Database Schema and Table Design

Database Creation

```
CREATE DATABASE electricity_analysis;

USE electricity_analysis;
```

Table Creation

```
CREATE TABLE electricity_consumption (
id INT AUTO_INCREMENT PRIMARY KEY,
state VARCHAR(100),
region VARCHAR(100),
latitude FLOAT,
longitude FLOAT,
date DATE,
usage FLOAT
);
```

Indexes for Performance Optimization

```
CREATE INDEX idx_state ON electricity_consumption(state);
CREATE INDEX idx_region ON electricity_consumption(region);
CREATE INDEX idx_date ON electricity_consumption(date);
```

Data Analysis Queries

Total Electricity Consumption (Overall)

```
SELECT SUM(usage) AS total_consumption
FROM electricity_consumption;
```

Year-wise Total Consumption (2019 vs 2020)

```
SELECT YEAR(date) AS year,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY YEAR(date)
ORDER BY year;
```

Month-wise Consumption for Each Year

```
SELECT YEAR(date) AS year,
MONTH(date) AS month,
SUM(usage) AS monthly_usage
FROM electricity_consumption
GROUP BY YEAR(date), MONTH(date)
ORDER BY year, month;
```

Quarter-wise Consumption

```
SELECT YEAR(date) AS year,
QUARTER(date) AS quarter,
```

```
SUM(usage) AS quarterly_usage
FROM electricity_consumption
GROUP BY YEAR(date), QUARTER(date)
ORDER BY year, quarter;
```

Region-wise Total Consumption

```
SELECT region,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY region
ORDER BY total_usage DESC;
```

State-wise Total Consumption

```
SELECT state,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY state
ORDER BY total_usage DESC;
```

Top 5 Highest Consuming States

```
SELECT state,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY state
ORDER BY total_usage DESC
LIMIT 5;
```

Bottom 5 Lowest Consuming States

```
SELECT state,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY state
ORDER BY total_usage ASC
LIMIT 5;
```

Region-wise Consumption by Year

```
SELECT region,
YEAR(date) AS year,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY region, YEAR(date)
ORDER BY region, year;
```

Pre-Lockdown vs Post-Lockdown Analysis (Lockdown: 25 March 2020)

```
SELECT
CASE
```

```
WHEN date < '2020-03-25' THEN 'Pre-Lockdown'
ELSE 'Post-Lockdown'
END AS lockdown_period,
SUM(usage) AS total_usage
FROM electricity_consumption
GROUP BY lockdown_period;
```

Monthly Consumption Before and After Lockdown

```
SELECT
CASE
WHEN date < '2020-03-25' THEN 'Pre-Lockdown'
ELSE 'Post-Lockdown'
END AS lockdown_period,
YEAR(date) AS year,
MONTH(date) AS month,
SUM(usage) AS monthly_usage
FROM electricity_consumption
GROUP BY lockdown_period, YEAR(date), MONTH(date)
ORDER BY year, month;
```

Average Daily Consumption Per State

```
SELECT state,
AVG(usage) AS avg_daily_usage
FROM electricity_consumption
GROUP BY state
ORDER BY avg_daily_usage DESC;
```

Peak Consumption Day

```
SELECT date,
SUM(usage) AS total_daily_usage
FROM electricity_consumption
GROUP BY date
ORDER BY total_daily_usage DESC
LIMIT 1;
```

Lowest Consumption Day

```
SELECT date,
SUM(usage) AS total_daily_usage
FROM electricity_consumption
GROUP BY date
ORDER BY total_daily_usage ASC
LIMIT 1;
```

Yearly Growth Rate (2019 vs 2020)

```
SELECT
(SUM(CASE WHEN YEAR(date)=2020 THEN usage ELSE 0 END) -
```

```
SUM(CASE WHEN YEAR(date)=2019 THEN usage ELSE 0 END))
/
SUM(CASE WHEN YEAR(date)=2019 THEN usage ELSE 0 END)
* 100 AS growth_percentage
FROM electricity_consumption;
```

Region-wise Monthly Trend

```
SELECT region,
YEAR(date) AS year,
MONTH(date) AS month,
SUM(usage) AS monthly_usage
FROM electricity_consumption
GROUP BY region, YEAR(date), MONTH(date)
ORDER BY region, year, month;
```

Quarter-wise State Analysis

```
SELECT state,
YEAR(date) AS year,
QUARTER(date) AS quarter,
SUM(usage) AS quarterly_usage
FROM electricity_consumption
GROUP BY state, YEAR(date), QUARTER(date)
ORDER BY state, year, quarter;
```