

Indian EV Market Analysis



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About AtliQ Motors

AtliQ Motors, headquartered in the United States, is a leader in electric and hybrid vehicle technology, recognized for its commitment to innovation and sustainable automotive solutions. AtliQ has established itself as a trusted name in North America, with a strong emphasis on quality and cutting-edge EV technology.



Key Highlights

- **Market Leadership:** Over the past five years, AtliQ Motors has secured a solid **25% market share** in the North American EV and hybrid segment, becoming one of the most influential players in the region.
- **Global Vision:** As part of its expansion strategy, AtliQ aims to introduce its **bestselling EV models** to international markets, bringing its sustainable transportation solutions to more regions worldwide.
- **India Bound:** With India identified as a key market, AtliQ seeks to expand its footprint, where it currently holds **less than a 2% share**. This strategic move aligns with the company's goal to support the country's growing demand for EVs and green mobility solutions.



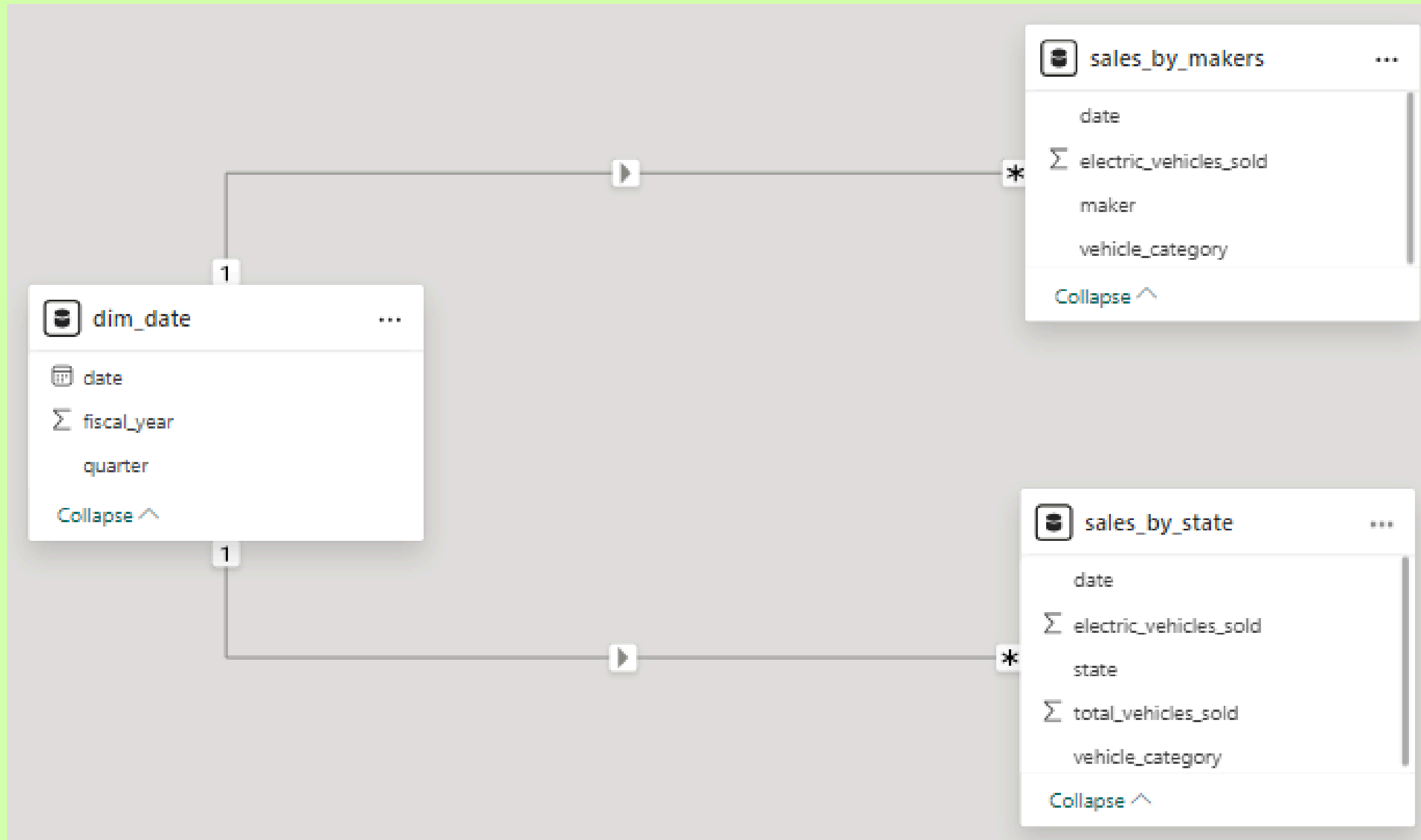


Objective

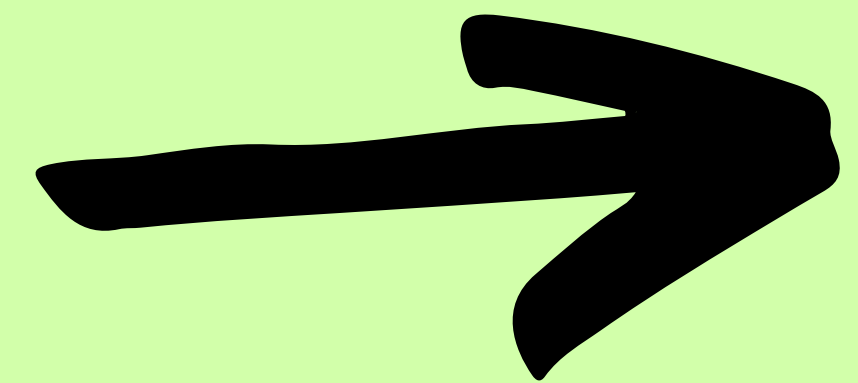
To support AtliQ's entry into the Indian market, Bruce Haryali, head of AtliQ Motors India, has tasked data analyst team with conducting a detailed analysis of India's EV and hybrid vehicle landscape. This study aims to uncover market trends, customer preferences, and competitive insights that will inform AtliQ's launch strategy.



Dataset and Model:



Let's review the Task, Query and Output



Tools Used:



