

```
In [1]: pwd
```

Out[1]: 'C:\\Users\\mohd arhab ahmad\\Downloads\\csv datasets'

```
In [2]: #IMPORT ALL REQUIRED LIBRARIES
import pandas as pd #DATA PROCESSING,CSV file
import plotly.express as px #DATA VISUALISATION
```

```
In [3]: #IMPORT DATASET
df=pd.read_csv(r"C:\Users\mohd arhab ahmad\Downloads\csv datasets\Methane_final.csv")
```

```
In [4]: df.head(4)
```

Out[4]:

	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes
0	0	Africa	Algeria	257.611206	Agriculture	Total	All	2019-2021	Average based on United Nations Framework Conv...
1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available

```
In [5]: df.describe()
```

Out[5]:

	Unnamed: 0	emissions
count	1548.000000	1548.000000
mean	773.500000	643.255972
std	447.013423	5566.238201
min	0.000000	0.000459
25%	386.750000	2.659361
50%	773.500000	24.064669
75%	1160.250000	128.419594
max	1547.000000	141953.765625

```
In [6]: df.groupby('reason').count()
```

Out[6]:

	Unnamed: 0	region	country	emissions	type	segment	baseYear	notes
reason								
All	746	746	746	746	746	746	746	746
Flared	118	118	118	118	118	118	118	118
Fugitive	342	342	342	342	342	342	342	342
Vented	342	342	342	342	342	342	342	342

```
In [7]: df.loc[0,'notes']
```

Out[7]: "Average based on United Nations Framework Convention on Climate Change (UNFCCC) (2022), Greenhouse Gas Data Interface, available at: <https://di.unfccc.int/>; O'Rourke, P. R, Smith, S. J., Mott, A., Ahsan, H., McDuffie, E. E., Crippa, M., Klimont, S., McDonald, B., Z., Wang, Nicholson, M. B, Feng, L., and Hoesly, R. M. (2021, February 05) . Community Emissions Data System (CEDS) v-2021-02-05 Emission Data 1975-2019 (Version Feb-05-2021). Available at : <http://doi.org/10.5281/zenodo.4509372.>; Crippa, M., Guizzardi, D., Solazzo, E., Muntean, M., Schaaf, E., Monforti-Ferrario, F., Banja, M., Olivier, J.G.J., Grassi, G., Rossi, S., Vignati, E. (2021), GHG emissions of all world countries - 2021 Report, EUR 30831 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-41547-3, doi:10.2760/173513, JRC126363; (2022) EDGAR - Emissions Database for Global Atmospheric Research (EDGAR) v7.0 Greenhouse Gas Emissions. European Commission, Joint Research Centre (JRC) [Dataset] PID: [https://edgar.jrc.ec.europa.eu/dataset\\_ghg70](https://edgar.jrc.ec.europa.eu/dataset_ghg70); Climate Watch (2022), Food and Agriculture Organisation of the United Nations (2022). Climate Watch data: Climate Watch, 2022, GHG Emissions, Washington, DC: World Resources Institute. FAO 2022 , FAOSTAT Emissions Database. Available at: <https://www.climatewatchdata.org/ghg-emissions>"

```
In [8]: df.groupby('notes').count()
```

Out[8]:

