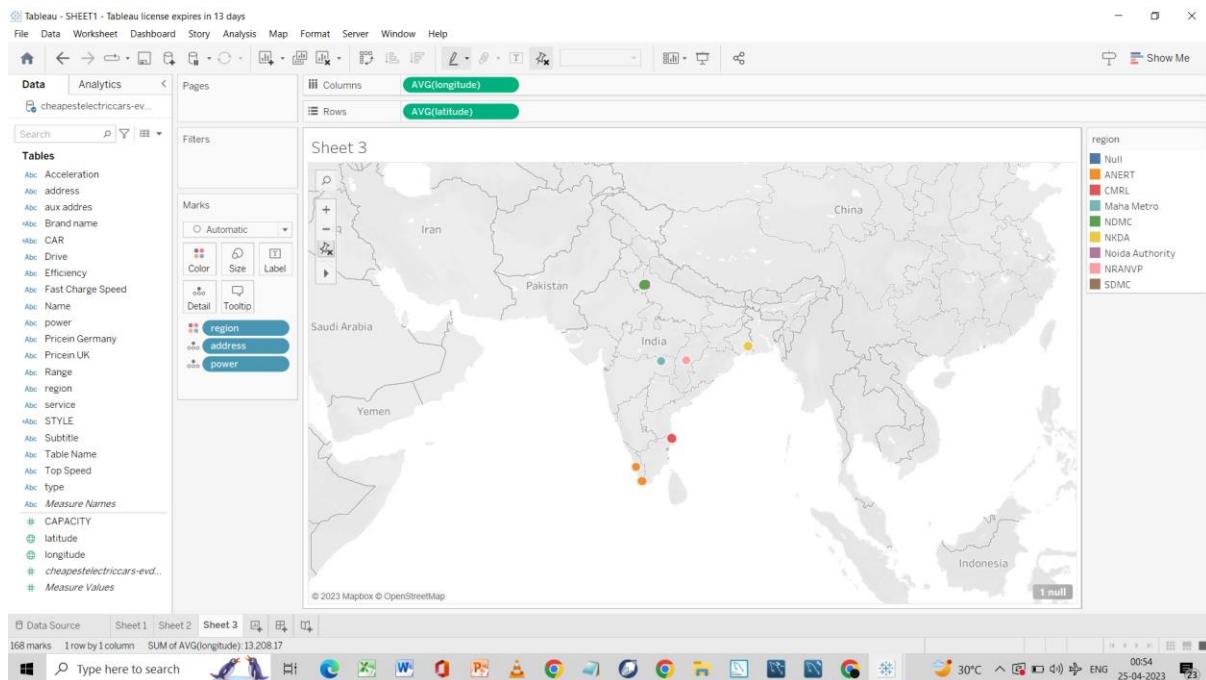
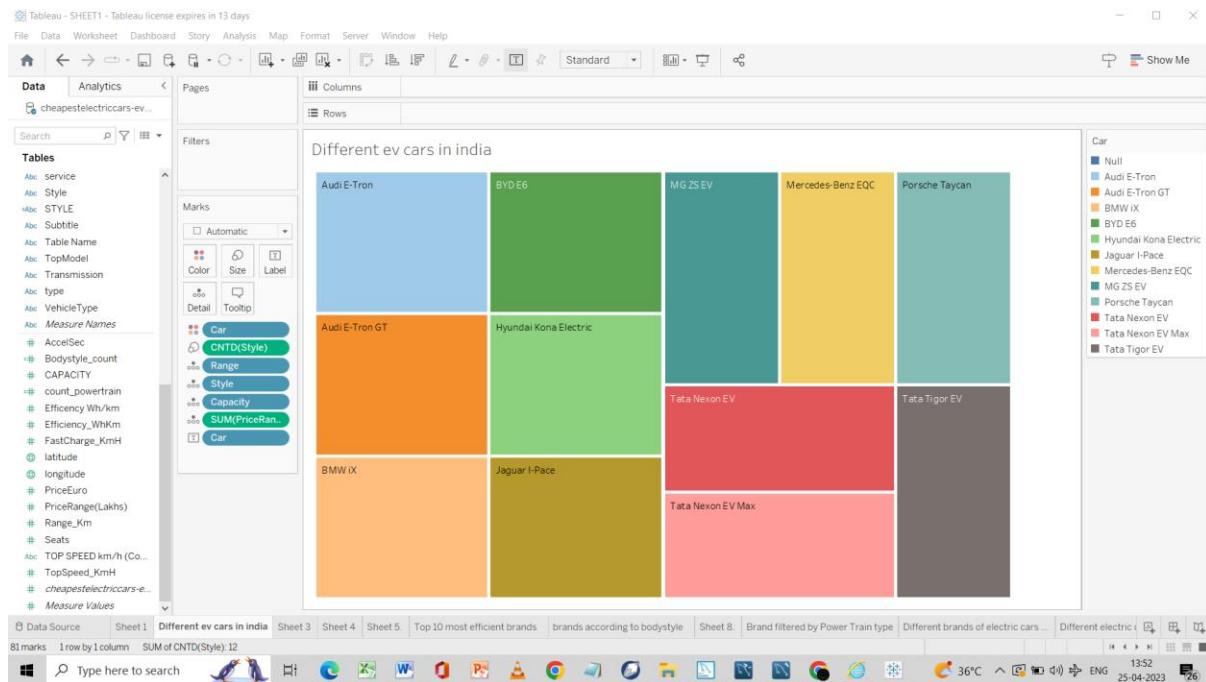
Name	Type	Field Name	Physical Table	Region	Address	Aux Address	Latitude	Longitude
electric_vehicle_charging_station_list	Region	Region	electric_vehicle_charging...	NDMC	Prithviraj Market, Rabindra N...	Electric Vehicle Charger, Prit...	28.6007	77.2125
	Address	address	electric_vehicle_chargin...	NDMC	Prithviraj Market, Rabindra N...	Electric Vehicle Charger, Prit...	28.6007	77.2125
	Aux Address	aux address	electric_vehicle_chargin...	NDMC	Outside RWA Park, Jor Bagh ...	Electric Vehicle Charger, Out...	28.5883	77.2125
				NDMC	Opposite Dory Pharmacy, Kh...	Electric Vehicle Charger, Opp...	28.5827	77.2125
				NDMC	Opposite Goel Opticals, Khan...	Electric Vehicle Charger, Opp...	28.5845	77.2125
				NDMC	Dharma Marg, Block Y, Dipl...	Electric Vehicle Charger, Dha...	28.6024	77.2125
				NDMC	Outside Westend Vedi Tailors...	Electric Vehicle Charger, Out...	28.6337	77.2125