Power BI

1. List the top 3 and bottom 3 makers for the fiscal years 2023 and 2024 in terms of the number of 2-wheelers sold.

Queries

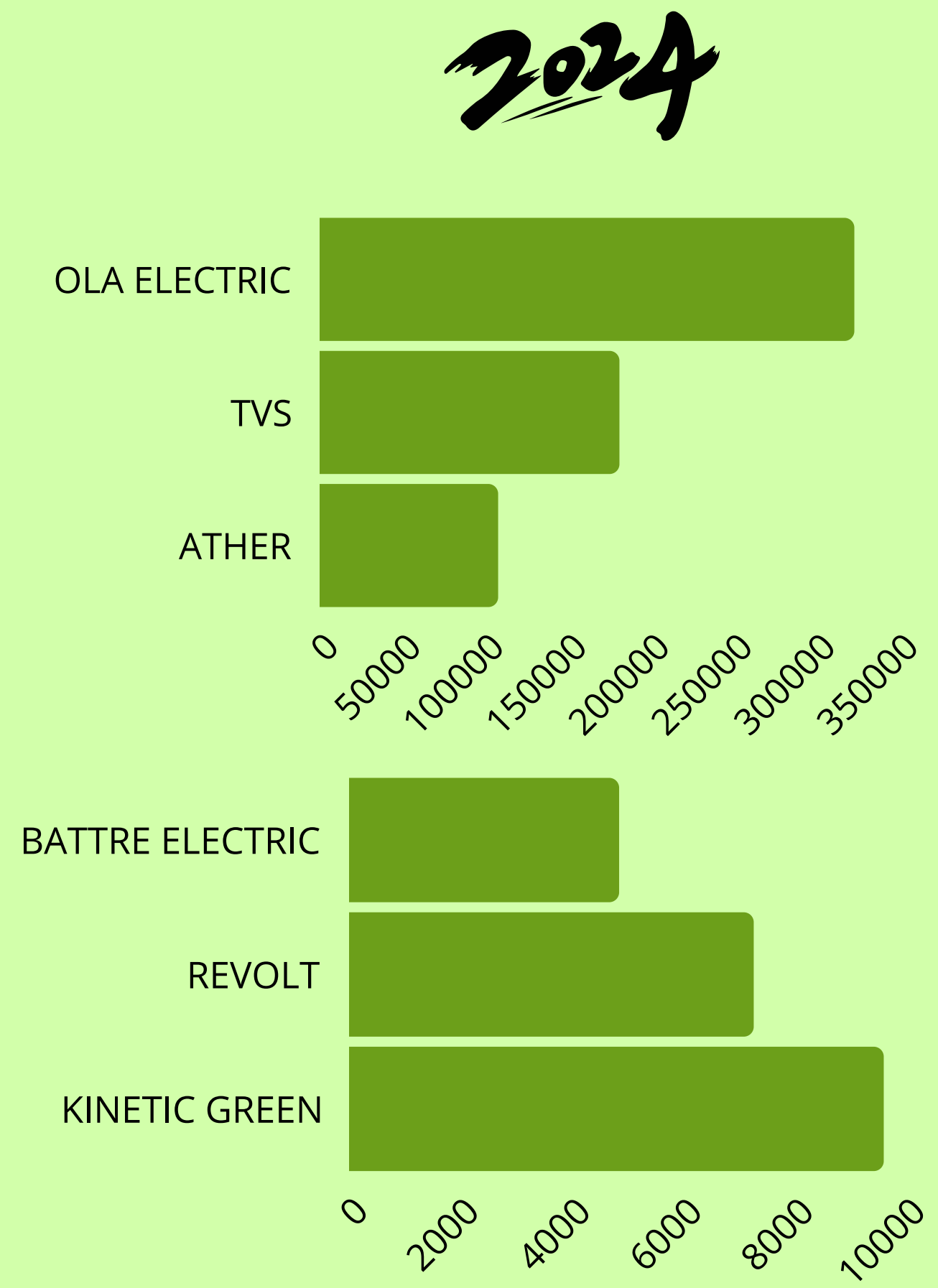
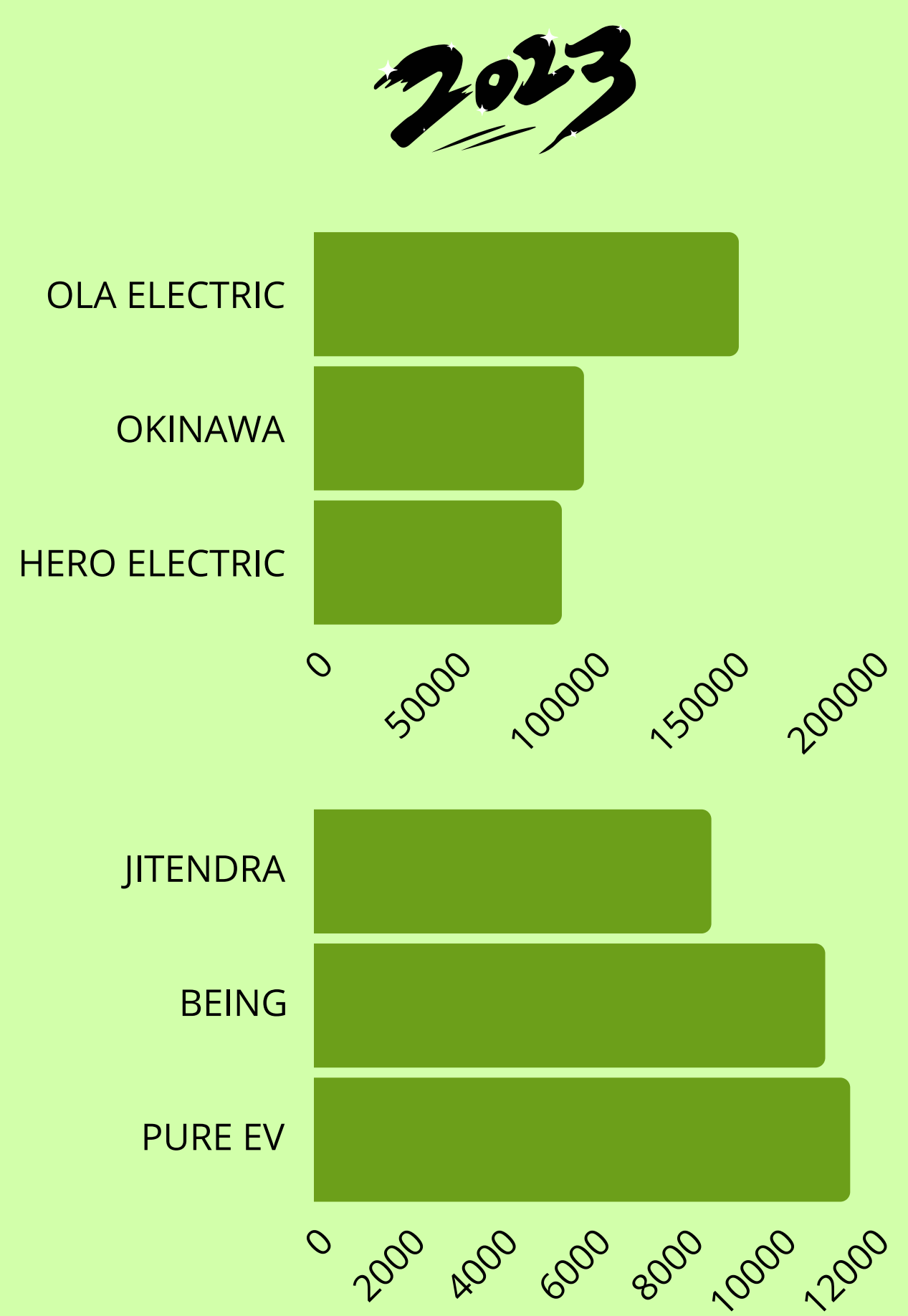
```
# Top 3 makers:
select
    maker,
    fiscal_year,
    no_of_ev_sold
from
    (select
        sbm.maker,
        dd.fiscal_year,
        sum(sbm.electric_vehicles_sold) no_of_ev_sold,
        rank()
        over(partition by dd.fiscal_year
            order by sum(sbm.electric_vehicles_sold) desc) as rnk
    from
        dim_date dd
    join
        sales_by_maker sbm
    on
        dd.`date` = sbm.`date`
    where
        sbm.vehicle_category = "2-Wheelers"
    group by
        sbm.maker, dd.fiscal_year
    having
        dd.fiscal_year in (2023,2024)
    ) as sbmr
where
    rnk in (1,2,3)
order by
    fiscal_year, no_of_ev_sold desc;
```

```
# Bottom 3 makers:
select
    maker,
    fiscal_year,
    no_of_ev_sold
from
    (select
        sbm.maker,
        dd.fiscal_year,
        sum(sbm.electric_vehicles_sold) no_of_ev_sold,
        rank()
        over(partition by dd.fiscal_year
            order by sum(sbm.electric_vehicles_sold) ) as rnk
    from
        dim_date dd
    join
        sales_by_maker sbm
    on
        dd.`date` = sbm.`date`
    where
        sbm.vehicle_category = "2-Wheelers"
    group by
        sbm.maker, dd.fiscal_year
    having
        dd.fiscal_year in (2023,2024)
    ) as sbmr
where
    rnk in (1,2,3)
order by
    fiscal_year, no_of_ev_sold;
```


Output: Top 3 and bottom 3 makers in terms of the number of 2-wheelers sold.

