



Electric Vehicle Data Analysis in SQL

- JAYNIL PATEL



Table Name : electric_vehicles

Total number of rows : 1,86,879

This dataset contains detailed information about electric vehicles registered in a certain region.

Each record represents an individual electric vehicle and includes various attributes such as location, vehicle specifications, and utility details.

The dataset can be used to analyze trends in electric vehicle adoption, geographic distribution, and the characteristics of different electric vehicle models.

Columns Description:

- ▶ VIN (Vehicle Identification Number): A unique identifier for each vehicle, typically composed of 17 characters, but this dataset seems to be using the first 10 characters.
- ▶ County: The county in which the vehicle is registered.
- ▶ City: The city in which the vehicle is registered.
- ▶ State: The state in which the vehicle is registered.
- ▶ Postal Code: The postal code for the vehicle's registration address.
- ▶ Model Year: The year the vehicle model was manufactured.
- ▶ Make: The manufacturer or brand of the vehicle (e.g., Tesla, Nissan).
- ▶ Model: The specific model name or number of the vehicle.
- ▶ Electric Vehicle Type: The type of electric vehicle (e.g., Battery Electric Vehicle (BEV), Plug-in Hybrid Electric Vehicle (PHEV)).
- ▶ Clean Alternative Fuel Vehicle (CAFV) Eligibility: Indicates whether the vehicle is eligible for clean alternative fuel vehicle incentives.



Columns Description:

- ▶ Electric Range: The maximum distance the vehicle can travel on a single charge.
- ▶ Base MSRP: The manufacturer's suggested retail price for the base model of the vehicle.
- ▶ Legislative District: The legislative district where the vehicle is registered.
- ▶ DOL Vehicle ID: A unique identifier assigned by the Department of Licensing.
- ▶ Vehicle Location: General location information for the vehicle.
- ▶ Electric Utility: The utility company providing electric service to the vehicle's location.
- ▶ 2020 Census Tract: The census tract for the vehicle's location based on the 2020 census.



Query to list all electric vehicles with their VIN (1-10), Make, and Model.

```
select vin, Make, Model from electric_vehicles;
```



Result Grid | Filter Rows: | Export:

	vin	Make	Model
▶	WBY8P6C58K	BMW	I3
	5YJSA1DN4D	TESLA	MODEL S
	5YJSA1E26J	TESLA	MODEL S
	WBY2Z2C54E	BMW	I8
	5YJXCDE23J	TESLA	MODEL X
	WBY33AW0XP	BMW	I4
	5YJ3E1EB5L	TESLA	MODEL 3
	1V2GNPE86P	VOLKSWAGEN	ID.4
	WVWPP7AU0G	VOLKSWAGEN	E-GOLF
	3C3CFFGE8D	FIAT	500
	5YJ3E1EB0M	TESLA	MODEL 3
	1N4BZ1CP3K	NISSAN	LEAF
	KL8CK6S00G	CHEVROLET	SPARK
	1N4AZ0CP4E	NISSAN	LEAF
	5YJSA1E29J	TESLA	MODEL S
	KNDCC3LGXK	KIA	NIRO
	5YJ3E1EBXJ	TESLA	MODEL 3
	3C3CFFGE4F	FIAT	500
	5YJXCBE25H	TESLA	MODEL X
	5YJ3E1EBXJ	TESLA	MODEL 3
	3C3CFFGE4F	FIAT	500
	5YJXCBE25H	TESLA	MODEL X

electric_vehicles 4 x

Output

Query to display all columns for electric vehicles with a Model Year of 2020 or later.

```
select * from electric_vehicles where model_year >= 2020;
```