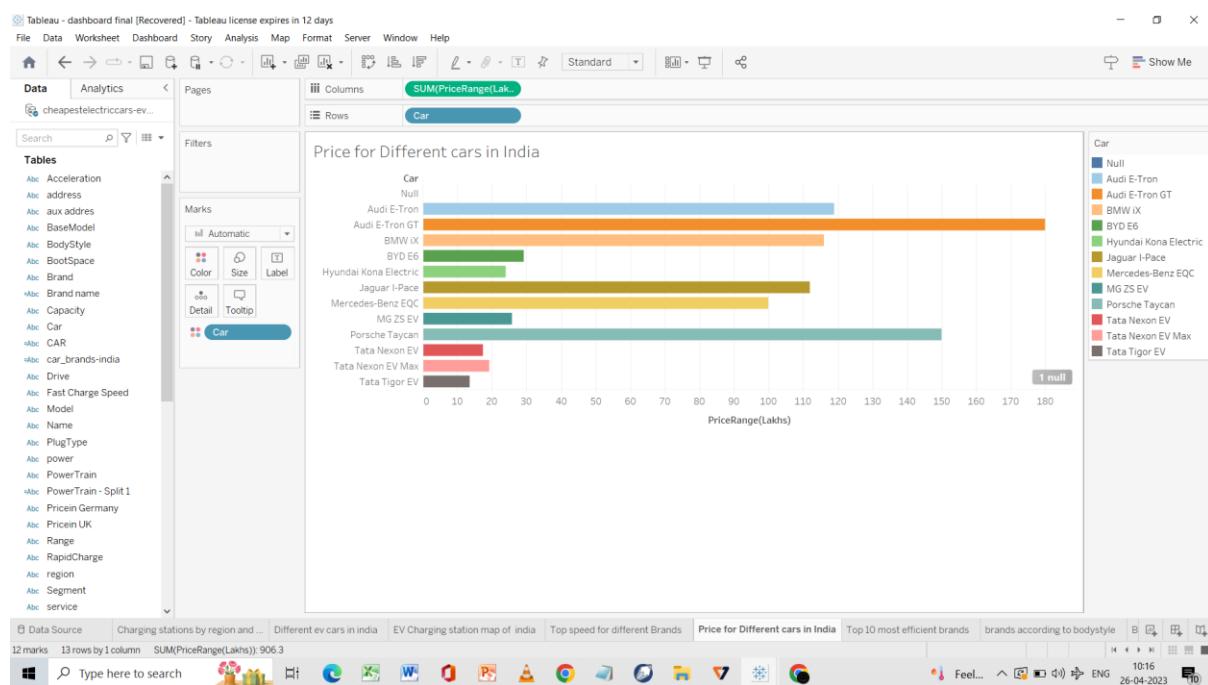
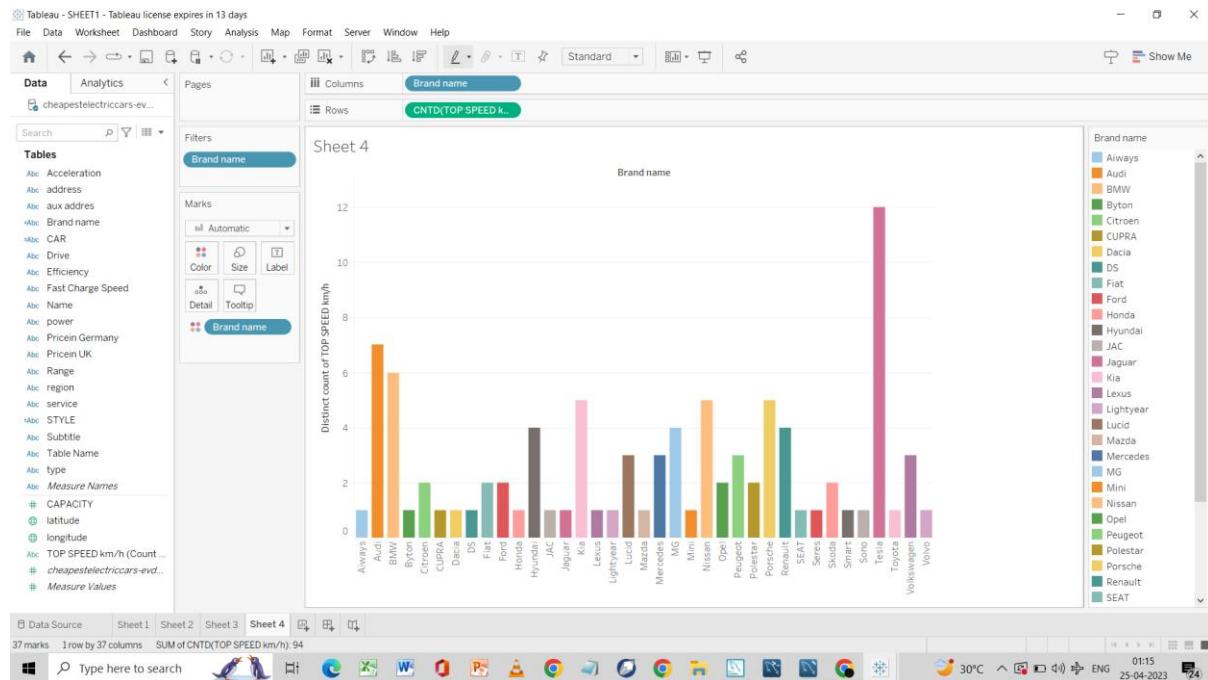
Data Source Sheet 1

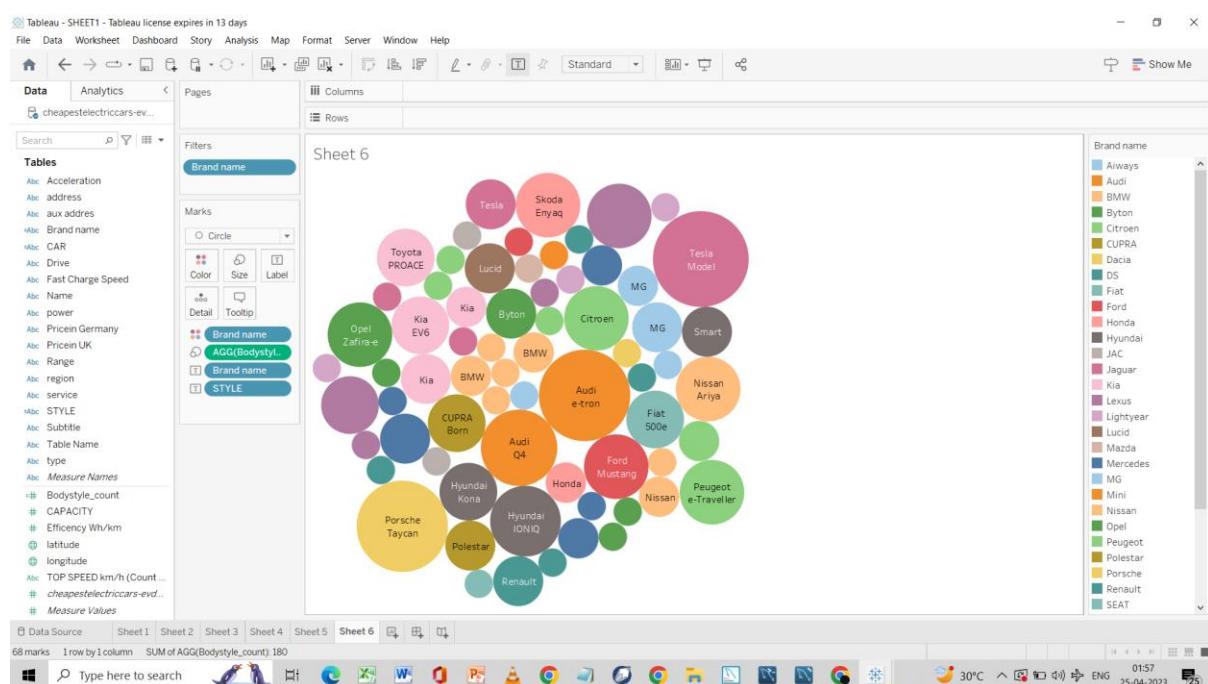
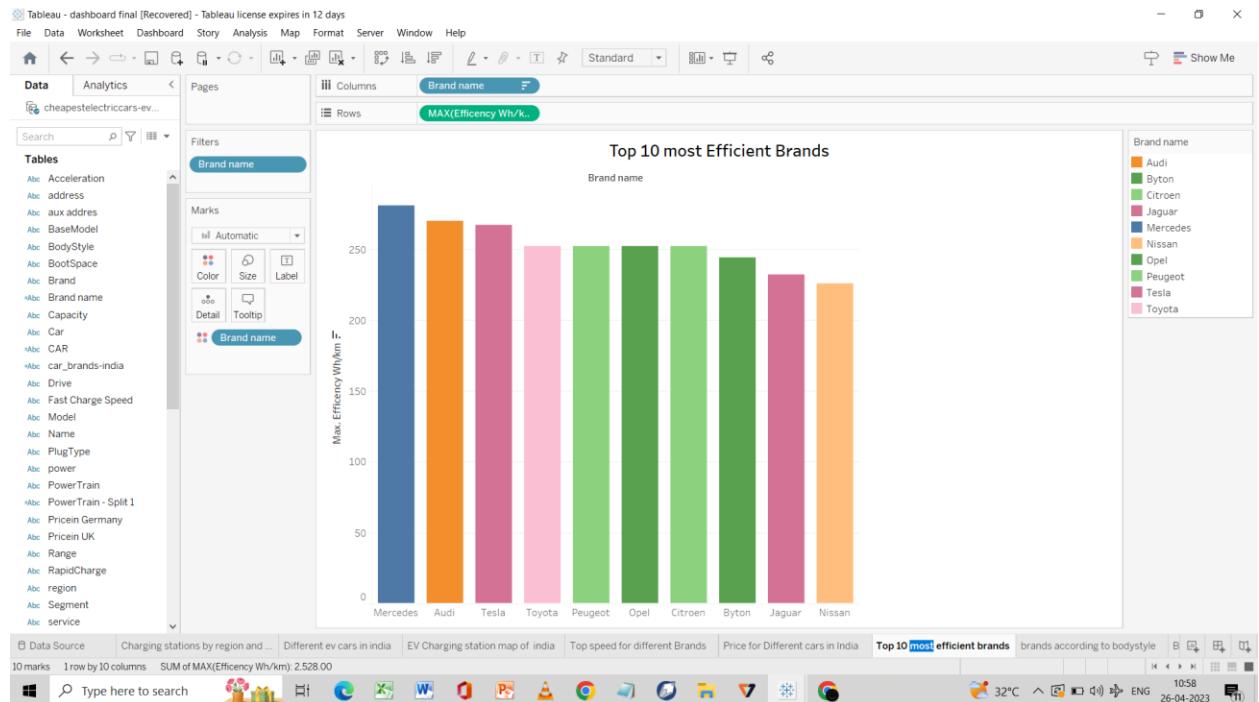
Type here to search