	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear
	notes							
Average based on United Nations Framework Convention on Climate Change (UNFCCC) (2022), Greenhouse Gas Data Interface, available at: <a href="https://di.unfccc.int/">https://di.unfccc.int/</a> ; O'Rourke, P. R, Smith, S. J., Mott, A., Ahsan, H., McDuffie, E. E., Crippa, M., Klimont, S., McDonald, B., Z., Wang, Nicholson, M. B, Feng, L., and Hoesly, R. M. (2021, February 05). Community Emissions Data System (CEDS) v-2021-02-05 Emission Data 1975-2019 (Version Feb-05-2021). Available at: <a href="http://doi.org/10.5281/zenodo.4509372">http://doi.org/10.5281/zenodo.4509372</a> ; Crippa, M., Guizzardi, D., Solazzo, E., Muntean, M., Schaaf, E., Monforti-Ferrario, F., Banja, M., Olivier, J.G.J., Grassi, G., Rossi, S., Vignati, E. (2021), GHG emissions of all world countries - 2021 Report, EUR 30831 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-41547-3, doi:10.2760/173513, JRC126363; (2022) EDGAR - Emissions Database for Global Atmospheric Research (EDGAR) v7.0 Greenhouse Gas Emissions. European Commission, Joint Research Centre (JRC) [Dataset] PID: <a href="https://edgar.jrc.ec.europa.eu/dataset_ghg70">https://edgar.jrc.ec.europa.eu/dataset_ghg70</a> ; Climate Watch (2022), Food and Agriculture Organisation of the United Nations (2022). Climate Watch data: Climate Watch, 2022, GHG Emissions, Washington, DC: World Resources Institute. FAO 2022, FAOSTAT Emissions Database. Available at: <a href="https://www.climatewatchdata.org/ghg-emissions">https://www.climatewatchdata.org/ghg-emissions</a>	315	315	315	315	315	315	315	315
Estimates from end-uses are for 2020 or 2021 (IEA, Greenhouse gas emissions from energy, 2022, <a href="https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy">https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy</a> )	356	356	356	356	356	356	356	356
Not available	877	877	877	877	877	877	877	877

```
In [9]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1548 entries, 0 to 1547
Data columns (total 9 columns):
#   Column      Non-Null Count  Dtype
---  ---
0   Unnamed: 0   1548 non-null   int64
1   region       1548 non-null   object
2   country      1548 non-null   object
3   emissions    1548 non-null   float64
4   type         1548 non-null   object
5   segment      1548 non-null   object
6   reason       1548 non-null   object
7   baseYear     1548 non-null   object
8   notes       1548 non-null   object
dtypes: float64(1), int64(1), object(7)
memory usage: 109.0+ KB
```

```
In [10]: df.isnull().sum()
```

```
Out[10]: Unnamed: 0      0
region          0
country         0
emissions       0
type            0
segment         0
reason          0
baseYear        0
notes           0
dtype: int64
```

```
In [11]: df['type'].value_counts()
```

```
Out[11]: Energy      1233
Agriculture    105
Other          105
Waste          105
Name: type, dtype: int64
```

```
In [12]:
```

```
df['segment'].value_counts()

Out[12]: Total 414
Onshore oil 217
Gas pipelines and LNG facilities 164
Offshore oil 159
Onshore gas 144
Offshore gas 118
Other from oil and gas 98
Bioenergy 93
Other from coal 66
Steam coal 30
Coking coal 24
Satellite-detected large oil and gas emissions 21
Name: segment, dtype: int64
```

```
In [13]: df
```

Out[13]:

	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes
0	0	Africa	Algeria	257.611206	Agriculture	Total	All	2019-2021	Average based on United Nations Framework Conv...
1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available
4	4	Africa	Algeria	213.987000	Energy	Onshore gas	Fugitive	2022	Not available
...	...	...	...	...	...	...	...	...	...
1543	1543	World	World	3102.500000	Energy	Satellite-detected large oil and gas emissions	All	2022	Not available
1544	1544	World	World	30296.500000	Energy	Steam coal	All	2022	Not available
1545	1545	World	World	133350.984375	Energy	Total	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
1546	1546	World	World	9737.874023	Other	Total	All	2019-2021	Average based on United Nations Framework Conv...
1547	1547	World	World	70758.710938	Waste	Total	All	2019-2021	Average based on United Nations Framework Conv...

1548 rows × 9 columns

```
In [14]: #REMOVING TOTAL&WORLD VALUES FROM SEGMENT&REGION COLUMN RESPECTIELY.
t1=df[(df['segment']!='Total')&(df['region']!='World')]
t1
```

Out[14]:

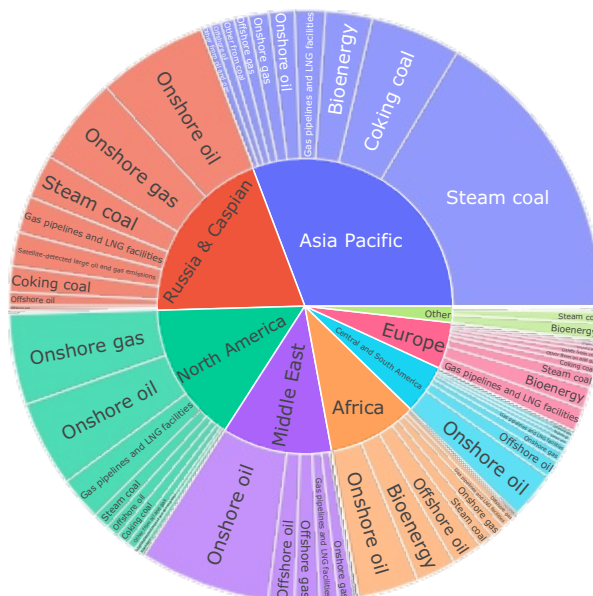
	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes
1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available
4	4	Africa	Algeria	213.987000	Energy	Onshore gas	Fugitive	2022	Not available
5	5	Africa	Algeria	464.308014	Energy	Onshore gas	Vented	2022	Not available
...	...	...	...	...	...	...	...	...	...
1518	1518	Russia & Caspian	Uzbekistan	4.675830	Energy	Onshore oil	Fugitive	2022	Not available
1519	1519	Russia & Caspian	Uzbekistan	63.348598	Energy	Onshore oil	Vented	2022	Not available
1520	1520	Russia & Caspian	Uzbekistan	5.676000	Energy	Other from coal	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
1521	1521	Russia & Caspian	Uzbekistan	16.973917	Energy	Other from oil and gas	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
1522	1522	Russia & Caspian	Uzbekistan	18.299999	Energy	Satellite-detected large oil and gas emissions	All	2022	Not available