Result Grid													
Filter Rows: Export: Wrap Cell Content: Fetch rows:													
vin	county	city	state	postal_code	model_year	make	model	electric_vehicle_type	cafv_eligibility	electric_range	base_msrp	legisla	
WB33AW0XP	King	Seattle	WA	98109	2023	BMW	I4	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	36	
5YJ3E1EB5L	King	Bothell	WA	98011	2020	TESLA	MODEL 3	Battery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	322	0.00	1	
1V2GNPE86P	King	Sammamish	WA	98075	2023	VOLKSWAGEN	ID.4	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	41	
5YJ3E1EB0M	Yakima	Yakima	WA	98908	2021	TESLA	MODEL 3	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	14	
SADHD2S10L	King	Bellevue	WA	98004	2020	JAGUAR	I-PACE	Battery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	234	0.00	41	
5YJYGAE8M	Snohomish	Snohomish	WA	98296	2021	TESLA	MODEL Y	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	1	
5YJ3E1EB6L	King	Redmond	WA	98052	2020	TESLA	MODEL 3	Battery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	322	0.00	45	
WBA7W4C07L	Snohomish	Lynnwood	WA	98087	2020	BMW	745E	Plug-in Hybrid Electric Vehicle (PHEV)	Not eligible due to low battery range	16	0.00	21	
1C4JJXR69P	Island	Coupeville	WA	98239	2023	JEEP	WRANGLER	Plug-in Hybrid Electric Vehicle (PHEV)	Not eligible due to low battery range	21	0.00	10	
YV4H60DE9P	King	Burien	WA	98168	2023	VOLVO	XC60	Plug-in Hybrid Electric Vehicle (PHEV)	Clean Alternative Fuel Vehicle Eligible	35	0.00	34	
JTJKCFZ4R	King	Renton	WA	98056	2024	LEXUS	NX	Plug-in Hybrid Electric Vehicle (PHEV)	Clean Alternative Fuel Vehicle Eligible	37	0.00	41	
WA1E2AFY5N	King	Issaquah	WA	98027	2022	AUDI	Q5	Plug-in Hybrid Electric Vehicle (PHEV)	Not eligible due to low battery range	22	0.00	5	
KM8JFDA28P	Yakima	Yakima	WA	98901	2023	HYUNDAI	TUCSON	Plug-in Hybrid Electric Vehicle (PHEV)	Clean Alternative Fuel Vehicle Eligible	33	0.00	15	
5UXTA6C07M	King	Seattle	WA	98116	2021	BMW	X5	Plug-in Hybrid Electric Vehicle (PHEV)	Clean Alternative Fuel Vehicle Eligible	30	0.00	34	
5YJYGDEE3M	Snohomish	Everett	WA	98208	2021	TESLA	MODEL Y	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	44	
KM8KRDDF0R	Kitsap	Bremerton	WA	98312	2024	HYUNDAI	IONIQ 5	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	35	
5YJ3E1EA6L	King	Bellevue	WA	98004	2020	TESLA	MODEL 3	Battery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	266	0.00	41	
7SAXCBE61P	Kitsap	Silverdale	WA	98383	2023	TESLA	MODEL X	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	23	
1V2GNPE86P	King	Sammamish	WA	98075	2023	VOLKSWAGEN	ID.4	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not bee...	0	0.00	41	

electric_vehicles 5 x

Output

Result Grid
Form Editor
Field Types
Query Stats
Execution Plan
Read Only

Query to list electric vehicles manufactured by Tesla.

```
select VIN from electric_vehicles where make= "TESLA";
```

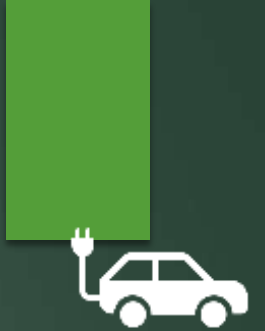


Result Grid		Filter Rows:	Export:	Wrap Cell Content:	Fetch rows:
	VIN				
▶	5YJSA1DN4D				
	5YJSA1E26J				
	5YJXCDE23J				
	5YJ3E1EB5L				
	5YJ3E1EB0M				
	5YJSA1E29J				
	5YJ3E1EBXJ				
	5YJXCBE25H				
	5YJ3E1EB9K				
	5YJYGAE8M				
	5YJSA1V24F				
	5YJ3E1EB6L				
	5YJYGDEE3M				
	5YJSA1E23H				
	5YJ3E1EA6L				
	7SAXCBE61P				
	5YJSA1H19E				
	5YJXCBE20J				
	7SAXCBE65N				
	5YJSA1E26J				

electric_vehicles 6 x

Query to find all electric vehicles where the Model contains the word Leaf.

```
select VIN from electric_vehicles where Model like "%LEAF%";
```

