

EV Carbon Emission Analysis

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Batch 2

CO²

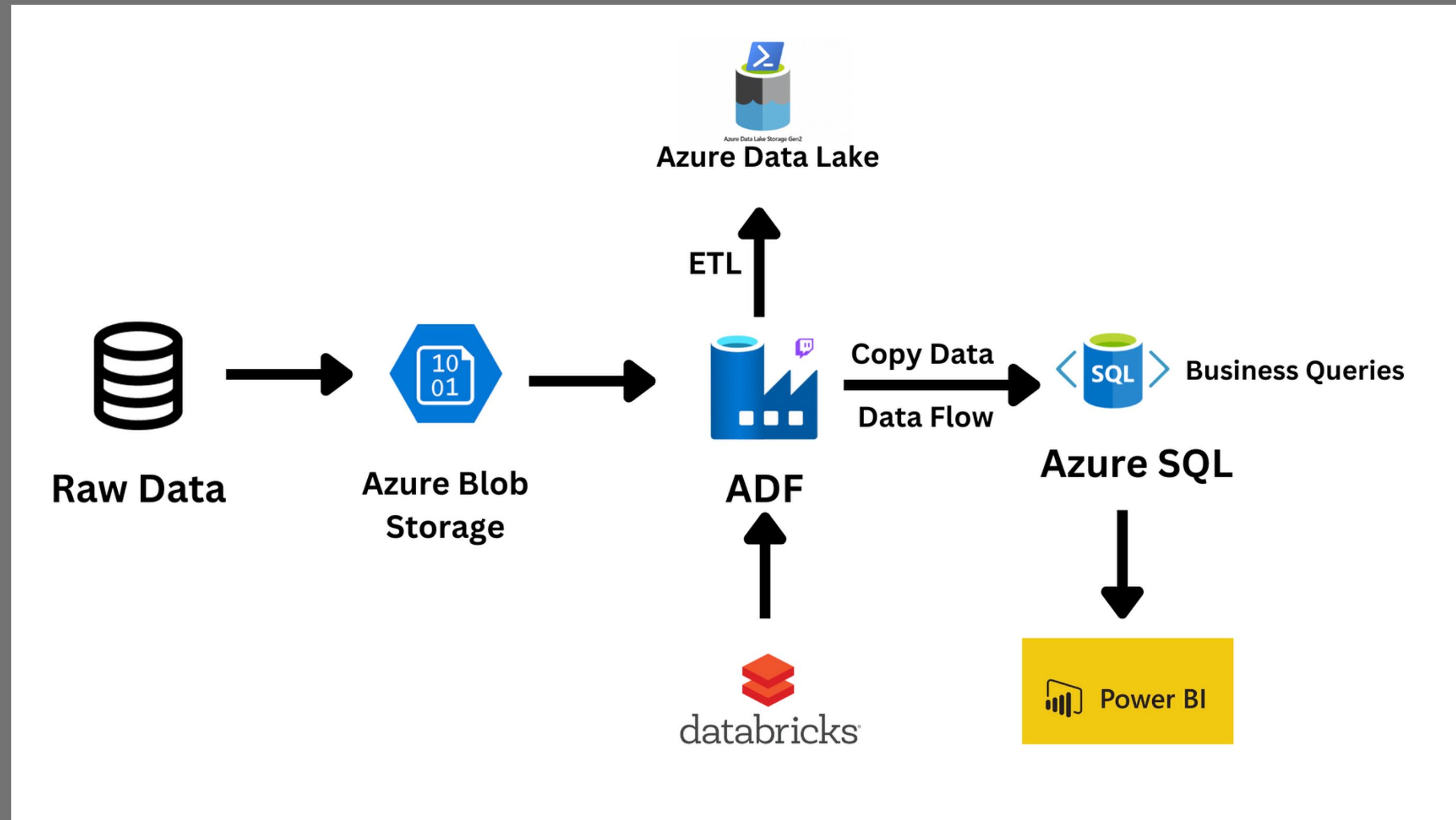
Contents

- Problem Statement
- Data Flow Diagram
- Azure Data Factory
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- Github Link
- Challenges faced, learnings, suggestions, and feedback.