**↑
3
Top**

**Bottom
↓
3**



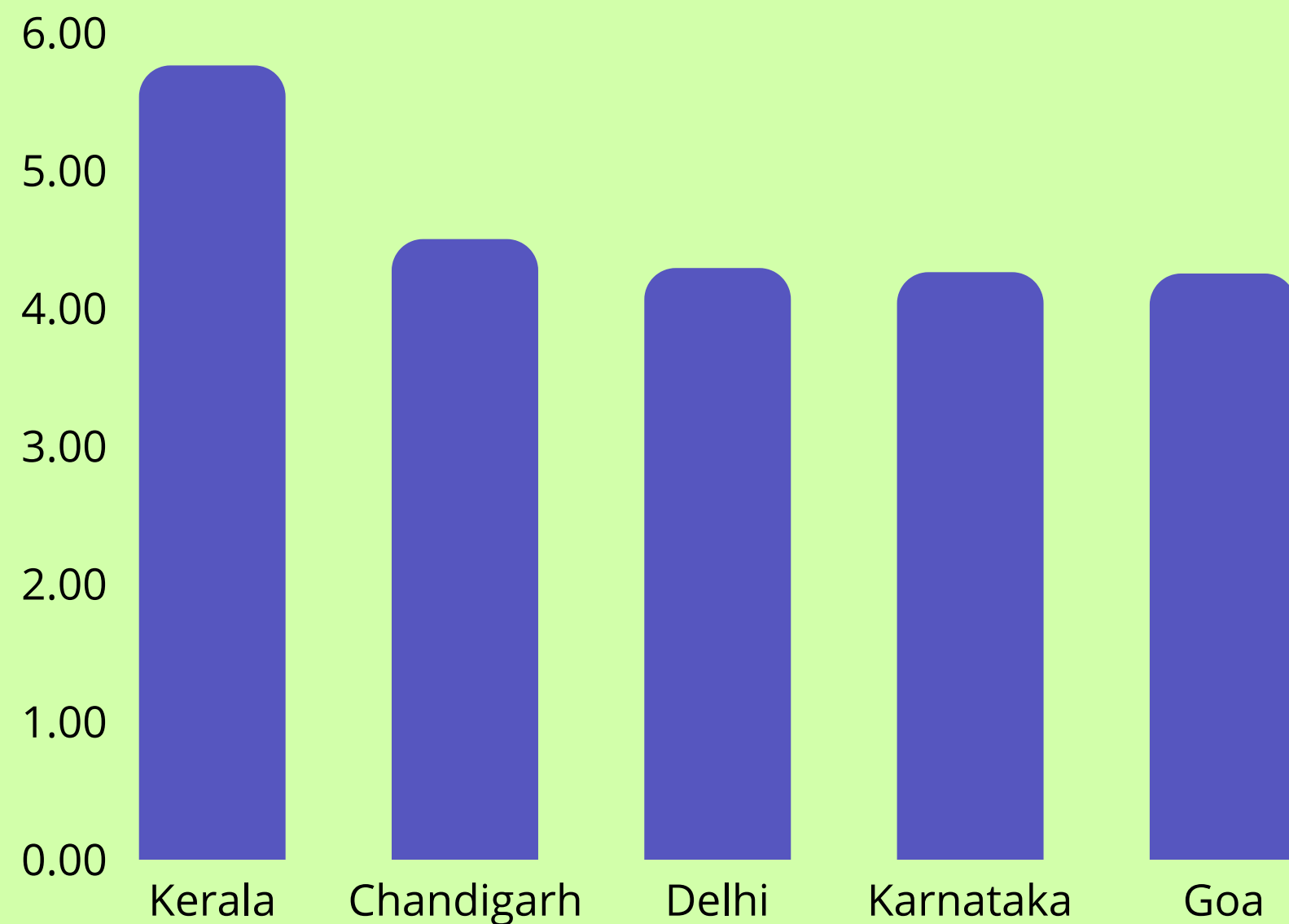
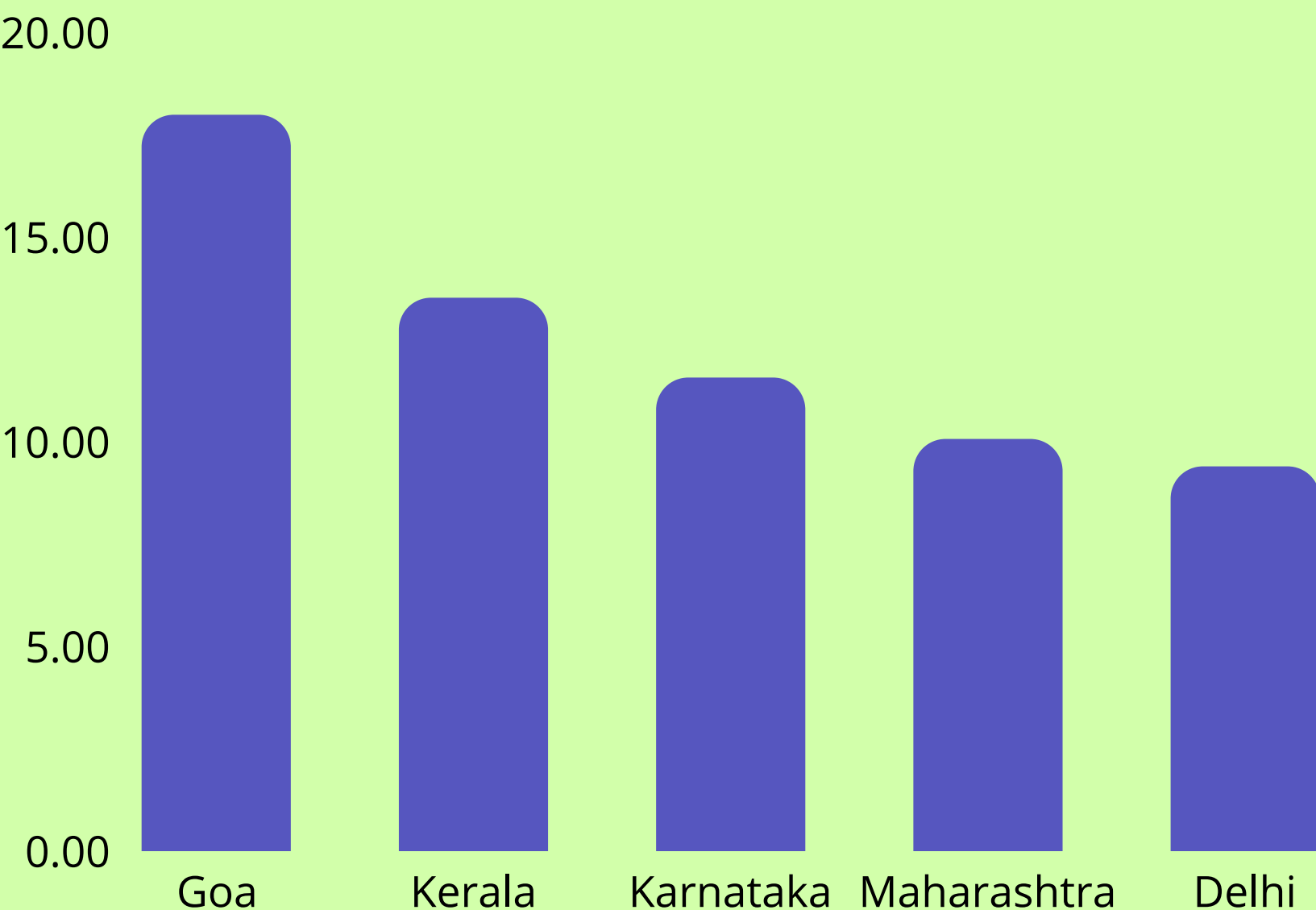
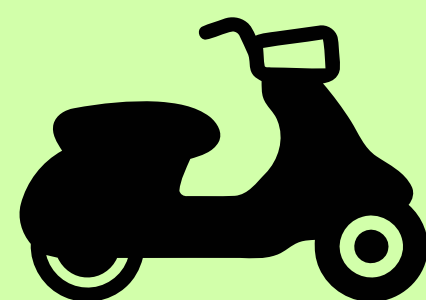
2. Identify the top 5 states with the highest penetration rate in 2-wheeler and 4-wheeler EV sales in FY 2024.