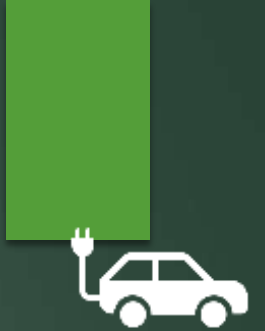


Result Grid			Filter Rows:	Export:	Wrap Cell Content:
	VIN	Model			
▶	1N4BZ1CP3K	LEAF			
	1N4AZ0CP4E	LEAF			
	1N4AZ0CP2D	LEAF			
	1N4AZ0CP6G	LEAF			
	JN1AZ0CP7B	LEAF			
	1N4BZ0CP9G	LEAF			
	1N4AZ0CP1G	LEAF			
	1N4AZ0CP6F	LEAF			
	1N4AZ0CP5F	LEAF			
	JN1AZ0CP4B	LEAF			
	1N4AZ0CP8E	LEAF			
	1N4AZ1CP8J	LEAF			
	1N4BZ0CP7H	LEAF			
	1N4AZ1CV0N	LEAF			
	1N4AZ0CP5D	LEAF			
	1N4AZ0CP6F	LEAF			
	JN1AZ0CP9B	LEAF			
	1N4AZ1CV5N	LEAF			
	1N4BZ1CP9L	LEAF			
	1N4AZ0CP7F	LEAF			

electric_vehicles 8 x

Query to count the total number of electric vehicles in the dataset.

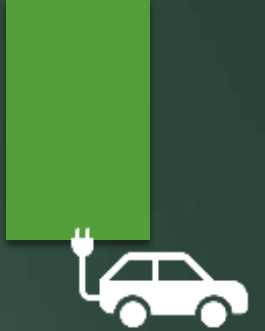
```
select count(*) from electric_vehicles;
```



Result Grid		Filter Rows:	Export:	Wrap Cell Content:
	count(*)			
▶	186879			

Query to find the average Electric Range of all electric vehicles.

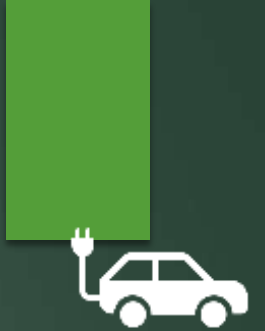
```
select avg(electric_range) as Average_Electric_Range from electric_vehicles;
```






Result Grid		Filter Rows:	Export:	Wrap Cell Content:
	Average_Electric_Range			
▶	56.7078			

Query to list the top 5 electric vehicles with the highest Base MSRP, sorted in descending order.

```
select VIN, Base_MSRP from electric_vehicles order by Base_MSRP desc limit 5;
```



Result Grid  Filter Rows: <input type="text"/> Export:  Wrap Cell Content: 		
	VIN	Base_MSRP
▶	WP0CA2A13F	845000.00
	WP0AH2A73J	184400.00
	WP0AH2A7XJ	184400.00
	WP0AH2A71J	184400.00
	WP0AH2A70J	184400.00

Query to find the total number of electric vehicles for each Make.

```
select Make, count(vin) as Total_vehicles from electric_vehicles group by Make;
```