Problem Statement

- Analysis of Carbon emission originating from Electric vehicles and other conventional vehicles.
- To Assess the environmental impact and optimize the transition to cleaner transportation, there is a need for analysis of carbon emissions originating from electric vehicles and other conventional vehicles

Data Flow Diagram



Azure Data Factory

Microsoft Azure | Data Factory > casestudydfactory Search factory and documentation 1 29 ? ? Shellunext_1693422719943@npunext.onmicrosoft.com UNEXT

Your insights matter! Participate in our [brief survey](#) about our CDC top-level resource, and help us enhance your experience.

main branch Validate all Save all Publish Preview experience Off

Factory Resources

Filter resources by name +

Pipelines

- pipeline1
- pipeline2
- pipeline3

Change Data Capture (preview)

- adfdc1

Datasets

Data flows

dataflow1

Power Query

Templates

dataflow1

Saved Validate Data flow debug ●

Preview experience Off

dataflow1

source1 Import data from DelimitedText1

derivedColumn1 Creating/updating the columns 'Make, Model, Vehicle Class, Engine Size(L), Cylinders, Transmission, Fuel Type, Fuel'

surrogateKey1 Adding new key Serial Number starting from 1 with step 1

select1 Renaming surrogateKey1 to select1 with columns 'Brand, Model, Vehicle Class, Engine Size(L), Cylinders, Transmission,'

sort1 Sorting rows on columns 'CO2 Emissions(g/km)'

sink1 Export data to DelimitedText2

Add Source ▼

Parameters Settings ^

+ New

```
graph LR; source1["source1  
Import data from DelimitedText1"] --> derivedColumn1["derivedColumn1  
Creating/updating the columns 'Make, Model, Vehicle Class, Engine Size(L), Cylinders, Transmission, Fuel Type, Fuel'"]; derivedColumn1 --> surrogateKey1["surrogateKey1  
Adding new key Serial Number starting from 1 with step 1"]; surrogateKey1 --> select1["select1  
Renaming surrogateKey1 to select1 with columns 'Brand, Model, Vehicle Class, Engine Size(L), Cylinders, Transmission,'"]; select1 --> sort1["sort1  
Sorting rows on columns 'CO2 Emissions(g/km)'"]; sort1 --> sink1["sink1  
Export data to DelimitedText2"]
```

Applications New Tab - Google Chrome

Microsoft Azure | day4azure (she | day5 - Microsoft | day5 - Azure Data Factory | retail - Microsoft | Settings | + | Fri 8 Sep, 06:27 labuser

adf.azure.com/en/monitoring/pipelineruns/4d490d9d-9668-474d-b093-7c790f6a381c?factory=%2Fsubscriptions%2Fa651e87... | Search factory and documentation | 1 | 6 | ? | User: Shellunext_1693422719943@npunext.onmicrosoft.com | UNEXT | +

Microsoft Azure | Data Factory > day5 | Search factory and documentation | Microsoft recently announced the public preview of Microsoft Fabric, a brand new and exciting way to build cloud-first data analytics. Click [here](#) to get started with Fabric Data Factory! | X

All pipeline runs > pipeline1 - Activity runs

Cancel Refresh Update pipeline | List Gantt

Pipeline was modified after this run. The current pipeline configuration is shown.

Data flow Data flow1

Activity runs

Pipeline run ID 4d490d9d-9668-474d-b093-7c790f6a381c

All status | Monitor in Azure Metrics | Export to CSV | ▾

Showing 1 - 1 of 1 items

Activity name	Activity status	Run start	Duration	Integration runtime	User properties
Data flow1	Succeeded	9/8/2023, 6:15:15 AM	1m 10s	debugpool-8Cores-Gei	

Business Queries

The screenshot shows the Microsoft Azure Query editor interface. The left sidebar lists database management options like Overview, Activity log, Tags, and Query editor (preview). The main area displays a query titled "Query 3" to calculate total CO2 emissions by car make:

```
--Calculate Total CO2 Emissions by Make
SELECT Make, SUM([CO2_Emissions(g/km)]) AS Total_CO2_Emissions
FROM carbonanalysis
GROUP BY Make
ORDER BY Total_CO2_Emissions DESC;
```

The results table shows the following data:

Make	Total_CO2_Emissions
FORD	163901
CHEVROLET	155436
BMW	133862

A status bar at the bottom indicates "Query succeeded | 0s".

The screenshot shows the Microsoft Azure Query editor (preview) interface. The left sidebar lists database management options like Overview, Activity log, Tags, and Query editor (preview). The main area displays a list of tables under 'dbo.carbonanalysis' and a query editor tab titled 'Query 4'. The query finds the most common fuel types:

```
1 -- Find the Most Common Fuel Types:
2
3 SELECT [Fuel_Type], COUNT(*) AS Count
4 FROM [dbo].[carbonanalysis]
5 GROUP BY [Fuel_Type]
6 ORDER BY Count DESC;
7
```

The results table shows the count for each fuel type:

Fuel_Type	Count
X	3637
Z	3202
E	370

At the bottom, a message indicates 'Query succeeded | 0s'.