Queries

```
# 2 Wheelers sales:
select
    sbs.state,
    round(sum(sbs.electric_vehicles_sold)*100
        /sum(sbs.total_vehicles_sold),2) as penetration_rate
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
where
    sbs.vehicle_category = '2-Wheelers' and
    dd.fiscal_year = 2024
group by
    sbs.state
order by
    penetration_rate desc
limit 5;
```

```
# 4 Wheelers sales:
select
    sbs.state,
    round(sum(sbs.electric_vehicles_sold)*100
        /sum(sbs.total_vehicles_sold),2) as penetration_rate
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
where
    sbs.vehicle_category = '4-Wheelers' and
    dd.fiscal_year = 2024
group by
    sbs.state
order by
    penetration_rate desc
limit 5;
```


Output: Top 5 states with the highest penetration rate



3. List the states with negative penetration (decline) in EV sales from 2022 to 2024?

Query for 2-Wheelers:

```
select
    penet_1.state,
    penet_1.penetration_rate as penet_rate_2022,
    penet_2.penetration_rate as penet_rate_2023,
    penet_2.penetration_rate - penet_1.penetration_rate as difference_of_22_23
from
    (select
        sbs.state,
        round(sum(sbs.electric_vehicles_sold)*100
            /sum(sbs.total_vehicles_sold),2) as penetration_rate
    from
        sales_by_state sbs
    join
        dim_date dd
    on
        sbs.`date` = dd.`date`
    where
        dd.fiscal_year in (2022) and sbs.vehicle_category = "2-Wheelers"
    group by
        sbs.state
    ) as penet_1
join
```

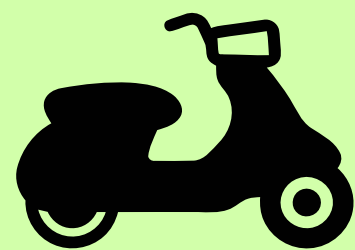
```
    (select
        sbs.state,
        round(sum(sbs.electric_vehicles_sold)*100
            /sum(sbs.total_vehicles_sold),2) as penetration_rate
    from
        sales_by_state sbs
    join
        dim_date dd
    on
        sbs.`date` = dd.`date`
    where
        dd.fiscal_year in (2024) and sbs.vehicle_category = "2-Wheelers"
    group by
        sbs.state
    ) as penet_2
on
    penet_1.state = penet_2.state
group by
    penet_1.state
having
    difference_of_22_23 < 0
order by
    penet_1.state;
```


Query for 4-Wheelers:

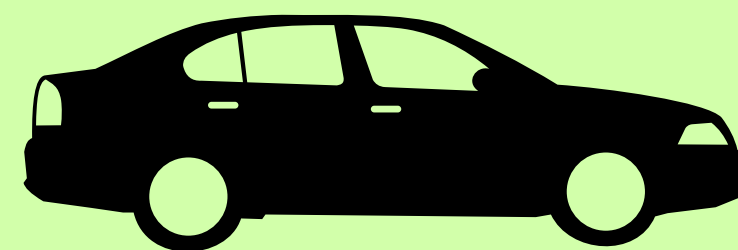
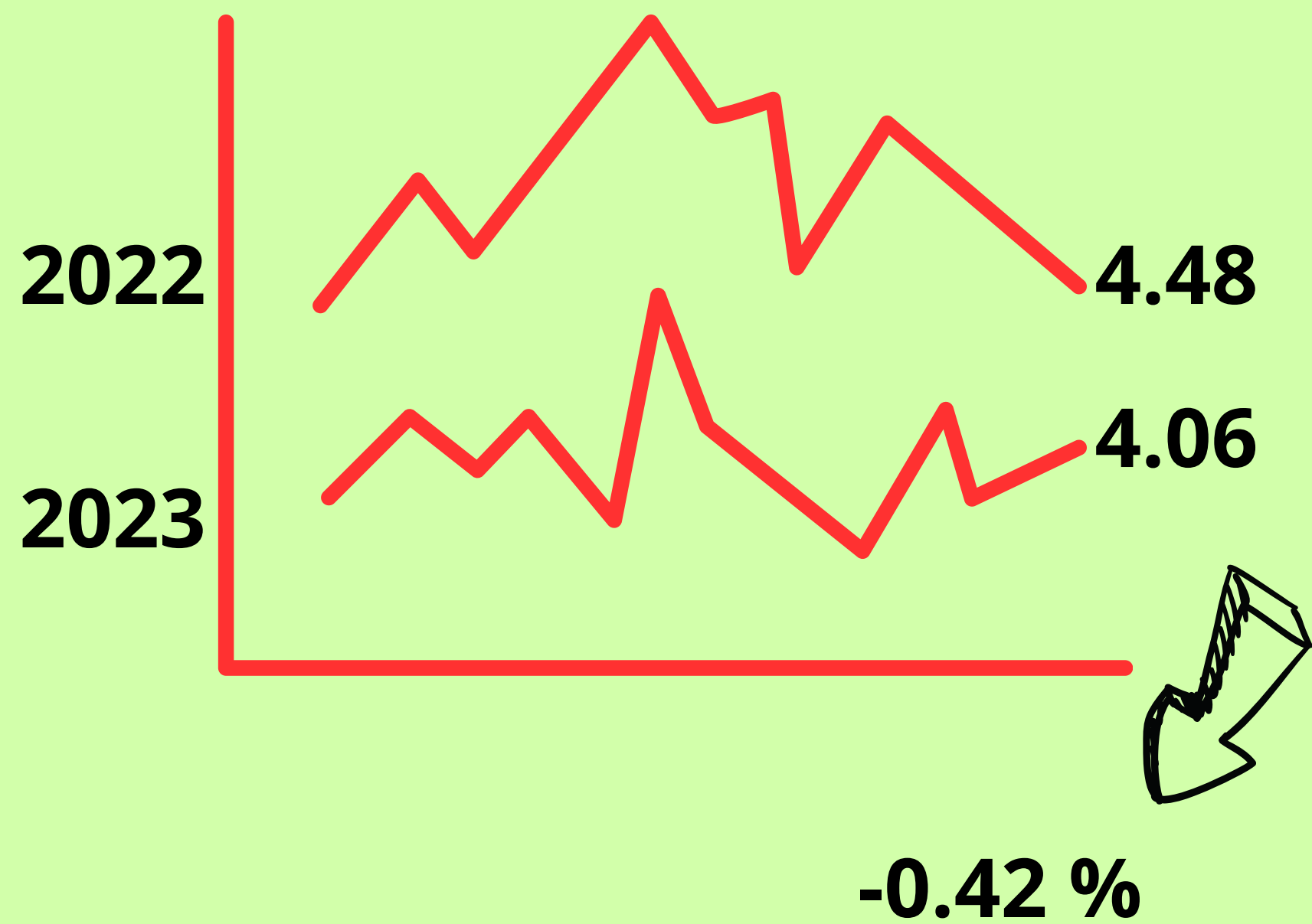
```
select
    penet_1.state,
    penet_1.penetration_rate as penet_rate_2022,
    penet_2.penetration_rate as penet_rate_2024,
    penet_2.penetration_rate - penet_1.penetration_rate as difference_of_22_24
from
    (select
        sbs.state as state,
        round(sum(sbs.electric_vehicles_sold)*100
            /sum(sbs.total_vehicles_sold),2) as penetration_rate
    from
        sales_by_state sbs
    join
        dim_date dd
    on
        sbs.`date` = dd.`date`
    where
        dd.fiscal_year in (2022) and sbs.vehicle_category = "4-Wheelers"
    group by
        sbs.state
    ) as penet_1
join
```

```
(select
    sbs.state as state,
    round(sum(sbs.electric_vehicles_sold)*100
        /sum(sbs.total_vehicles_sold),2) as penetration_rate
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
where
    dd.fiscal_year in (2024) and sbs.vehicle_category = "4-Wheelers"
group by
    sbs.state
) as penet_2
on
    penet_1.state = penet_2.state
group by
    penet_1.state
having
    difference_of_22_24 < 0
order by
    penet_1.state;
```