Result Grid			Filter Rows:	Export:	Wrap Cell Content:
	Make	Total_vehicles			
▶	BMW	7856			
	TESLA	83349			
	VOLKSWAGEN	5295			
	FIAT	784			
	NISSAN	14181			
	CHEVROLET	14072			
	KIA	7885			
	JAGUAR	232			
	SMART	260			
	VOLVO	4407			
	JEEP	4927			
	LEXUS	506			
	AUDI	3808			
	HYUNDAI	4784			
	CHRYSLER	3281			
	FORD	9836			
	PORSCHE	1163			
	MITSUBISHI	991			
	TOYOTA	6766			
	MINI	1510			

Result 12 x

Query using a CASE statement to categorize electric vehicles into three categories based on their Electric Range: Short Range for ranges less than 100 miles, Medium Range for ranges between 100 and 200 miles, and Long Range for ranges more than 200 miles.



```
select VIN, Electric_Range,      case      when Electric_Range < 100 then "Short
Range"      when Electric_Range >= 100 and Electric_Range <= 200 then "Medium
Range"      else "Long Range" end as Range_Category from electric_vehicles;
```

Result Grid	Filter Rows:	Export:	Wrap Cell Content:	Fetch rows:
VIN	Electric_Range	Range_Category		
WBY8P6C58K	153	Medium Range		
5YJSA1DN4D	208	Long Range		
5YJSA1E26J	249	Long Range		
WBY222C54E	14	Short Range		
5YJXCDE23J	238	Long Range		
WBY33AW0XP	0	Short Range		
5YJ3E1EB5L	322	Long Range		
1V2GNPE86P	0	Short Range		
WVWPP7AU0G	83	Short Range		
3C3CFFGE8D	87	Short Range		
5YJ3E1EB0M	0	Short Range		
1N4BZ1CP3K	150	Medium Range		
KL8CK6S00G	82	Short Range		
1N4AZ0CP4E	84	Short Range		
5YJSA1E29J	249	Long Range		
KNDC33LGXK	239	Long Range		
5YJ3E1EBXJ	215	Long Range		
3C3CFFGE4F	87	Short Range		
5YJXCBE25H	200	Medium Range		
5YJ3E1EB5L	322	Long Range		

Query to add a new column Model_Length to the electric vehicles table that calculates the length of each Model name.

alter table electric_vehicles add column Model_Length int;

update electric_vehicles set Model_Length = char_length(Model);



Result Grid									
Filter Rows:									
Export:									
Wrap Cell Content:									
Fetch rows:									
cafv_eligibility	electric_range	base_msrp	legislative_district	dol_vehicle_id	vehicle_location	electric_utility	census_tract	Model_Length	
Clean Alternative Fuel Vehicle Eligible	153	0.00	43	259254397	POINT (-122.3008235 47.6862671)	CITY OF SEATTLE - (WA) CITY OF TACOMA - (...)	53033003601	2	
Clean Alternative Fuel Vehicle Eligible	208	69900.00	35	127420940	POINT (-122.6961203 47.5759584)	PUGET SOUND ENERGY INC	53035080700	7	