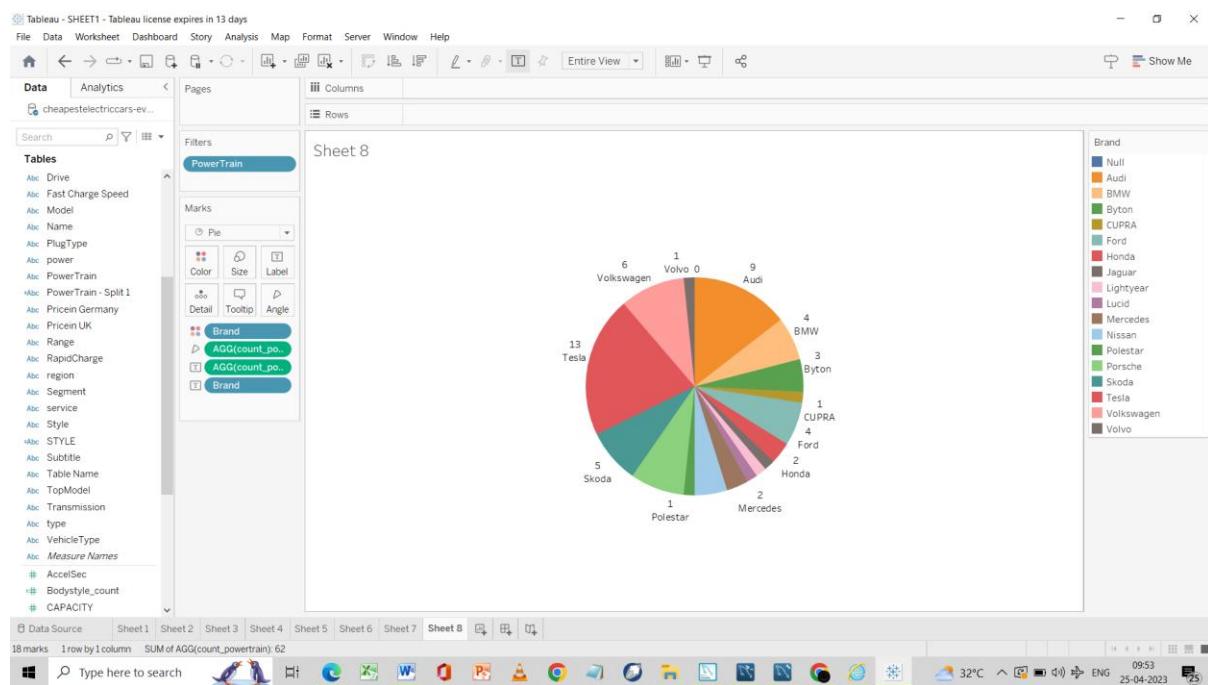
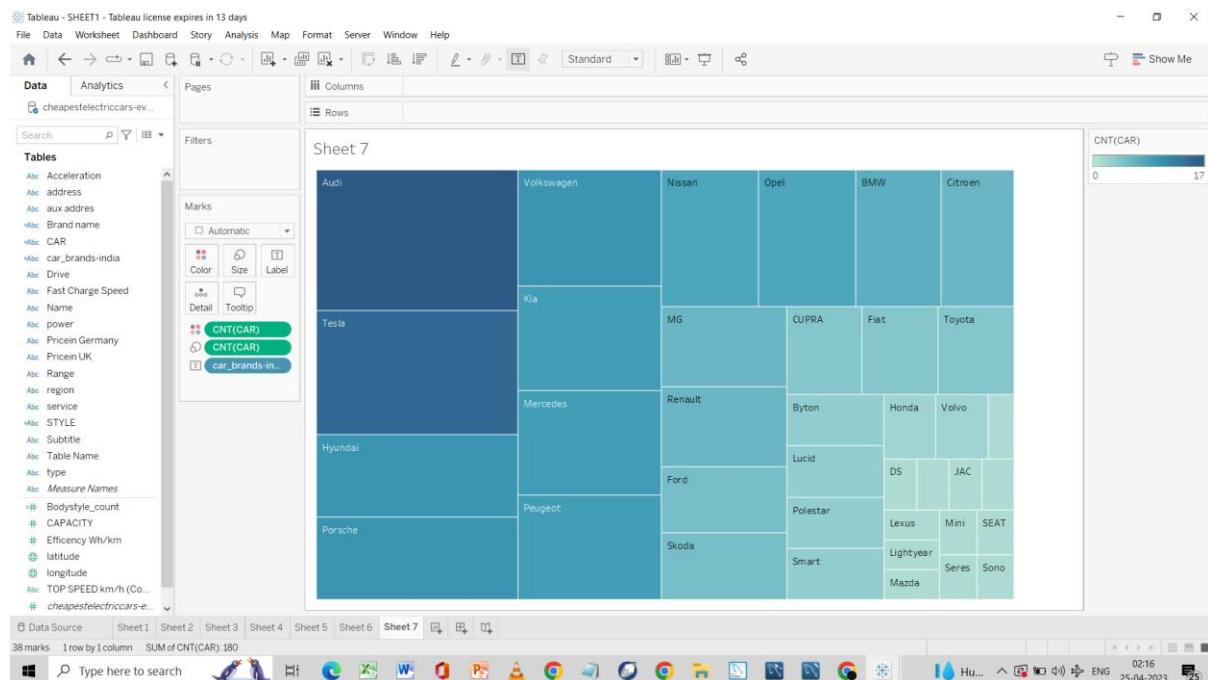
WORKSHEETS