Business Queries

InPrivate (2) evco2db (evco2... CO2 Emissions... carbon-emission... carbon-emission... Business Querie... adls to power b... +

Microsoft Azure Search resources, services, and docs (G+/)

Home > evco2db (evco2server/evco2db)

evco2db (evco2server/evco2db) | Query editor (preview)

SQL database

Search Login New Query Open query Feedback Getting started

Overview Activity log Tags Diagnose and solve problems Query editor (preview) Settings Compute + storage Connection strings Properties Locks Data management Replicas Sync to other databases Integrations Azure Synapse Link

Tables

Query 1 × Query 2 × Query 3 × Query 4 × Query 5 ×

--q3 Find Vehicles with the Highest CO2 Emissions:
1 SELECT Make, Model, [CO2_Emissions(g/km)]
2 FROM carbonanalysis
3 ORDER BY [CO2_emissions(g/km)] DESC;

Run Cancel query Save query Export data as Show only Editor

Results Messages

Make	Model	CO2_Emissions(g/km)
BUGATTI	CHIRON	522
BUGATTI	Chiron	522
BUGATTI	Chiron	522

Query succeeded | 1s

84°F Partly sunny Search 1:36 PM 10/5/2023 20

InPrivate (2) evco2db (evco2... CO2 Emissions... carbon-emission... carbon-emission... Business Querie... adls to power b... +

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evco2db (evco2server/evco2db) | Query editor (preview)

SQL database

Search Login New Query Open query Feedback Getting started

Overview Activity log Tags Diagnose and solve problems Query editor (preview) Settings Compute + storage Connection strings Properties Locks Data management Replicas Sync to other databases Integrations Azure Synapse Link

Tables

Query 1 × Query 2 × Query 3 × Query 4 × Query 5 × Query 6 ×

--q4 Find vehicles with both a high engine size (greater than 3.0) and a high number of cylinders (greater than 6):
1 SELECT Make, Model, [Engine_Size(L)], Cylinders
2 FROM carbonanalysis
3 WHERE [Engine_Size(L)] > 3.0 AND Cylinders > 6;

Run Cancel query Save query Export data as Show only Editor

Results Messages

Make	Model	Engine_Size(L)	Cylinders
ASTON MARTIN	DB9	5.9	12
ASTON MARTIN	RAPIDE	5.9	12
ASTON MARTIN	V8 VANTAGE	4.7	8

Query succeeded | 0s

84°F Partly sunny Search 1:38 PM 10/5/2023 20

Business Queries

The screenshot shows the Microsoft Azure Query editor (preview) interface. The left sidebar lists database resources: Compute + storage, Connection strings, Properties, Locks, Data management (Replicas, Sync to other databases), Integrations (Azure Synapse Link, Stream analytics (preview), Add Azure Search), and Power Platform (Power BI, Power Apps, Power Automate). The main area displays a query titled "Query 7" for the "dbo.carbonanalysis" table. The query identifies vehicles with high fuel efficiency (greater than 40 MPG) and low CO2 emissions:

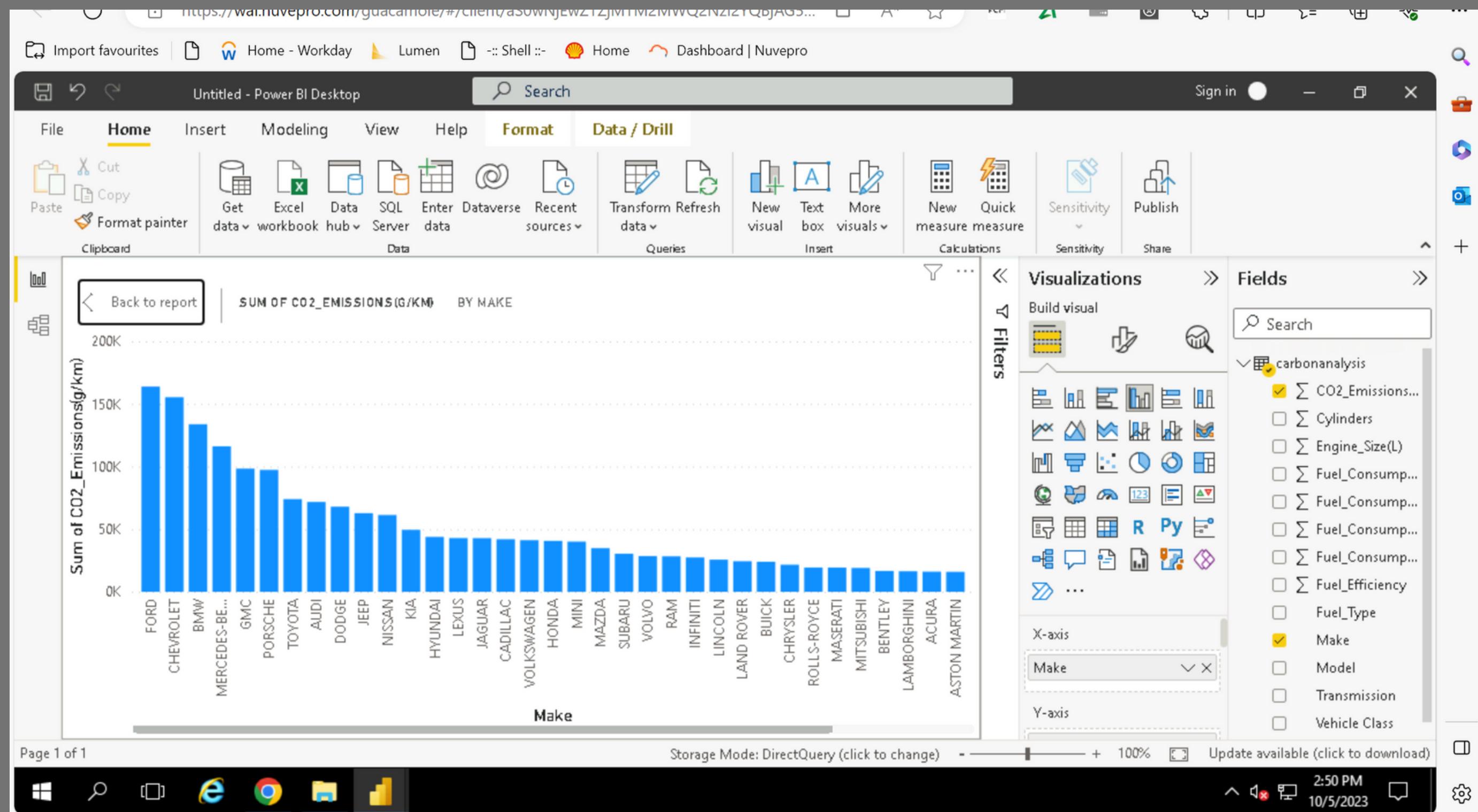
```
1 --q5
2 | --Identify Vehicles with High Fuel Efficiency and Low CO2 Emissions:
3 --Find vehicles with both high fuel efficiency (greater than 40 MPG) and low CO2
4
5 SELECT Make, Model, Fuel_Efficiency, [CO2_Emissions(g/km)]
6 FROM carbonanalysis
7 WHERE Fuel_Efficiency > 0.4 AND [CO2_Emissions(g/km)] < 100;
```

The results table shows three rows of data:

Make	Model	Fuel_Efficiency	CO2_Emissions(g/km)
HYUNDAI	IONIQ BLUE	0.72	96
HYUNDAI	IONIQ BLUE	0.72	96
HYUNDAI	IONIQ Blue	0.72	96

At the bottom, a message indicates "Query succeeded | 0s". The status bar at the bottom right shows the date and time: 10/5/2023 1:56 PM.

Screenshot of dashboards built on powerbi



Untitled - Power BI Desktop

File Home Insert Modeling View Help Format Data / Drill

Paste Cut Copy Format painter Clipboard

Get data workbook hub Data SQL Server Enter Dataverse Recent sources

New visual Text box More visuals

Transform Refresh data

Insert Calculations Sensitivity Share

Sign in

MAX OF CO₂ EMISSIONS(G/KM) BY MAKE

Make

- BUGATTI
- LAMBORGHINI
- FORD
- MERCEDES-BENZ
- BENTLEY
- CHEVROLET
- GMC
- ASTON MARTIN
- JEEP
- AUDI
- ROLLS-ROYCE
- NISSAN

Make	Value
D	175
E	370
N	1
X	3637
Z	3202

Filters

Visualizations

Fields

carbonanalysis

- CO₂Emissions...
- Cylinders
- Engine_Size(L)
- Fuel_Consum...
- Fuel_Consum...
- Fuel_Consum...
- Fuel_Consum...
- Fuel_Efficiency
- Fuel_Type
- Make
- Model
- Transmission
- Vehicle Class