Clean Alternative Fuel Vehicle Eligible	249	0.00	47	170287183	POINT (-122.1145138 47.3581107)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033031708	7	
Not eligible due to low battery range	14	0.00	41	205545868	POINT (-122.202397 47.619252)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033024002	2	
Clean Alternative Fuel Vehicle Eligible	238	0.00	41	237977386	POINT (-122.202397 47.619252)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033023601	7	
Eligibility unknown as battery range has not bee...	0	0.00	36	238283545	POINT (-122.3441532 47.6305366)	CITY OF SEATTLE - (WA) CITY OF TACOMA - (...)	53033007002	2	
Clean Alternative Fuel Vehicle Eligible	322	0.00	1	123837269	POINT (-122.201408 47.754528)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033021804	7	
Eligibility unknown as battery range has not bee...	0	0.00	41	266068799	POINT (-122.0181135 47.5880568)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033032224	4	
Clean Alternative Fuel Vehicle Eligible	83	0.00	48	156800388	POINT (-122.202397 47.619252)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033024001	6	
Clean Alternative Fuel Vehicle Eligible	87	0.00	41	267527928	POINT (-122.202397 47.619252)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033023901	3	
Eligibility unknown as battery range has not bee...	0	0.00	14	178942550	POINT (-120.611068 46.596645)	PACIFICORP	53077000401	7	
Clean Alternative Fuel Vehicle Eligible	150	0.00	23	103550366	POINT (-122.5305071 47.6400595)	PUGET SOUND ENERGY INC	53035090800	4	
Clean Alternative Fuel Vehicle Eligible	82	0.00	14	332341264	POINT (-120.5807155 46.5654909)	PACIFICORP	53077002803	5	
Clean Alternative Fuel Vehicle Eligible	84	0.00	45	179934191	POINT (-122.1207376 47.6705374)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033032323	4	
Clean Alternative Fuel Vehicle Eligible	249	0.00	23	303847974	POINT (-122.6368884 47.7469547)	PUGET SOUND ENERGY INC	53035091100	7	
Clean Alternative Fuel Vehicle Eligible	239	0.00	45	187057048	POINT (-122.1925969 47.676241)	PUGET SOUND ENERGY INC CITY OF TACOMA ...	53033022603	4	
Clean Alternative Fuel Vehicle Eligible	215	0.00	20	251261419	POINT (-122.6771414 46.8882415)	PUGET SOUND ENERGY INC	53067012530	7	
Clean Alternative Fuel Vehicle Eligible	87	0.00	44	292932748	POINT (-122.0816912 48.0122934)	PUGET SOUND ENERGY INC	53061052706	3	
Clean Alternative Fuel Vehicle Eligible	200	0.00	44	110766018	POINT (-122.000000 47.610000)	PUGET SOUND ENERGY INC	53033000000	7	