1116 rows × 9 columns

```
In [15]: t1['type'].value_counts()
```

```
Out[15]: Energy      1116
Name: type, dtype: int64
```

```
In [16]: #REGION WISE SEGMENT ANALYSIS
px.sunburst(tl,path=['region','segment'],values='emissions')
```



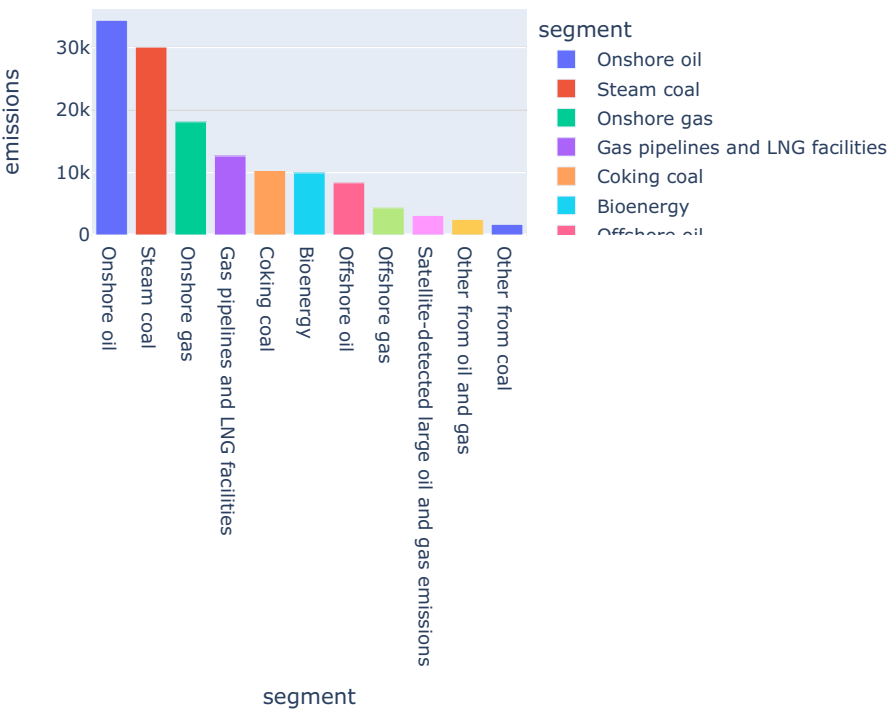
```
In [17]: t1.head(9)
```

Out[17]:	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes	
	1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
	2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
	3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available
	4	4	Africa	Algeria	213.987000	Energy	Onshore gas	Fugitive	2022	Not available
	5	5	Africa	Algeria	464.308014	Energy	Onshore gas	Vented	2022	Not available
	6	6	Africa	Algeria	469.786987	Energy	Onshore oil	Flared	2022	Not available
	7	7	Africa	Algeria	85.187202	Energy	Onshore oil	Fugitive	2022	Not available
	8	8	Africa	Algeria	1154.119995	Energy	Onshore oil	Vented	2022	Not available
	9	9	Africa	Algeria	0.004000	Energy	Other from coal	All	2022	Estimates from end-uses are for 2020 or 2021 (...)

```
In [18]: t1.groupby('notes').count()
```

Out[18]:	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear
	notes							
	Estimates from end-uses are for 2020 or 2021 (IEA, Greenhouse gas emissions from energy, 2022, <a href="https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy">https://www.iea.org/data-and-statistics/data-product/greenhouse-gas-emissions-from-energy</a> )	254	254	254	254	254	254	254
	Not available	862	862	862	862	862	862	862

```
In [19]: #EMISSIONS COMPARISON FOR EACH SEGMENT
t2=t1.groupby('segment').sum().sort_values('emissions',ascending=False).reset_index()
px.bar(t2,x='segment',y='emissions',color='segment')
```



```
In [20]: df.head()
```

Out[20]:	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes
0	0	Africa	Algeria	257.611206	Agriculture	Total	All	2019-2021	Average based on United Nations Framework Conv...
1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available
4	4	Africa	Algeria	213.987000	Energy	Onshore gas	Fugitive	2022	Not available

```
In [21]: # REMOVING WORLD VALUES FROM COUNTRY COLUMN
t3=df[df['country']!='World']
t3
```

