

--1. Average Energy Consumption by Region

```
--SELECT
    r.RegionName,
    COUNT(cs.SessionID) AS SessionCount,
    AVG(cs.EnergyConsumed) AS AvgEnergyConsumed,
    SUM(cs.EnergyConsumed) AS TotalEnergyConsumed
FROM Charging_Sessions cs
JOIN Charging_Stations st ON cs.StationID = st.StationID
JOIN Regions r ON st.RegionID = r.RegionID
GROUP BY r.RegionName;
```

161 %

Results Messages

	RegMonth	RegistrationsCount	CumulativeRegistrations
1	2024-04-01	1	1
2	2024-05-01	31	32
3	2024-06-01	30	62
4	2024-07-01	31	93
5	2024-08-01	31	124
6	2024-09-01	30	154
7	2024-10-01	31	185
8	2024-11-01	30	215
9	2024-12-01	31	246
10	2025-01-01	31	277
11	2025-02-01	23	300

```
-- 2. Monthly EV Registration Trends with Cumulative Totals
```

```
WITH MonthlyRegistrations AS (  
    SELECT  
        DATEFROMPARTS(YEAR(RegistrationDate), MONTH(RegistrationDate), 1) AS RegMonth,  
        COUNT(*) AS RegistrationsCount  
    FROM EV_Registrations  
    GROUP BY DATEFROMPARTS(YEAR(RegistrationDate), MONTH(RegistrationDate), 1)  
)  
SELECT  
    RegMonth,  
    RegistrationsCount,  
    SUM(RegistrationsCount) OVER (ORDER BY RegMonth) AS CumulativeRegistrations  
FROM MonthlyRegistrations  
ORDER BY RegMonth;
```

161 %

Results Messages

	RegMonth	RegistrationsCount	CumulativeRegistrations
1	2024-04-01	1	1
2	2024-05-01	31	32
3	2024-06-01	30	62
4	2024-07-01	31	93
5	2024-08-01	31	124
6	2024-09-01	30	154
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11	2025-02-01	23	300

```
-- 3. Ranking Vehicles by Number of Charging Sessions
```

```
SELECT
    v.VehicleID,
    v.Manufacturer,
    v.Model,
    COUNT(cs.SessionID) AS SessionCount,
    RANK() OVER (ORDER BY COUNT(cs.SessionID) DESC) AS RankBySessions
FROM Vehicles v
LEFT JOIN Charging_Sessions cs ON v.VehicleID = cs.VehicleID
GROUP BY v.VehicleID, v.Manufacturer, v.Model
ORDER BY RankBySessions;
```

161 %

Results Messages

	VehicleID	Manufacturer	Model	SessionCount	RankBySessions
1	1	Tesla	Model S	3	1
2	2	Nissan	Leaf	3	1
3	3	Chevrolet	Bolt EV	3	1
4	4	Ford	Mustang Mach-E	3	1
5	5	BMW	i3	3	1
6	6	Audi	e-tron	3	1
7	7	Tesla	Model X	3	1
8	8	Nissan	Leaf	3	1
9	9	Chevrolet	Bolt EV	3	1
10	10	Ford	Mustang Mach-E	3	1
11	11	BMW	i3	3	1
12	12	Audi	e-tron	3	1
13	13	Tesla	Model S	3	1
14	14	Nissan	Leaf	3	1
15	15	Chevrolet	Bolt EV	3	1
16	16	Ford	Mustang Mach-E	3	1
17	17	BMW	i3	3	1
18	18	Audi	e-tron	3	1
19	19	Tesla	Model X	3	1
20	20	Nissan	Leaf	3	1
21	21	Chevrolet	Bolt EV	3	1
22	22	Ford	Mustang Mach-E	3	1
23	23	BMW	i3	3	1
24	24	Audi	e-tron	3	1

-- 4. Analyzing Charging Session Duration by Station

```
-- SELECT
    st.StationName,
    cs.SessionID,
    DATEDIFF(minute, cs.SessionStart, cs.SessionEnd) AS SessionDuration,
    AVG(DATEDIFF(minute, cs.SessionStart, cs.SessionEnd)) OVER (PARTITION BY st.StationID) AS Avg
FROM Charging_Sessions cs
JOIN Charging_Stations st ON cs.SessionID = st.SessionID
ORDER BY st.StationName, cs.SessionID;
```

161 %

Results Messages

	StationName	SessionID	SessionDuration	AvgSessionDurationByStation
1	Station 1	1	30	55
2	Station 1	101	40	55
3	Station 1	201	50	55
4	Station 1	301	60	55
5	Station 1	401	70	55
6	Station 1	501	80	55
7	Station 10	10	39	64
8	Station 10	110	49	64
9	Station 10	210	59	64
10	Station 10	310	69	64
11	Station 10	410	79	64
12	Station 10	510	89	64
13	Station 100	100	39	64
14	Station 100	200	49	64
15	Station 100	300	59	64
16	Station 100	400	69	64
17	Station 100	500	79	64
18	Station 100	600	89	64
19	Station 11	11	40	65
20	Station 11	111	50	65
21	Station 11	211	60	65
22	Station 11	311	70	65
23	Station 11	411	80	65
24	Station 11	511	90	65

-- 5. Regional Utilization: EV Registrations vs. Charging Sessions

```
SELECT
    r.RegionName,
    COUNT(DISTINCT er.VehicleID) AS RegisteredVehicles,
    COUNT(DISTINCT cs.SessionID) AS TotalChargingSessions,
    CASE
        WHEN COUNT(DISTINCT cs.SessionID) = 0 THEN NULL
        ELSE CAST(COUNT(DISTINCT er.VehicleID) AS DECIMAL(10,2)) / COUNT(DISTINCT cs.SessionID)
    END AS RegistrationToSessionRatio
FROM Regions r
LEFT JOIN EV_Registrations er ON r.RegionID = er.RegionID
LEFT JOIN Charging_Stations st ON r.RegionID = st.RegionID
LEFT JOIN Charging_Sessions cs ON st.StationID = cs.StationID
GROUP BY r.RegionName;
```

161 %

Results Messages

	RegionName	RegisteredVehicles	TotalChargingSessions	RegistrationToSessionRatio
1	California	20	60	0.333333333333
2	Great Lakes	20	60	0.333333333333
3	Mid-Atlantic	20	60	0.333333333333
4	Mid-Florida	20	60	0.333333333333
5	New England	20	60	0.333333333333
6	Pacific Northwest	20	60	0.333333333333
7	Plains	20	60	0.333333333333
8	Rocky Mountains	20	60	0.333333333333
9	Southeast	20	60	0.333333333333
10	Southwest	20	60	0.333333333333