Result Grid

Form Editor

Field Types

Query Stats

Execution Plan

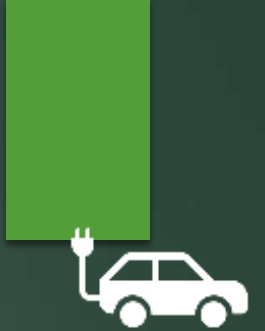
electric_vehicles 14 x

Read Only

Query using an advanced function to find the electric vehicle with the highest Electric Range.

with cte as (select vin, electric_range, rank() over (order by electric_range desc) as Ranking from electric_vehicles)

select VIN, Electric_Range as Highest_electric_range from cte where Ranking=1;



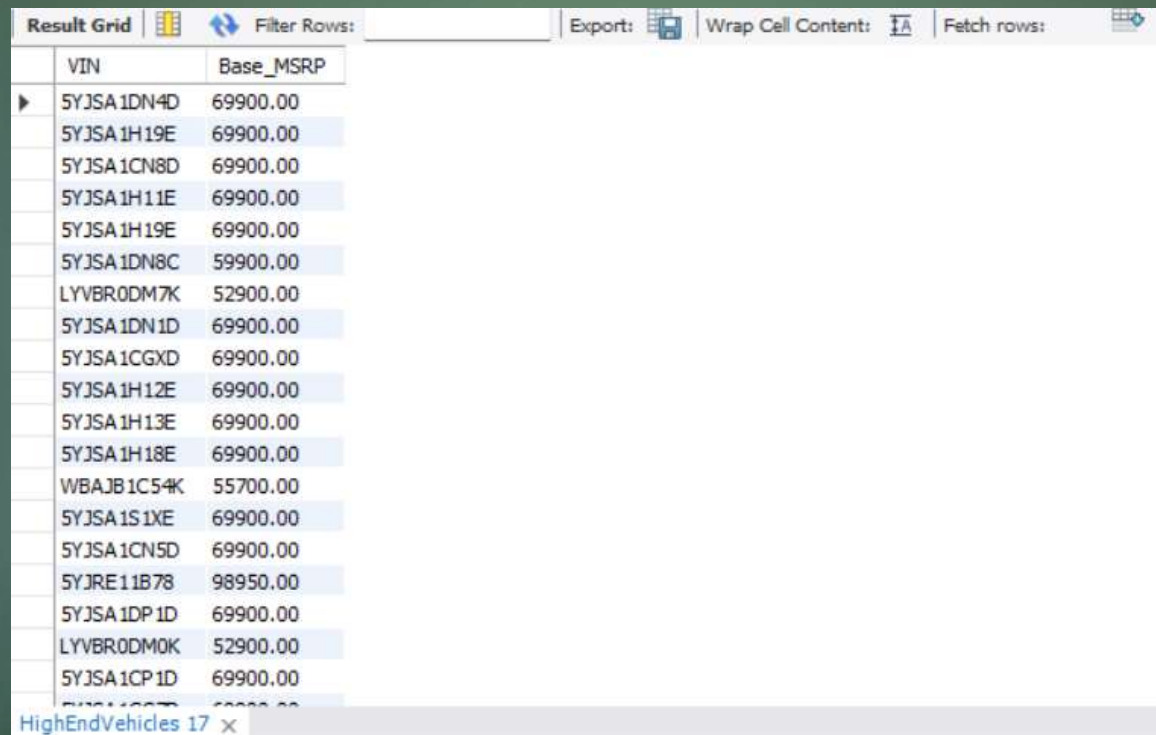
Result Grid			Filter Rows:	Export:	Wrap Cell Content:
	VIN	Highest_electric_range			
▶	5YJSA1E4XL	337			
	5YJSA1E45L	337			
	5YJSA1E40L	337			
	5YJSA1E48L	337			
	5YJSA1E49L	337			
	5YJSA1E42L	337			
	5YJSA1E41L	337			
	5YJSA1E43L	337			
	5YJSA1E4XL	337			
	5YJSA1E43L	337			
	5YJSA1E44L	337			
	5YJSA1E45L	337			
	5YJSA1E40L	337			
	5YJSA1E48L	337			
	5YJSA1E49L	337			
	5YJSA1E49L	337			
	5YJSA1E4XL	337			
	5YJSA1E43L	337			
	5YJSA1E49L	337			
	5YJSA1E40L	337			

Result 15 x

Createing a view named **HighEndVehicles** that includes electric vehicles with a Base MSRP of \$50,000 or higher.

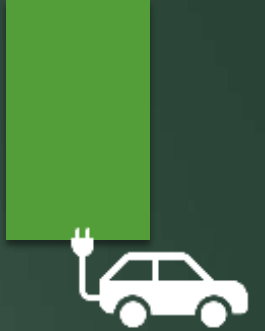
```
create view HighEndVehicles as (select VIN, Base_MSRP from electric_vehicles where Base_MSRP >= 50000);
```

```
select * from HighEndVehicles;
```



VIN	Base_MSRP
5YJSA1DN4D	69900.00
5YJSA1H19E	69900.00
5YJSA1CN8D	69900.00
5YJSA1H11E	69900.00
5YJSA1H19E	69900.00
5YJSA1DN8C	59900.00
LYVBR0DM7K	52900.00
5YJSA1DN1D	69900.00
5YJSA1CGXD	69900.00
5YJSA1H12E	69900.00
5YJSA1H13E	69900.00
5YJSA1H18E	69900.00
WBAJB1C54K	55700.00
5YJSA1S1XE	69900.00
5YJSA1CN5D	69900.00
5YJRE11B78	98950.00
5YJSA1DP1D	69900.00
LYVBR0DM0K	52900.00
5YJSA1CP1D	69900.00
5YJSA1CP1D	69900.00

HighEndVehicles 17 x



Query using a window function to rank electric vehicles based on their Base MSRP within each Model Year.