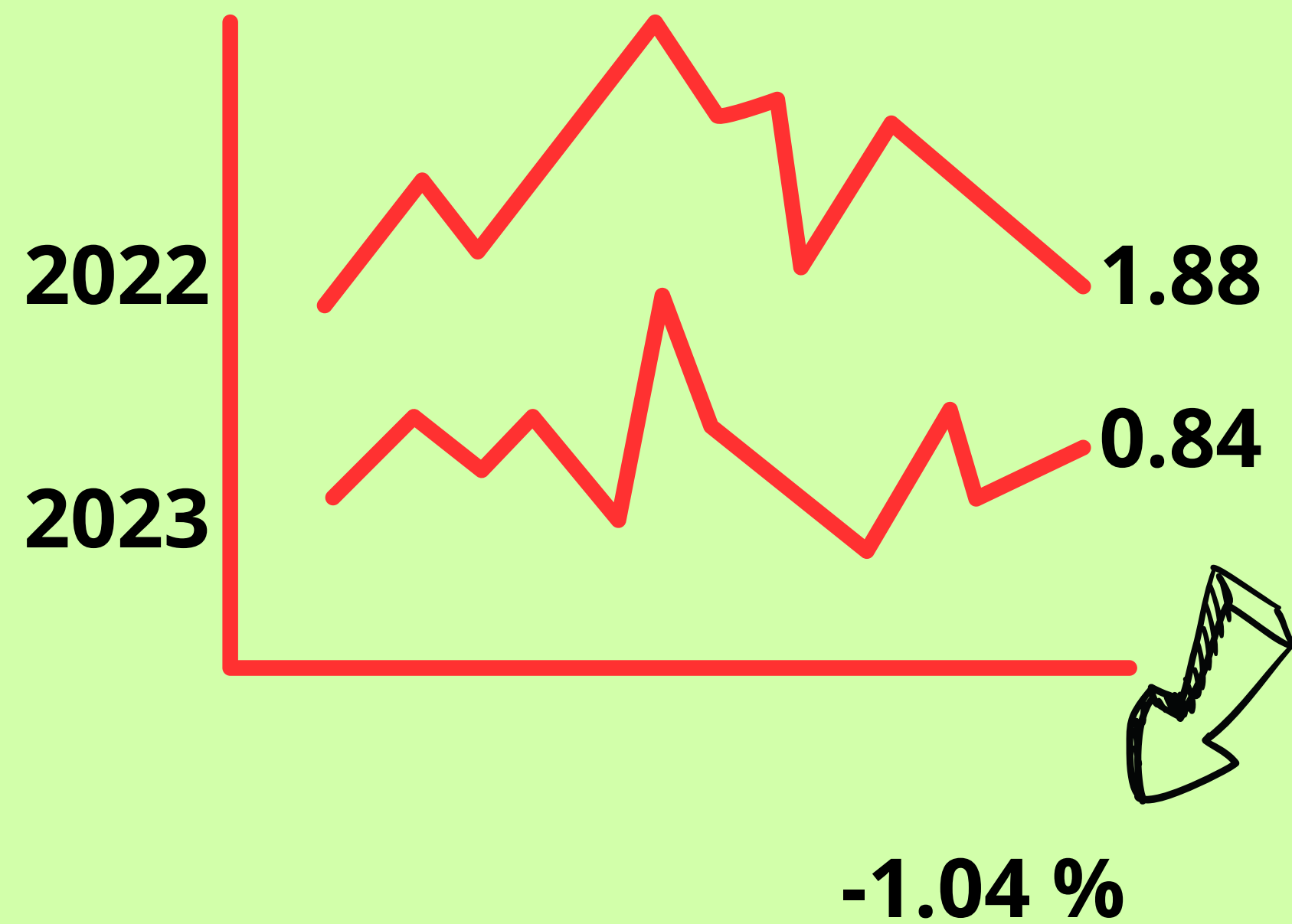
Output: States with negative penetration



Ladakh



Andaman & Nicobar Island



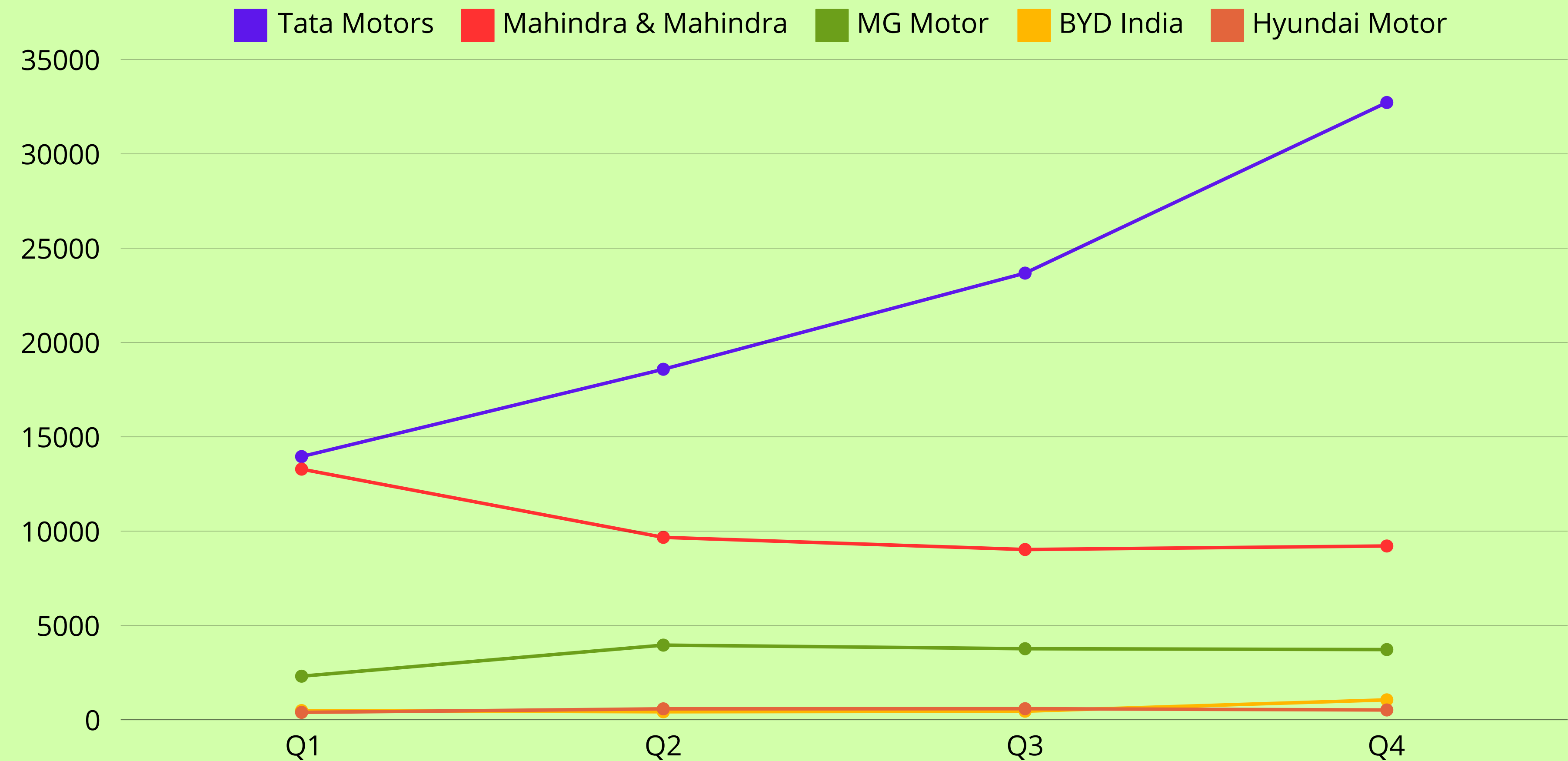
4. What are the quarterly trends based on sales volume for the top 5 EV makers (4-wheelers) from 2022 to 2024?

Query:

```
select
    top_5.makers,
    dd2.quarter,
    sum(sbm2.electric_vehicles_sold)
from
    (select
        sbm.maker as makers,
        sum(sbm.electric_vehicles_sold)
    from
        sales_by_maker sbm
    join
        dim_date dd
    on
        sbm.`date` = dd.`date`
    where
        sbm.vehicle_category = "4-Wheelers"
    group by
        sbm.maker
    order by
        sum(sbm.electric_vehicles_sold) desc
    limit 5
    ) as top_5
```

```
join
    sales_by_maker sbm2
on
    top_5.makers = sbm2.maker
join
    dim_date dd2
on
    sbm2.`date` = dd2.`date`
group by
    top_5.makers, dd2.quarter
order by
    top_5.makers;
```

Output: Quarterly trends based on sales volume for the top 5 EV makers (4-wheelers)