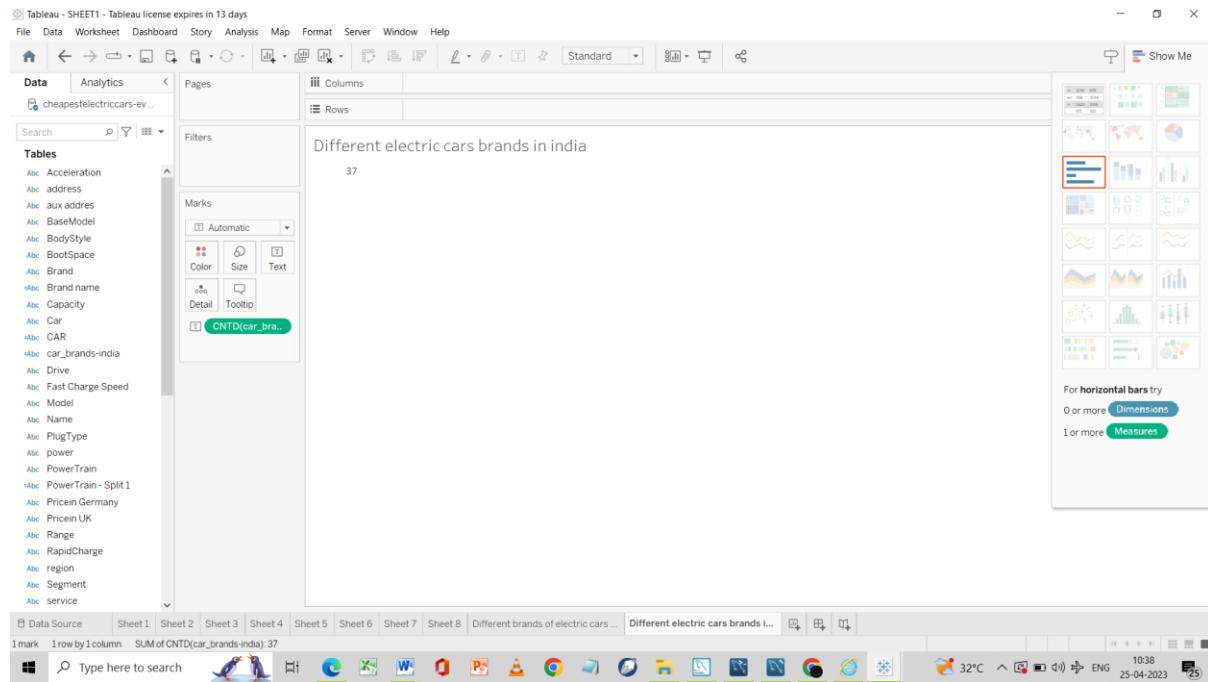
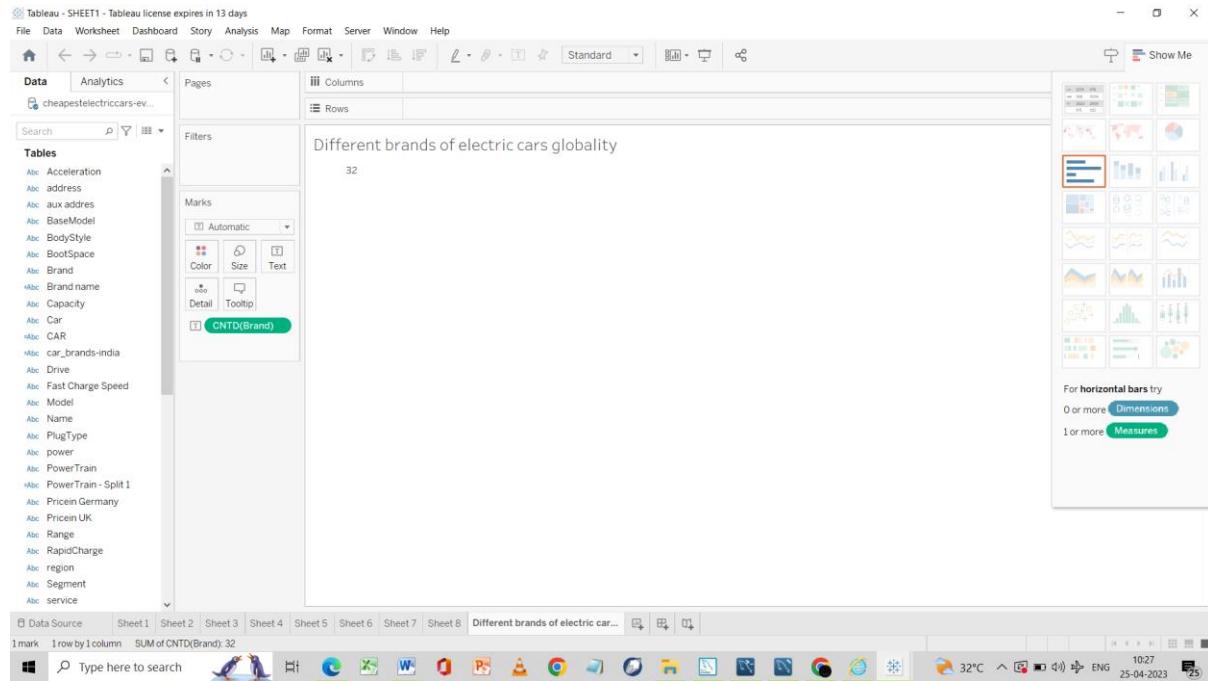












DASHBOARD

Tableau - Story of electric car [Recovered] - Tableau license expires in 12 days

File Data Worksheet Dashboard Story Analysis Format Server Window Help

Dashboard Layout < Default Phone Device Preview

Size Custom size (1320 x 2000)

Sheets

- Charging ...
- Different ev ...
- EV Charging ...
- Top speed for ...
- Price for ...
- Top 10 most ...
- brands ...

Electric Cars Analytics Dashboard

summary card for different brands of ev globally

Different electric cars brands in india

32 37

Brands

- Always
- Audi
- BMW
- Byton
- Citroen
- CUPRA
- Dacia
- DS
- Honda
- Hyundai
- JAC
- Jaguar
- Kia
- Lexus
- Lightyear
- Lucid
- Mazda
- Mercedes
- MG
- Mini
- Opel
- Peugeot
- Polestar
- Porsche
- Renault
- SEAT
- Seres
- Skoda
- Smart
- Sono
- Tesla
- Toyota

Data Source brands according to bodystyle Brand filtered by Powertrain type No of models by each Brand summary card for different bran... Different electric cars brands in ... Dashboard 1 Story of Electric car in India Sheet 12 Logeswari S 32°C ENG 26-04-2023

Type here to search

Tableau - Story of electric car [Recovered] - Tableau license expires in 12 days

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Dashboard Layout < Default Phone Device Preview

Size Custom size (1320 x 2000)

Sheets

- Charging ...
- Different ev ...
- EV Charging ...
- Top speed for ...
- Price for ...
- Top 10 most ...
- brands ...

Objects

- Horizontal Container
- Vertical Container
- A Text
- Extension
- Ask Data
- Data Story
- Image
- Blank
- Workflow
- Web Page

Tiled Floating Show dashboard title

Porsche Renault SEAT Seres Skoda Smart Sono Tesla Toyota Volkswagen Volvo

Brands

- Null
- Audi
- BMW
- Byton
- CUPRA
- Ford
- Honda
- Jaguar
- Lightyear
- Lucid
- Mercedes
- Nissan
- Polestar
- Porsche
- Skoda
- Tesla
- Volkswagen
- Volvo