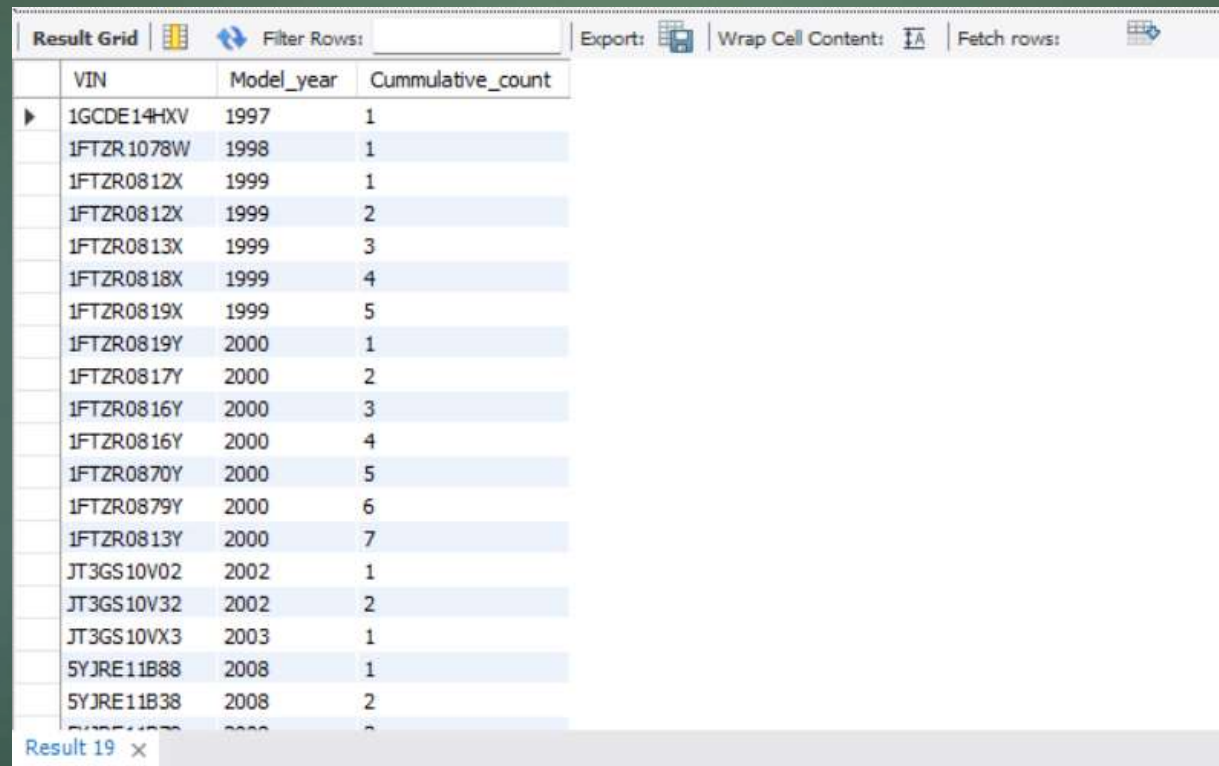
```
select VIN, Base_MSRP, Model_year,  
rank() over (partition by Model_year order by Base_MSRP desc) as Ranking from  
electric_vehicles;
```



Result Grid					Filter Rows:	Export:	Wrap Cell Content:	Fetch rows:
	VIN	Base_MSRP	Model_year	Ranking				
▶	1GCDE14HXV	0.00	1997	1				
	1FTZR1078W	0.00	1998	1				
	1FTZR0812X	0.00	1999	1				
	1FTZR0818X	0.00	1999	1				
	1FTZR0812X	0.00	1999	1				
	1FTZR0813X	0.00	1999	1				
	1FTZR0819X	0.00	1999	1				
	1FTZR0813Y	0.00	2000	1				
	1FTZR0870Y	0.00	2000	1				
	1FTZR0879Y	0.00	2000	1				
	1FTZR0817Y	0.00	2000	1				
	1FTZR0816Y	0.00	2000	1				
	1FTZR0819Y	0.00	2000	1				
	1FTZR0816Y	0.00	2000	1				
	JT3GS10V32	0.00	2002	1				
	JT3GS10V02	0.00	2002	1				
	JT3GS10VX3	0.00	2003	1				
	5YJRE11B88	98950.00	2008	1				
	5YJRE11B38	98950.00	2008	1				
	5YJRE11B78	98950.00	2008	1				