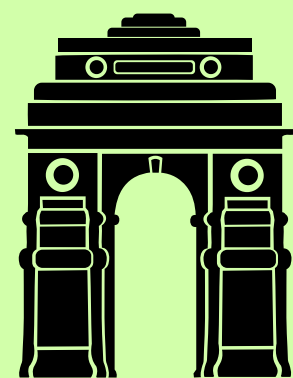


5. How do the EV sales and penetration rates in Delhi compare to Karnataka for 2024?

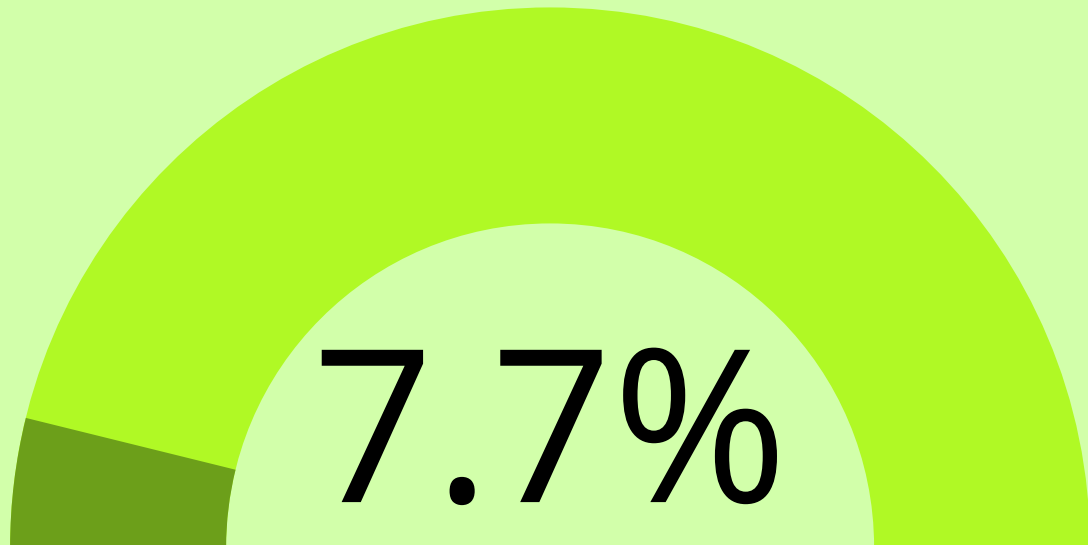
Query:

```
select
    sbs.state as state,
    sum(sbs.electric_vehicles_sold),
    round(sum(sbs.electric_vehicles_sold)*100
          /sum(sbs.total_vehicles_sold),2) as penetration_rate
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
where
    dd.fiscal_year in (2024) and sbs.state in ('Delhi','Karnataka')
group by
    sbs.state;
```

Output: Delhi vs Kranataka penetration rate



Delhi



Karnataka



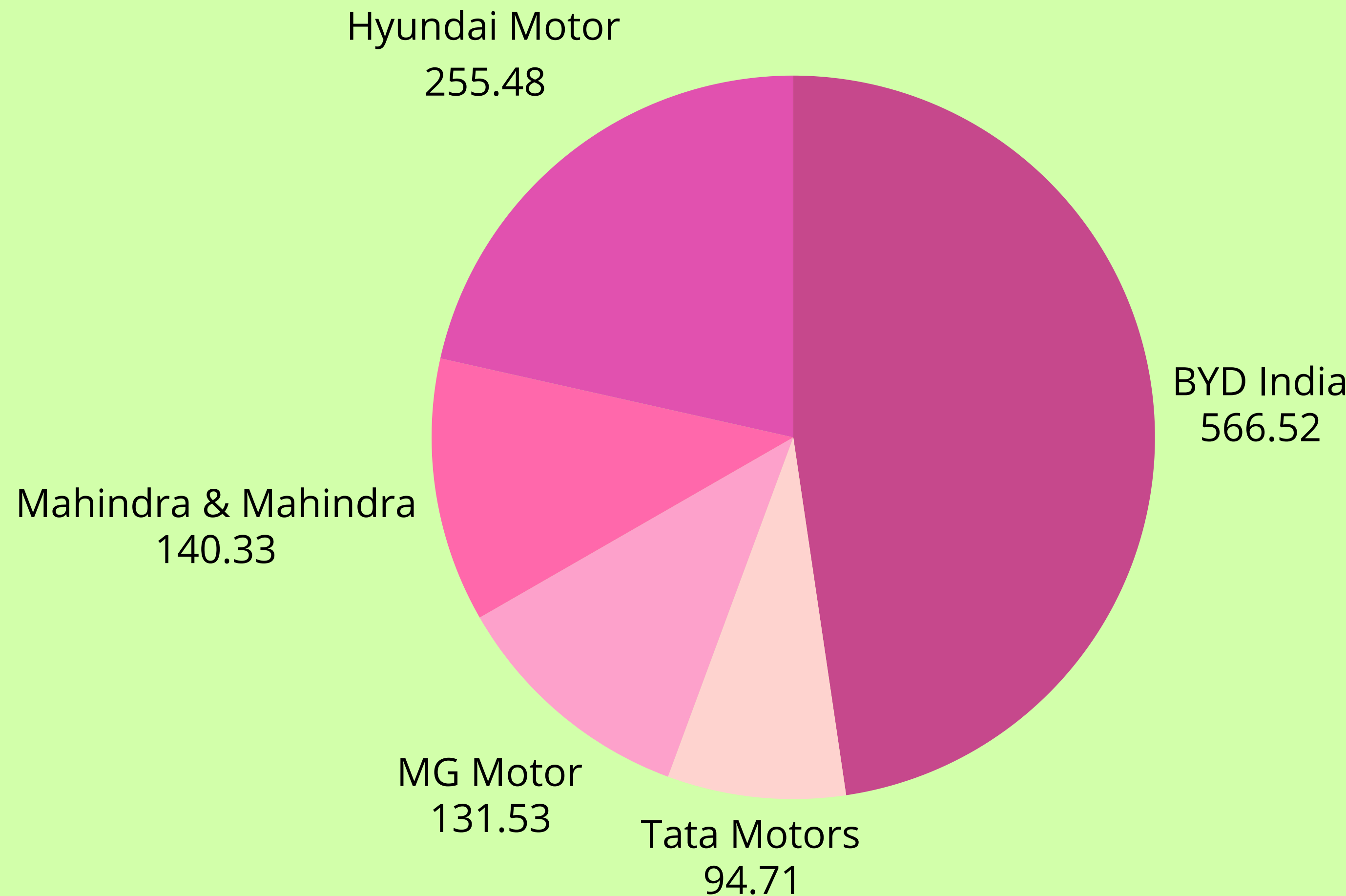
6. List down the compounded annual growth rate (CAGR) in 4-wheeler units for the top 5 makers from 2022 to 2024.

Query:

```
select
    ending_ev_sales maker,
    round((power(sum(ending_ev_sales.ev_sales_2024)
        /sum(beginning_ev_sales.ev_sales_2022),1/2)-1)*100,2) as cagr_per
from
    (select
        sbm maker,
        sum(sbm.electric_vehicles_sold) ev_sales_2024
    from
        sales_by_maker sbm
    join
        dim_date dd
    on
        sbm.`date` = dd.`date`
    where
        sbm maker in
        ('Tata Motors','Mahindra & Mahindra',
        'MG Motor','BYD India','Hyundai Motor')
        and
        dd.fiscal_year = 2024
    group by
        sbm maker
    ) as ending_ev_sales
join
```

```
(select
    sbm maker,
    sum(sbm.electric_vehicles_sold) ev_sales_2022
from
    sales_by_maker sbm
join
    dim_date dd
on
    sbm.`date` = dd.`date`
where
    sbm maker in
    ('Tata Motors','Mahindra & Mahindra',
    'MG Motor','BYD India','Hyundai Motor')
    and
    dd.fiscal_year = 2022
group by
    sbm maker
) as beginning_ev_sales
on
    ending_ev_sales maker = beginning_ev_sales maker
group by
    ending_ev_sales maker;
```