Car

- Null
- Audi E-Tron

Brands According to Bodystyle

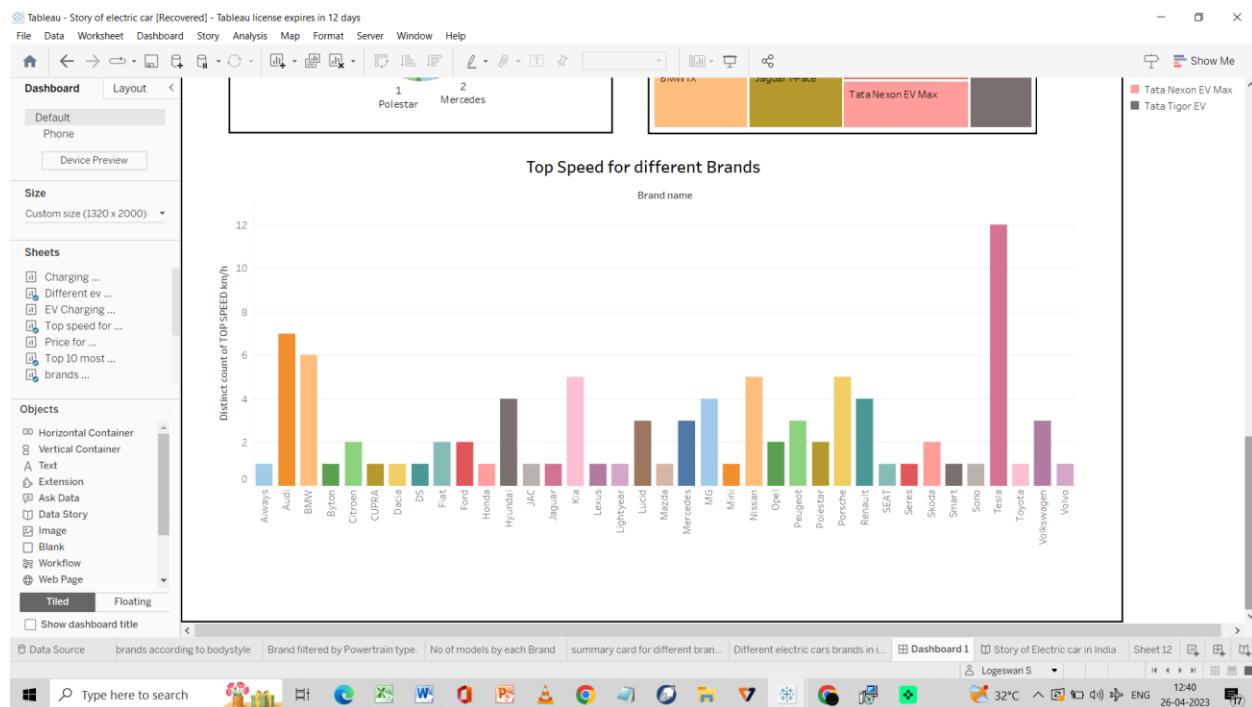
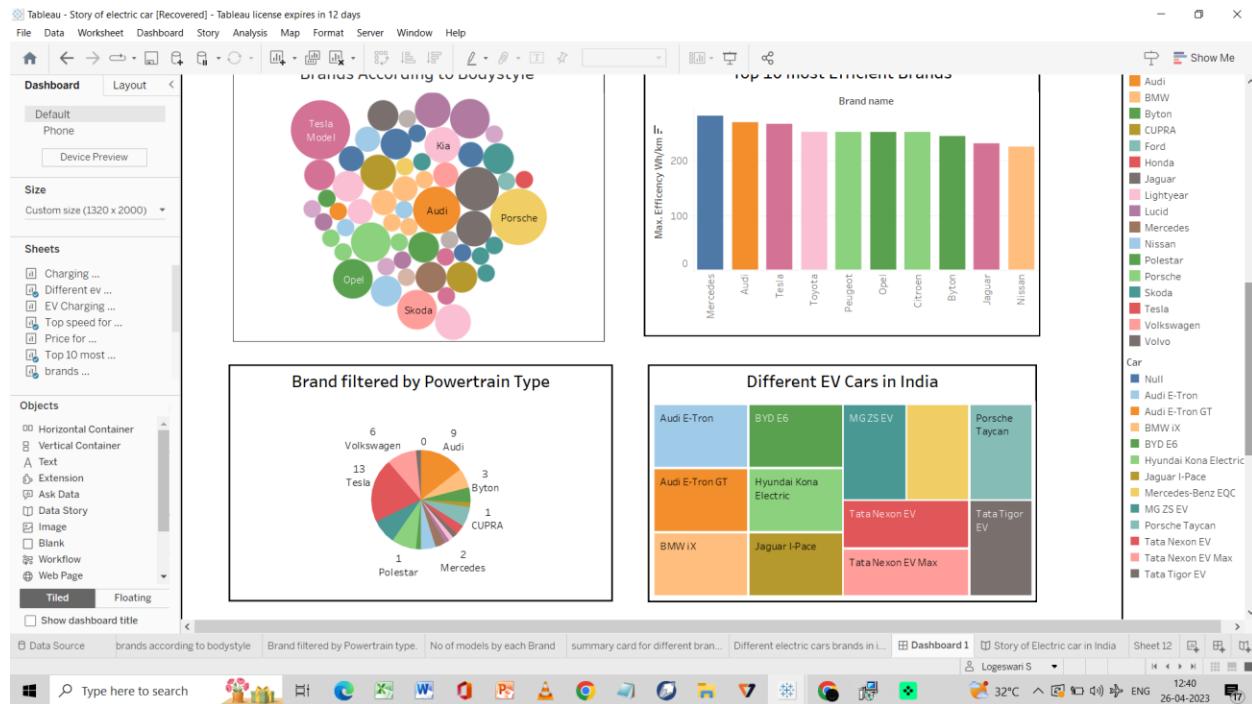
Max Efficiency Wh/km

Top 10 most Efficient Brands

Brand name

Brand filtered by Powertrain Type Different EV Cars in India

Data Source brands according to bodystyle Brand filtered by Powertrain type No of models by each Brand summary card for different bran... Different electric cars brands in ... Dashboard 1 Story of Electric car in India Sheet 12 Logeswari S 32°C ENG 26-04-2023



STORY

Tableau - Story of electric car [Recovered] - Tableau license expires in 12 days

File Data Worksheet Dashboard Story Analysis Format Server Window Help

Story Layout < > Show Me

Story of Electric car in India

charging stations map of India Charging station by Region and type India Price for different cars in India Brand filtered by powertrain trainType

A Drag to add text

Show title

Size Story (1016 x 964)

Data Source brands according to bodystyle Brand filtered by Powertrain type. No of models by each Brand summary card for different bran... Different electric cars brands in I... Dashboard 1 Story of Electric car in India Sheet 12 Logeswari S 32°C ENG 1235 26-04-2023

Type here to search

Region

- Null
- ANERT
- CMRL
- Maha Metro
- NDMC
- NKDA
- Noida Authority
- NRANVP
- SDMC

Tableau - Story of electric car [Recovered] - Tableau license expires in 12 days

File Data Worksheet Dashboard Story Analysis Format Server Window Help

Story Layout < > Show Me

Story of Electric car in India

charging stations map of India Charging station by Region and type India Price for different cars in India Brand filtered by powertrain trainType