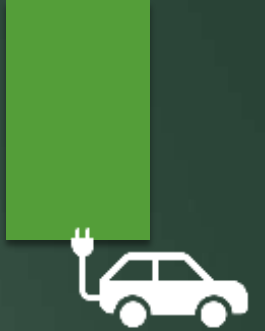
Query to calculate the cumulative count of electric vehicles registered each year sorted by Model Year.

```
select VIN, Model_year,  
count(vin) over (partition by Model_year rows between unbounded preceding and  
current row) as Cummulative_count  
from electric_vehicles order by Model_year;
```



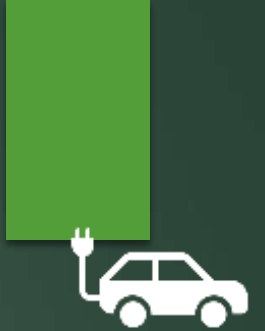
The screenshot shows a database query result grid with the following data:

VIN	Model_year	Cummulative_count
1GCDE14HXV	1997	1
1FTZR1078W	1998	1
1FTZR0812X	1999	1
1FTZR0812X	1999	2
1FTZR0813X	1999	3
1FTZR0818X	1999	4
1FTZR0819X	1999	5
1FTZR0819Y	2000	1
1FTZR0817Y	2000	2
1FTZR0816Y	2000	3
1FTZR0816Y	2000	4
1FTZR0870Y	2000	5
1FTZR0879Y	2000	6
1FTZR0813Y	2000	7
JT3GS10V02	2002	1
JT3GS10V32	2002	2
JT3GS10VX3	2003	1
5YJRE11B88	2008	1
5YJRE11B38	2008	2



Query to find the county with the highest average Base MSRP for electric vehicles using subqueries and aggregate functions.

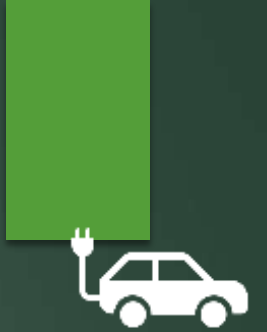
```
select County, Average_BaseMSRP as Highest_Average_BaseMSRP from  
(select county, avg(Base_MSRP) as Average_BaseMSRP from electric_vehicles group by  
county) tbl order by Average_BaseMSRP desc limit 1;
```



Result Grid			Filter Rows:	Export:	Wrap Cell Content:
	County	Highest_Average_BaseMSRP			
▶	Charles	102000.000000			

Result 20 x

Stored procedure to update the Base MSRP of a vehicle given its VIN (1-10) and new Base MSRP.



- ▶ delimiter //
- ▶ create procedure
- ▶ update_Base_MSRP(in viNumber varchar(200), in New_Base_MSRP varchar(300))
- ▶ begin
- ▶ update electric_vehicles
- ▶ set Base_MSRP= New_Base_MSRP where vin = viNumber ;
- ▶ end //
- ▶ delimiter ;
- ▶ call update_Base_MSRP("WBY8P6C58K", 40000);

Dataset Report Summary:

- ▶ This dataset provides comprehensive information about electric vehicles, including their geographic distribution, manufacturing details, and eligibility for clean alternative fuel incentives. Each record is uniquely identified by the Vehicle Identification Number (VIN) and includes details such as the make, model, and year of the vehicle, as well as its electric range and base MSRP. Location-based attributes such as county, city, state, postal code, and census tract enable detailed geographic analysis.
- ▶ This dataset is valuable for studying electric vehicle adoption patterns, assessing the impact of clean energy policies, and planning for infrastructure development to support electric vehicles.