Output: CAGR in 4-wheeler units for the top 5 makers

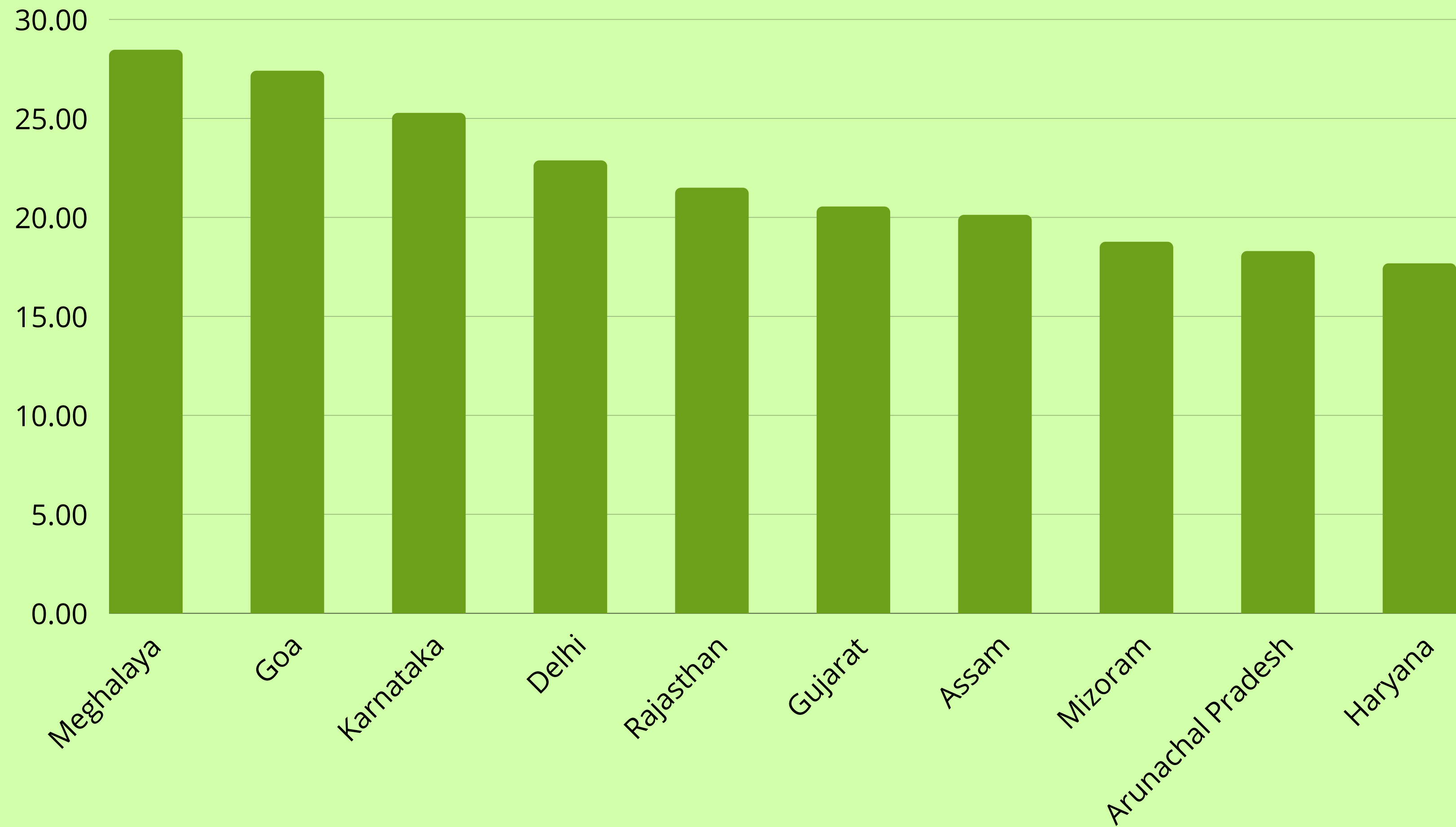


7. List down the top 10 states that had the highest compounded annual growth rate (CAGR) from 2022 to 2024 in total vehicles sold.

Query:

```
with beggining_sales as
(select
    sbs.state,
    sum(sbs.total_vehicles_sold) as vehicle_sold
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
where
    dd.fiscal_year = 2022
group by
    sbs.state
),
ending_sales as
(select
    sbs.state,
    sum(sbs.total_vehicles_sold) as vehicle_sold
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
where
    dd.fiscal_year = 2024
group by
    sbs.state
)
select
    bs.state,
    round((power(sum(es.vehicle_sold)
        /sum(bs.vehicle_sold),1/2)-1)*100,2) as cagr_per
from
    beggining_sales bs
join
    ending_sales es
on
    bs.state = es.state
group by
    bs.state
order by
    cagr_per desc
limit
    10;
```

Output: Top 10 states that had the highest CAGR from 2022 to 2024



8. What are the peak and low season months for EV sales based on the data from 2022 to 2024?

Queries:

```
# To extract monthname from date column I have to change its date type
# As date column in dim_date table can't be change as it is useful to join it with other tables
# So I will add one same column date_updated in dim_date table as date column we have and then I will change its datatype to date

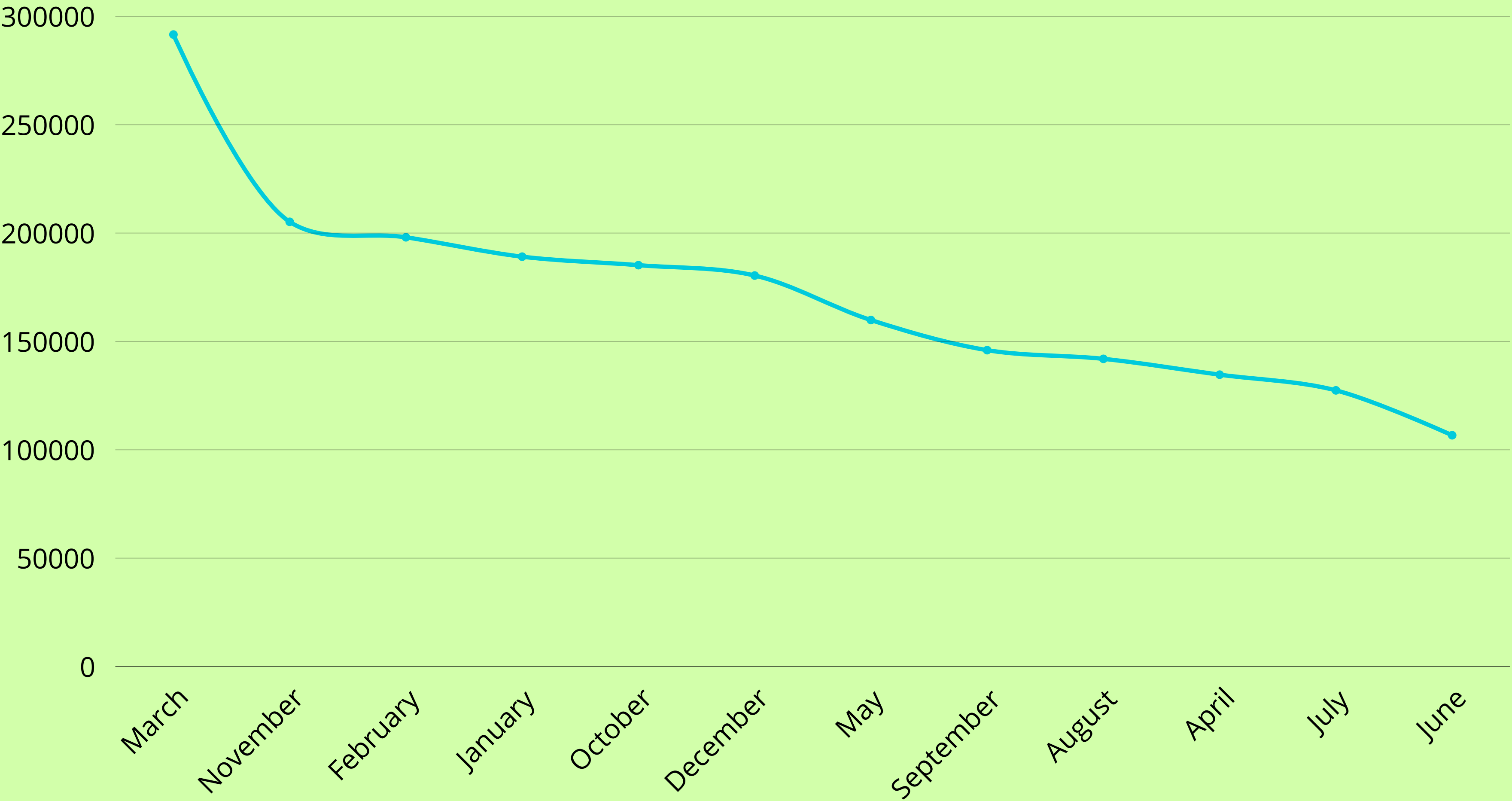
alter table dim_date
add date_updated varchar(20);

update dim_date
set date_updated = str_to_date(`date`, '%d-%b-%y')
```

```
# All over peak and low season months:
select
    monthname(dd.date_updated) as month_name,
    sum(sbs.electric_vehicles_sold) as ev_sold
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
group by
    month_name
order by
    ev_sold desc;
```

```
# Fiscal year wise peak and low season months:
select
    dd.fiscal_year as year_no,
    monthname(dd.date_updated) as month_name,
    sum(sbs.electric_vehicles_sold) as ev_sold
from
    sales_by_state sbs
join
    dim_date dd
on
    sbs.`date` = dd.`date`
group by
    year_no, month_name
order by
    year_no, ev_sold desc;
```


Output: The peak and low season months for EV sales



9. What is the projected number of EV sales (including 2-wheelers and 4- wheelers) for the top 10 states by penetration rate in 2030, based on the compounded annual growth rate (CAGR) from previous years?