Page 1 of 1

Storage Mode: DirectQuery (click to change)

Update available (click to download)

3:10 PM 10/5/2023

15:10 05/10/2023

Untitled - Power BI Desktop

File Home Insert Modeling View Help Format Data / Drill Table tools Column tools

Name Model
Data type Text

Format Text Summarization Don't summarize
\$ % Auto Data category Uncategorized

Sort by column Sort Data groups Groups Manage relationships Relationships New column Calculations

Filters Visualizations Fields

Search

Cylinders Engine_Size(L) Make Model

Cylinders	Engine_Size(L)	Make	Model
16	8.00	BUGATTI	Chiron
12	5.20	ASTON MARTIN	DB11 AMR
12	5.20	ASTON MARTIN	DB11 V12
12	5.20	ASTON MARTIN	DBS Superleggera
12	5.90	ASTON MARTIN	DB9
12	5.90	ASTON MARTIN	DB9 GT
12	5.90	ASTON MARTIN	RAPIDE
12	5.90	ASTON MARTIN	VANQUISH
12	6.00	ASTON MARTIN	Rapide AMR
12	6.00	ASTON MARTIN	RAPIDE S
12	6.00	ASTON MARTIN	V12 VANTAGE S
12	6.00	ASTON MARTIN	VANQUISH
12	6.00	ASTON MARTIN	Vanquish Zagato
12	6.00	BENTLEY	Bentayga
12	6.00	BENTLEY	Continental GT
12	6.00	BENTLEY	Continental GT Convertible

Back to report

CO2_Emissions... Cylinders Engine_Size(L) Fuel_Consum... Fuel_Consum... Fuel_Consum... Fuel_Consum... Fuel_Efficiency Fuel_Type Make Model Transmission Vehicle Class

157 428 1013

3:26 PM 10/5/2023 15:26 05/10/2023

Untitled - Power BI Desktop

File Home Insert Modeling View Help Format Data / Drill

Import favourites Home - Workday Lumen Shell :: Home Dashboard | Nuvepro

Search

Sign in

Paste Cut Copy Format painter Clipboard

Get data workbook hub Data SQL Server Enter data Dataverse Recent sources

Transform data Refresh data New visual Text box More visuals New measure Quick measure Sensitivity Publish

Clipboard

Back to report

Make	Model	CO2_Emissions(g/km)	Fuel_Efficiency
CHEVROLET	MALIBU HYBRID	121.00	0.45
CHEVROLET	MALIBU HYBRID	122.00	0.45
HONDA	ACCORD HYBRID	110.00	0.54
HONDA	ACCORD HYBRID	114.00	0.49
HONDA	ACCORD HYBRID	115.00	0.49
HONDA	ACCORD HYBRID	117.00	0.48
HONDA	ACCORD HYBRID	118.00	0.47
HONDA	CIVIC HYBRID	120.00	0.45
HONDA	Insight EX	114.00	0.51
HONDA	Insight EX/Touring	115.00	0.50
HONDA	Insight Touring	114.00	0.51
HYUNDAI	IONIQ	99.00	0.68
HYUNDAI	IONIQ	102.00	0.65
HYUNDAI	IONIQ	103.00	0.62
HYUNDAI	IONIQ	104.00	0.63
HYUNDAI	IONIQ Blue	96.00	0.72

Filters Visualizations Fields

Search

is greater than 0.4

Filter type Advanced filtering

Show items when the value is greater than 0.4

And Or

Apply filter

Add data fields here

carbonanalysis

- CO2_Emissions...
- Cylinders
- Engine_Size(L)
- Fuel_Consump...
- Fuel_Consump...
- Fuel_Consump...
- Fuel_Efficiency
- Fuel_Type
- Make
- Model
- Transmission
- Vehicle Class

Storage Mode: DirectQuery (click to change) 100% Update available (click to download)

4:31 PM 10/5/2023

Github Link

[harshithakumesh/EV-Carbon-Emission-Analysis](https://github.com/harshithakumesh/EV-Carbon-Emission-Analysis)

3 Contributors 0 Issues 0 Stars 0 Forks



harshithakumesh/EV-Carbon-Emission-Analysis
Contribute to harshithakumesh/EV-Carbon-Emission-Analysis development by creating an account on GitHub.
 GitHub

THANK YOU