Out[21]:	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes
0	0	Africa	Algeria	257.611206	Agriculture	Total	All	2019-2021	Average based on United Nations Framework Conv...
1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available
4	4	Africa	Algeria	213.987000	Energy	Onshore gas	Fugitive	2022	Not available
...	...	...	...	...	...	...	...	...	...
1521	1521	Russia & Caspian	Uzbekistan	16.973917	Energy	Other from oil and gas	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
1522	1522	Russia & Caspian	Uzbekistan	18.299999	Energy	Satellite-detected large oil and gas emissions	All	2022	Not available

1523	1523	Russia & Caspian	Uzbekistan	780.916138	Energy	Total	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
1524	1524	Russia & Caspian	Uzbekistan	3.845616	Other	Total	All	2019-2021	Average based on United Nations Framework Conv...
1525	1525	Russia & Caspian	Uzbekistan	280.418243	Waste	Total	All	2019-2021	Average based on United Nations Framework Conv...

1526 rows × 9 columns

```
In [22]: t3=t3.groupby('country').sum().sort_values('emissions',ascending=False).reset_index()
```

```
In [23]: t3=t3.head(20)
t3
```

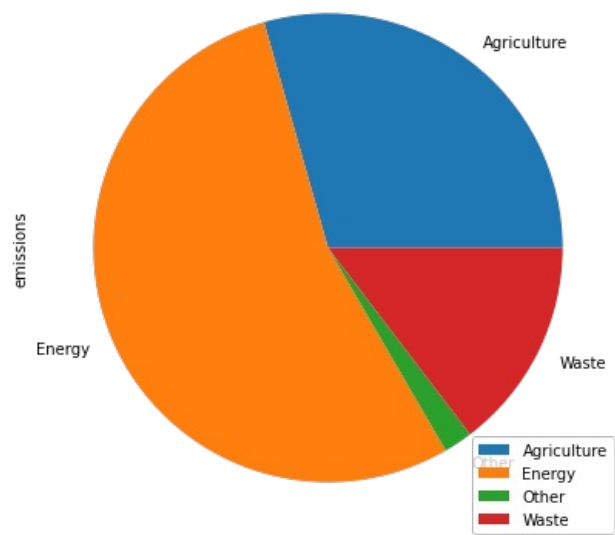
Out[23]:

	country	Unnamed: 0	emissions
0	China	9870	81048.371586
1	United States	30745	48604.877296
2	Russia	32571	42432.929804
3	India	10813	34852.007386
4	Brazil	14390	21720.838126
5	Indonesia	10773	19404.469000
6	European Union	19679	18985.173461
7	Other	29799	15997.357175
8	Iran	26037	13030.685366
9	Nigeria	5643	9903.895667
10	Turkmenistan	28519	9834.398293
11	Pakistan	9375	8170.627576
12	Australia	9163	7775.794053
13	Mexico	28896	7632.438320
14	Saudi Arabia	24510	7206.823957
15	Canada	24417	7110.093561
16	Venezuela	16970	6691.244875
17	Argentina	13710	6558.256740
18	Kazakhstan	32087	6459.562582
19	Algeria	105	6113.441756

```
In [24]: #EMISSIONS COMPARISON IN EACH COUNTRY
px.bar(t3,x='country',y='emissions',color='country')
```

```
In [25]: #EMISSIONS FOR EACH SECTOR TYPE
df.groupby(['type']).sum().plot(kind='pie',y='emissions',figsize=(7, 7))
```

Out[25]: <AxesSubplot:ylabel='emissions'>



```
In [26]: df
```

	Unnamed: 0	region	country	emissions	type	segment	reason	baseYear	notes
0	0	Africa	Algeria	257.611206	Agriculture	Total	All	2019-2021	Average based on United Nations Framework Conv...
1	1	Africa	Algeria	0.052000	Energy	Bioenergy	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
2	2	Africa	Algeria	130.798996	Energy	Gas pipelines and LNG facilities	Fugitive	2022	Not available
3	3	Africa	Algeria	69.741898	Energy	Gas pipelines and LNG facilities	Vented	2022	Not available
4	4	Africa	Algeria	213.987000	Energy	Onshore gas	Fugitive	2022	Not available
...	...	...	...	...	...	...	...	...	...
1543	1543	World	World	3102.500000	Energy	Satellite-detected large oil and gas emissions	All	2022	Not available
1544	1544	World	World	30296.500000	Energy	Steam coal	All	2022	Not available
1545	1545	World	World	133350.984375	Energy	Total	All	2022	Estimates from end-uses are for 2020 or 2021 (...)
1546	1546	World	World	9737.874023	Other	Total	All	2019-2021	Average based on United Nations Framework Conv...
1547	1547	World	World	70758.710938	Waste	Total	All	2019-2021	Average based on United Nations Framework Conv...

1548 rows × 9 columns

```
In [ ]:
```