Queries:

```
# to find projected number of ev sales in 2030 we can use cagr formula as follows:  
# Future value = previous value * (1+cagr/100)^n  
# where n denotes number of years
```

```
with top10_states_by_PR as  
(select  
    sbs.state as state,  
    round(sum(sbs.electric_vehicles_sold)/sum(sbs.total_vehicles_sold)*100,2) as pen_rate,  
    sum(case when dd.fiscal_year = 2022 then electric_vehicles_sold end) as ev_sales_2022,  
    sum(case when dd.fiscal_year = 2024 then electric_vehicles_sold end) as ev_sales_2024  
from  
    sales_by_state sbs  
join  
    dim_date dd  
on  
    sbs.`date` = dd.`date`  
group by  
    state  
order by  
    pen_rate desc  
limit  
    10  
,
```

```
growth_rate as  
(select  
    state,  
    ev_sales_2022,  
    ev_sales_2024,  
    case  
        when ev_sales_2022 > 0 then  
            round((power(ev_sales_2024/ev_sales_2022,0.5)-1)*100,2)  
        end as cagr  
from  
    top10_states_by_PR  
)  
select  
    state,  
    round(ev_sales_2024*power((1+cagr/100),(2030-2024)),0) as ev_sales_2030  
from  
    growth_rate  
order by  
    ev_sales_2030 desc;
```

Output: Projected number of EV sales for the top 10 states by penetration rate in 2030

Top 10 States	Projected EV Sales
Maharashtra	13351421
Kerala	11778808
Gujarat	8646332.0
Karnataka	8382593.0
Odisha	2732641.0
Goa	2419672.0
Rajasthan	2404486.0
Tamil Nadu	1579362.0
Delhi	1054257.0

10. Estimate the revenue growth rate of 4-wheeler and 2-wheelers EVs in India for 2022 vs 2024 and 2023 vs 2024, assuming an average unit price.

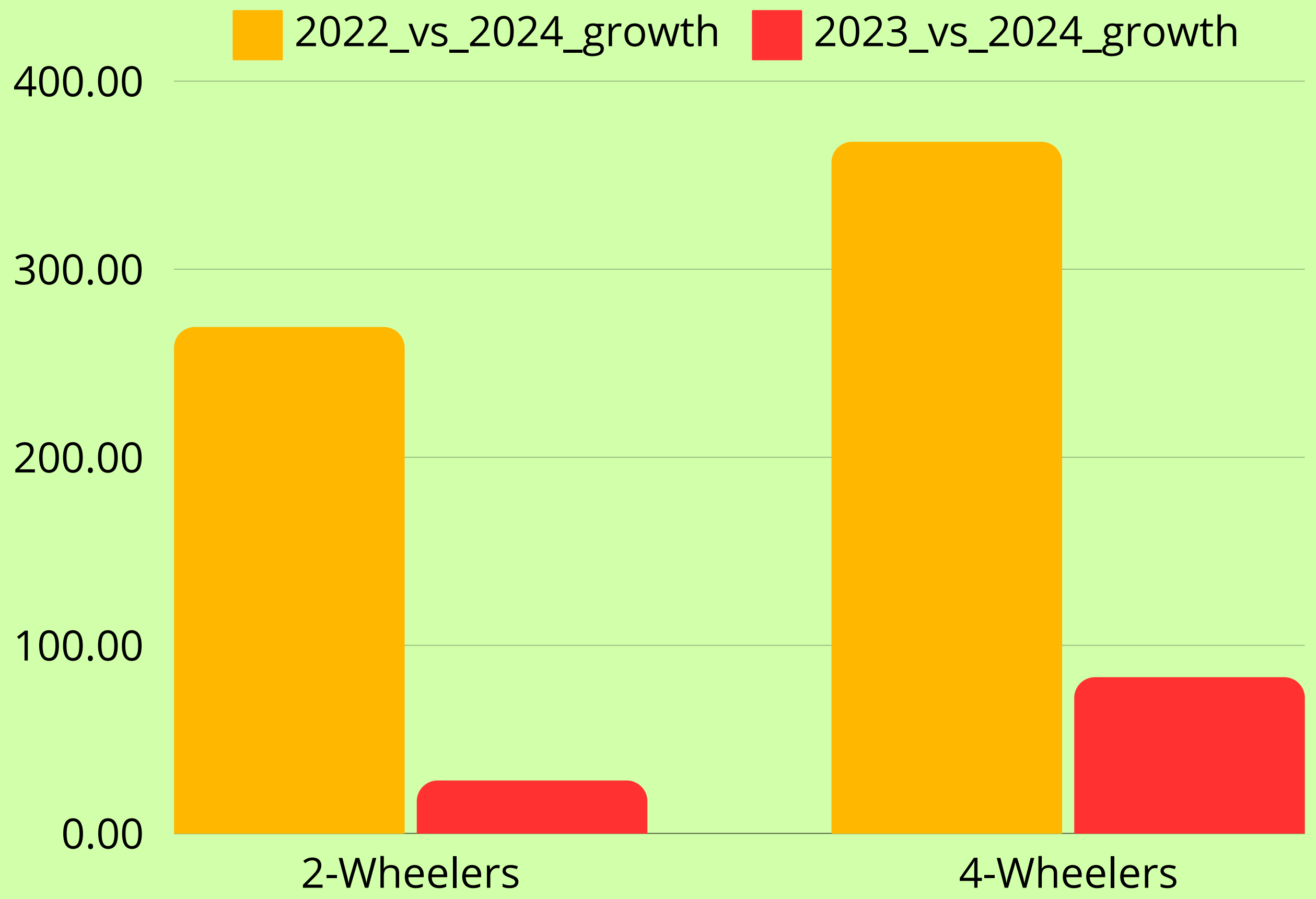
Vehicle_category	Average Price
2-Wheelers	₹ 85,000.00
4-Wheelers	₹ 15,00,000.00

Queries:

```
with revenue as
(select
    sbm.vehicle_category,
    dd.fiscal_year,
    sum(sbm.electric_vehicles_sold*sbm.unit_price) as revenue
from
    sales_by_maker sbm
join
    dim_date dd
on
    sbm.`date` = dd.`date`
group by
    sbm.vehicle_category, dd.fiscal_year
),
```

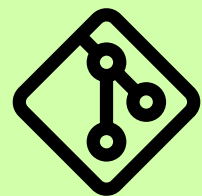
```
growth as
(select
    r1.vehicle_category,
    round((r2.revenue-r1.revenue)/r1.revenue*100,2) as 2022_vs_2024_growth,
    round((r2.revenue-r3.revenue)/r3.revenue*100,2) as 2023_vs_2024_growth
from
    revenue r1
join revenue r2
on r1.vehicle_category = r2.vehicle_category and r2.fiscal_year = 2024
join revenue r3
on r1.vehicle_category = r3.vehicle_category and r3.fiscal_year = 2023
where
    r1.fiscal_year = 2022
)
select
    vehicle_category,
    2022_vs_2024_growth,
    2023_vs_2024_growth
from
    growth
order by
    1;
```


Output: The revenue growth rate of 4-wheeler and 2-wheelers EVs in India



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Thank you!



github.com/darshan208



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