A Drag to add text

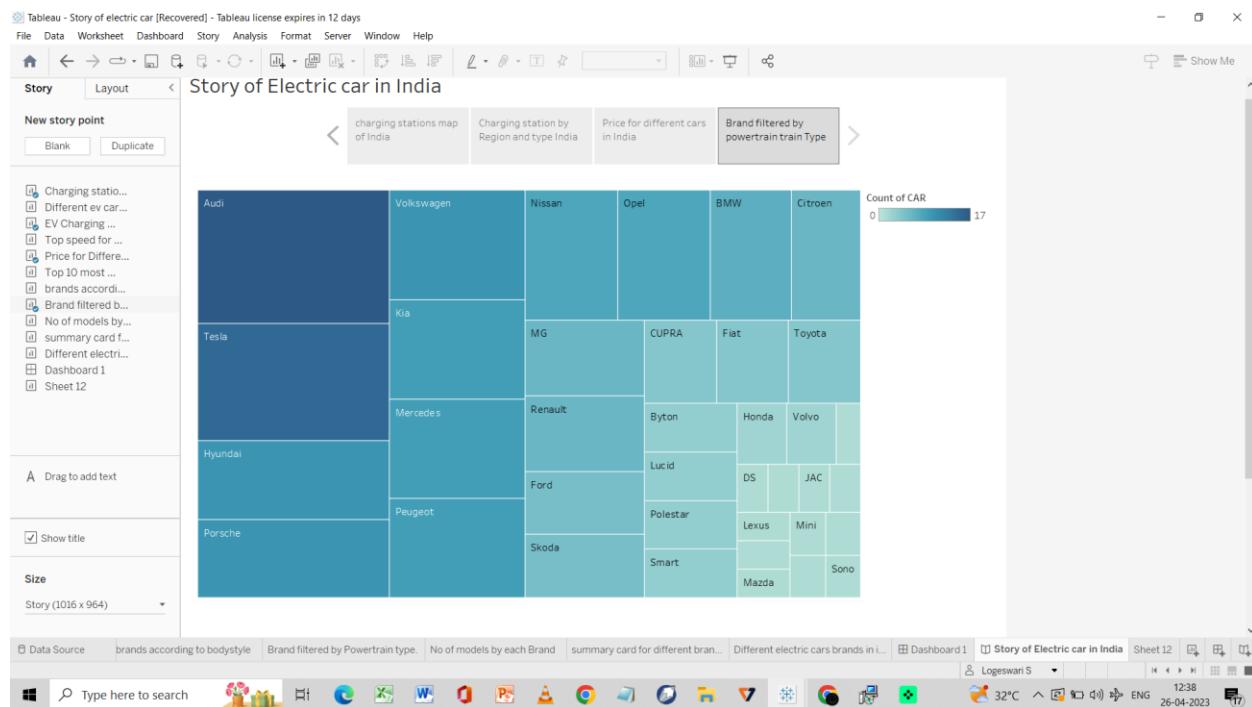
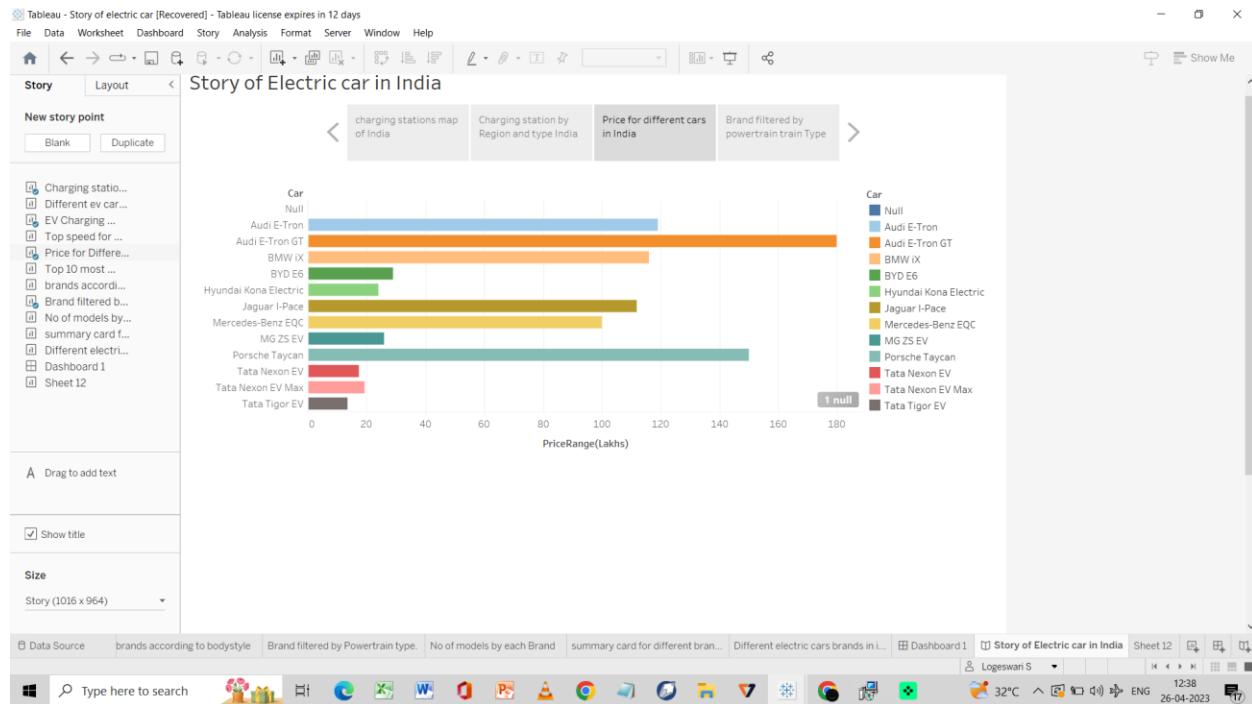
Show title

Size Story (1016 x 964)

Data Source brands according to bodystyle Brand filtered by Powertrain type. No of models by each Brand summary card for different bran... Different electric cars brands in I... Dashboard 1 Story of Electric car in India Sheet 12 Logeswari S 32°C ENG 1237 26-04-2023

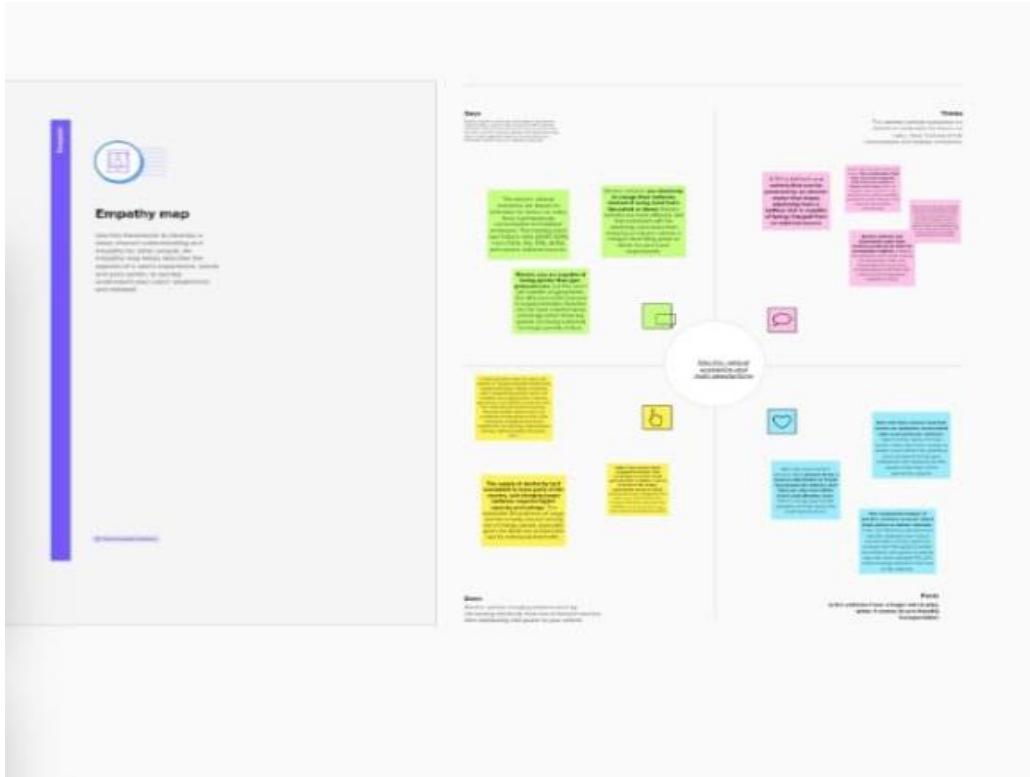
Type here to search

region	Count of address
AC-001	~53
CCS/CHADEMO/Type..	~31
DC-001	~75



Problem Definition And Design Thinking

Empathy Map:



Ideation & Brainstorming



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

10 minutes to prepare
1 hour to collaborate
2-8 people recommended

Before you collaborate
A little bit of preparation goes a long way with this session. Here's what you need to do to get going.
10 minutes

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.
[Open article](#)

Define your problem statement
analysis the battery conditions electric vehicles
6 minutes

It's no more hidden from anyone that the Li-ion battery in electric vehicles is built to last till 6-7 years or hardly 8 years and after the battery decay period of an electric vehicle battery its user remains with no other choice than to buy a newer battery which costs nearly 3/4 th of the whole vehicle cost.

[Share template feedback](#)



⌚ 10 minutes

Share your findings with the group

Person 1



Person 2



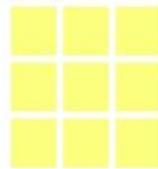
Person 3



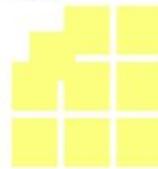
Person 4



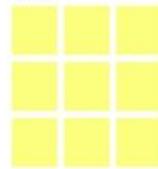
Person 5



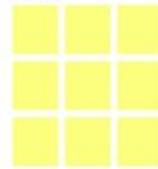
Person 6



Person 7



Person 8



3

Group ideas

group idea for batter condition in electrical vehicles

⌚ 20 minutes

Redwood
Materials began
a pilot program in
California to
recycle electric
vehicle batteries.

The startup partnered with
the state government as
well as Ford, Volvo,
Volkswagen, and Toyota,
plus the car dismantling
industry, to source end-of-
life lithium-ion and nickel
metal hydride traction
batteries.

4

Prioritize

Important points of electric vehicles batter condition

⌚ 20 minutes



Importance

If each of these tasks could get done with any difficulty or cost, which would have the most positive impact?

EV batteries go through a 'discharge' cycle when driving and a 'charge' cycle when the car is plugged in.

Instead of a single battery, EVs employ a pack made up of many small discrete Li-ion cells that work together.

Redwood Materials began a pilot program in California to recycle electric vehicle batteries.

These adjustments are reversed when it's on the road to generate electricity.

The startup partnered with the state government, as well as Ford, Volvo, Volkswagen, and Toyota, plus the car dismantling industry, to source end-of-life lithium-ion and nickel metal hydride traction batteries.



Feasibility

Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

Advantages of Electric Vehicles

Eco-friendly:

Because electric vehicles do not utilize fuel for combustion, there are no emissions or gas exhaust. Vehicles that run on fossil fuels contribute significantly to hazardous gas accumulation in the environment, thus driving an electric car can help contribute to a cleaner environment.

Renewable energy source:

Electric vehicles run on renewable power, whereas conventional automobiles function on the combustion of fossil fuels, which reduces the world's fossil-fuel stocks.

Less noise and smoother motion:

Driving an electric car is significantly smoother. Because they lack fast-moving elements, they are quieter and produce less noise

Cost-effective:

Electricity is far less expensive than fuels such as gasoline and diesel, which are subject to regular price increases. When solar electricity is utilized at home, battery recharging is cost-effective.

Low maintenance:

Because electric cars have fewer moving components, wear and tear is reduced when compared to traditional auto parts. Repairs are also simpler and less expensive than combustion engines.

Government support:

Government throughout the world have granted tax breaks to encourage people to drive Electric vehicles as part of a green program. Discover the top Electric Vehicles to compare and find the best fit in the List of Electric Vehicles Blog

Disadvantages of Electric Vehicles

High initial cost:

Electric vehicles continue to be quite expensive, and many buyers believe they are not as inexpensive as traditional automobiles.

Charging station limitations:

People who need to travel long distances are concerned about finding adequate charging stations in the middle of their journey, which are not always accessible.

Recharging takes time:

Unlike conventional automobiles, which require only a few minutes to replenish their gas tanks, charging an electric vehicle takes many hours.

Limited options:

Currently, there aren't many electric car models to pick from in terms of appearance, style, or customized variations.

Less driving range:

When compared to conventional automobiles, electric vehicles have a shorter driving range. Electric cars can be convenient for short-distance travel but are inconvenient for long-distance travel.

Applications of Electrical Transportation

Reduced Pollution

The transportation sector is now the largest source of carbon dioxide emissions in the U.S. The continued integration of EVs will help reduce this impact because they produce 54 percent less carbon dioxide emissions per mile than a conventional vehicle.

Cost Savings

EV batteries convert 59 to 62 percent of energy into vehicle movement while gas powered vehicles use 17 and 21 percent. EV drivers spend about \$1.2 per gallon to charge, less than half the price of gasoline. The average operating cost of an EV is \$485 annually compared to \$1,117 for a conventional vehicle.

Economic Growth

According to the U.S. Department of Energy, in 2017, the U.S. imported 19 percent of the petroleum it used. Using Electric Vehicles can reduce our energy dependency abroad and support the U.S. economy through the generation of new jobs, particularly in skilled electrical trades.

EV Trends and Developments

Consumers are demonstrating strong interest in EVs and increasing demand. EVs accounted for only 1.3 percent of total vehicles sold in the U.S in 2017. By third quarter 2018, that had nearly doubled to 2.5 percent; hitting 3 percent by the fourth quarter.

Proactive State Policies

States continue to raise clean energy goals with states like California, New Jersey, and New York setting a number of new, ambitious targets and regulations. However, Not all state-news is positive, as some made plans in 2018 to scale back net energy metering or renewable energy credit programs.

Conclusion

The progress that the electric vehicle industry has seen in recent years is not only extremely welcomed, but highly necessary in light of the increasing global greenhouse gas levels. As demonstrated within the economic, social, and environmental analysis sections of this webpage, the benefits of electric vehicles far surpass the costs. The biggest obstacle to the widespread adoption of electric-powered transportation is cost related, as gasoline and the vehicles that run on it are readily available, convenient, and less costly. As is demonstrated in our timeline, we hope that over the course of the next decade technological advancements and policy changes will help ease the transition from traditional fuel-powered vehicles. Additionally, the realization and success of this industry relies heavily on the global population, and it is our hope that through mass marketing and environmental education programs people will feel incentivized and empowered to drive an electric-powered vehicle. Each person can make a difference, so go electric and help make a difference!

FUTURE SCOPE

Electric vehicles have enormous future potential. The charging station is the obvious starting point for these vehicles. However, this is only the first step in a potentially long journey that will include charging banks and other industrial areas, as well as homes and cities. Electric vehicle technology has existed in labs such as NASA since the 1970s. In a few years, current technology will undoubtedly be far more advanced. EVs are even expected to power themselves by harvesting energy from their surroundings. Such vehicles will require little maintenance and may even be powered by renewable energy sources such as wind. It will also be interesting to see the impact of EU and US regulations that will go into effect. These regulations are intended to reduce the use of gasoline-powered vehicles. As the popularity of electric vehicles grows, so will the need to reduce their use. It is obvious that new zero-emission technologies will be required.

One of the most important aspects is the power source, and the global market segmentation is thoroughly examined. Electric vehicles today use a variety of power sources, including wind power, solar power, and hydroelectric power. The majority of these technologies have emerged in Africa. Morocco, South Africa, Tanzania, Namibia, Zimbabwe, and Brazil are among the countries that have developed these technologies. It should be noted that all of these countries have very low fuel costs, which means that installing a charging system on cars is very affordable. All over the world, batteries have been the primary concern. Lithium-ion batteries are replacing traditional alkaline batteries as technology advances. This has presented a significant challenge to the manufacturers. The market research report provides information on the major key players in this industry as well as the various strategies they are employing to overcome the challenges.

APPENDIX

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>Electric Cars Analytics</title>
  <meta content="" name="description">

  <meta content="" name="keywords">

  <!-- Favicons -->
  <link href="assets/img/favicon.png" rel="icon">
  <link href="assets/img/apple-touch-icon.png" rel="apple-touch-icon">

  <!-- Google Fonts -->
  <link
    href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Nunito:300,300i,400,400i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">

  <!-- Vendor CSS Files -->
  <link href="assets/vendor/aos/aos.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
  <link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
  <link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
  <link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">

  <!-- Template Main CSS File -->
  <link href="assets/css/style.css" rel="stylesheet">

  <!-- =====
  * Template Name: FlexStart - v1.12.0
  * Template URL: https://bootstrapmade.com/flexstart-bootstrap-startup-template/
  * Author: BootstrapMade.com
  * License: https://bootstrapmade.com/license/
  ===== -->
</head>

<body>
```

```

<!-- ===== Header ===== -->
<header id="header" class="header fixed-top">
  <div class="container-fluid container-xl d-flex align-items-center justify-content-between">

    <a href="index.html" class="logo d-flex align-items-center">
      
      <span>E-CarStart</span>
    </a>

    <nav id="navbar" class="navbar">
      <ul>
        <li><a class="nav-link scrollto active" href="#hero">Home</a></li>
        <li><a class="nav-link scrollto" href="#about">About</a></li>
        <li><a class="nav-link scrollto" href="#values">Dashboard</a></li>
        <li><a class="nav-link scrollto" href="#services">Story</a></li>
        <li><a class="nav-link scrollto" href="#team">Team</a></li>
        <li><a class="nav-link scrollto" href="#contact">Contact</a></li>
        <li><a class="getstarted scrollto" href="#about">Get Started</a></li>
      </ul>
      <i class="bi bi-list mobile-nav-toggle"></i>
    </nav><!-- .navbar -->

  </div>
</header><!-- End Header -->

<!-- ===== Hero Section ===== -->
<section id="hero" class="hero d-flex align-items-center">

  <div class="container">
    <div class="row">
      <div class="col-lg-6 d-flex flex-column justify-content-center">
        <h1 data-aos="fade-up">We offer modern Analytics solutions for Electric Vehicles</h1>

        <div data-aos="fade-up" data-aos-delay="600">
          <div class="text-center text-lg-start">
            <a href="#about" class="btn-get-started scrollto d-inline-flex align-items-center justify-content-center align-self-center">
              <span>Get Started</span>
              <i class="bi bi-arrow-right"></i>
            </a>
          </div>
        </div>
      </div>
    </div>
  </div>
</section>

```

```

        </div>
    <div class="col-lg-6 hero-img" data-aos="zoom-out" data-aos-delay="200">
        
    </div>
</div>

</section><!-- End Hero -->

<main id="main">
    <!-- ===== About Section ===== -->
    <section id="about" class="about">

        <div class="container" data-aos="fade-up">
            <div class="row gx-0">

                <div class="col-lg-6 d-flex flex-column justify-content-center" data-aos="fade-up" data-aos-delay="200">
                    <div class="content">
                        <h3>E-Car Start</h3>
                        <h2>E-Cart Start is a complete analytics tool for electric vehicles all over the world.</h2>
                        <p>
                            The Electric Vehicle (EV) is not new, but it has been receiving significantly more attention in recent years. Advances in both EV analytics and battery technologies have led to increased automotive market share. The modern mechatronic vehicle marries electrical storage and propulsion systems with electronic sensors, controls, and actuators, integrated closely with software, secure data transfer, and data analysis, to form a comprehensive transportation solution. Advances in all these areas have contributed to the overall rise of EV's, but the common thread that runs through all these elements is data analytics.
                        </p>
                        <div class="text-center text-lg-start">
                            <a href="#" class="btn-read-more d-inline-flex align-items-center justify-content-center align-self-center">
                                <span>Read More</span>
                                <i class="bi bi-arrow-right"></i>
                            </a>
                        </div>
                    </div>
                </div>
            </div>

            <div class="col-lg-6 d-flex align-items-center" data-aos="zoom-out" data-aos-delay="200">

```

```

        
    </div>

</div>
</div>

</section><!-- End About Section -->

<!-- ===== Values Section ===== -->
<section id="values" class="values">

<div class="container" data-aos="fade-up">

    <header class="section-header">
        <h2>Dashboard</h2>
        <p>https://public.tableau.com/views/dashboardnew_16824389260360/Dashboard1?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link</p>
    </header>

    <div class="row">

        <div class='tableauPlaceholder' id='viz1682438997433' style='position: relative'><noscript><a href='#'><img alt='Dashboard 1 ' src='https://public.tableau.com/static/images/dashboards/new_16824389260360/1_rss.png' style='border: none' /></a></noscript><object class='tableauViz' style='display:none;'><param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param name='embed_code_version' value='3' /> <param name='site_root' value=' ' /><param name='name' value='dashboardnew_16824389260360/1' /><param name='tabs' value='no' /><param name='toolbar' value='yes' /><param name='static_image' value='https://public.tableau.com/static/images/dashboards/new_16824389260360/1.png' /> <param name='animate_transition' value='yes' /><param name='display_static_image' value='yes' /><param name='display_spinner' value='yes' /><param name='display_overlay' value='yes' /><param name='display_count' value='yes' /><param name='language' value='en-US' /><param name='filter' value='publish=yes' /></object></div>           <script type='text/javascript'>           var divElement =
document.getElementById('viz1682438997433');           var vizElement =
divElement.getElementsByTagName('object')[0];           if (
divElement.offsetWidth > 800 ) {
vizElement.style.width='1320px';vizElement.style.height='2027px';} else if (
divElement.offsetWidth > 500 ) {
vizElement.style.width='1320px';vizElement.style.height='2027px';} else {

```

```
vizElement.style.width='100%';vizElement.style.height='2277px';}
    var scriptElement =
document.createElement('script');                                scriptElement.src =
'https://public.tableau.com/javascripts/api/viz_v1.js';           vizElem
ent.parentNode.insertBefore(scriptElement, vizElement);            ent
</div>

</div>

</section><!-- End Values Section -->

<!-- ===== Features Section ===== -->
<section id="features" class="features">

<div class="container" data-aos="fade-up">

    <header class="section-header">
        <h2>Features</h2>
        <p>There are many different features of our project</p>
    </header>

    <div class="row">

        <div class="col-lg-6">
            
        </div>

        <div class="col-lg-6 mt-5 mt-lg-0 d-flex">
            <div class="row align-self-center gy-4">

                <div class="col-md-6" data-aos="zoom-out" data-aos-delay="200">
                    <div class="feature-box d-flex align-items-center">
                        <i class="bi bi-check"></i>
                        <h3>Analyse the current stats</h3>
                    </div>
                </div>

                <div class="col-md-6" data-aos="zoom-out" data-aos-delay="300">
                    <div class="feature-box d-flex align-items-center">
                        <i class="bi bi-check"></i>
                        <h3>Get to know EV more</h3>
                    </div>
                </div>

                <div class="col-md-6" data-aos="zoom-out" data-aos-delay="400">

```

```

<div class="feature-box d-flex align-items-center">
  <i class="bi bi-check"></i>
  <h3>Know about Charging Stations</h3>
</div>
</div>

<div class="col-md-6" data-aos="zoom-out" data-aos-delay="500">
  <div class="feature-box d-flex align-items-center">
    <i class="bi bi-check"></i>
    <h3>Top performing Brands</h3>
  </div>
</div>

<div class="col-md-6" data-aos="zoom-out" data-aos-delay="600">
  <div class="feature-box d-flex align-items-center">
    <i class="bi bi-check"></i>
    <h3>different brands in India</h3>
  </div>
</div>

<div class="col-md-6" data-aos="zoom-out" data-aos-delay="700">
  <div class="feature-box d-flex align-items-center">
    <i class="bi bi-check"></i>
    <h3>different brands Globally</h3>
  </div>
</div>

</div>
</div>

</div> <!-- / row -->

<!-- Feature Tabs -->
<div class="row fUTURE-TABS" data-aos="fade-up">
  <div class="col-lg-6">
    <h3>Overview of Electric Vehicle Sector</h3>

    <!-- Tabs -->
    <ul class="nav nav-pills mb-3">
      <li>
        <a class="nav-link active" data-bs-toggle="pill"
href="#tab1">Overview</a>
      </li>
      <li>

```

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        <a class="nav-link active" data-bs-toggle="pill"
href="#tab2">Pricing</a>
    </li>
</ul><!-- End Tabs -->

<!-- Tab Content -->
<div class="tab-content">

    <div class="tab-pane fade show active" id="tab1">
        <p>The supply of fossil fuels is constantly decreasing. The situation is very alarming. It is time for the world to slowly adapt to electric vehicles. </p>
        <div class="d-flex align-items-center mb-2">
            <i class="bi bi-check2"></i>
            <h4>A lot of change needs to happen</h4>
        </div>
        <p>Major carmakers like Tesla and Porsche manufacture many electric vehicles. </p>
        <div class="d-flex align-items-center mb-2">
            <i class="bi bi-check2"></i>
            <h4> The improvement of battery technology in recent years has led to the higher popularity of electric vehicles.</h4>
        </div>
        <p>Buying an electric vehicle can be a great choice for consumers. The drive quality, low noise levels, and convenience are really great.</p>
    </div><!-- End Tab 1 Content -->

    <div class="tab-pane fade show" id="tab2">
        <p> In the United States, one year of driving a petrol car can cost from 1500 USD to 2500 USD.</p>
        <div class="d-flex align-items-center mb-2">
            <i class="bi bi-check2"></i>
            <h4>On the other hand, the driving cost of Electric Vehicles is 500 USD. Electric cars are more preferable.</h4>
        </div>
        <p>The maintenance cost of electric vehicles is also very low. They are economical to maintain.</p>
        <div class="d-flex align-items-center mb-2">
            <i class="bi bi-check2"></i>
            <h4>The energy conversion efficiency of electric vehicles is also high.</h4>
        </div>
        <p>Electric vehicles use 60-70% of electrical energy. On the other hand, vehicles based on internal combustion engines have an efficiency of 18-22% only. The energy cost of manufacturing an electric vehicle is also very high, but
```

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considering everything and the fact that charging electric vehicles is very cheap,  
EVs are a great option. Manufacturing batteries is an important task in the  
production of Electric vehicles.</p>  
    </div><!-- End Tab 2 Content -->  
  
    </div>  
  
    </div>  
  
    <div class="col-lg-6">  
          
    </div>  
  
    </div><!-- End Feature Tabs -->  
  
    </div>  
  
</section><!-- End Features Section -->  
  
<!-- ===== Services Section ===== -->  
<section id="services" class="services">  
  
    <div class="container" data-aos="fade-up">  
  
        <header class="section-header">  
            <h2>Story</h2>  
            <p>https://public.tableau.com/views/Storyofelectriccar/StoryofElectricca  
rinIndia?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link</p>  
        </header>  
    </div>
```