## Installing world bank data python package

In [1]:
```
pip install world_bank_data --upgrade
```

```
Requirement already satisfied: world_bank_data in c:\users\ompra\anaconda3\lib\site-packages
(0.1.3)
Requirement already satisfied: requests in c:\users\ompra\anaconda3\lib\site-packages (from
world_bank_data) (2.26.0)
Requirement already satisfied: cachetools in c:\users\ompra\anaconda3\lib\site-packages (fro
m world_bank_data) (5.0.0)
Requirement already satisfied: pandas in c:\users\ompra\anaconda3\lib\site-packages (from wo
rld_bank_data) (1.3.4)
Requirement already satisfied: pytz>=2017.3 in c:\users\ompra\anaconda3\lib\site-packages (f
rom pandas->world_bank_data) (2021.3)
Requirement already satisfied: python-dateutil>=2.7.3 in c:\users\ompra\anaconda3\lib\site-p
ackages (from pandas->world_bank_data) (2.8.2)
Requirement already satisfied: numpy>=1.17.3 in c:\users\ompra\anaconda3\lib\site-packages
(from pandas->world_bank_data) (1.20.3)
Note: you may need to restart the kernel to use updated packages.
Requirement already satisfied: six>=1.5 in c:\users\ompra\anaconda3\lib\site-packages (from
python-dateutil>=2.7.3->pandas->world_bank_data) (1.16.0)
Requirement already satisfied: charset-normalizer~=2.0.0 in c:\users\ompra\anaconda3\lib\sit
e-packages (from requests->world_bank_data) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\users\ompra\anaconda3\lib\site-packages (f
rom requests->world_bank_data) (3.2)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\ompra\anaconda3\lib\site-pa
ckages (from requests->world_bank_data) (1.26.7)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\ompra\anaconda3\lib\site-packa
ges (from requests->world_bank_data) (2021.10.8)
```

In [2]:
```
pip install wbgapi
```

```
Requirement already satisfied: wbgapi in c:\users\ompra\anaconda3\lib\site-packages (1.0.7)
Requirement already satisfied: requests in c:\users\ompra\anaconda3\lib\site-packages (from
wbgapi) (2.26.0)
Requirement already satisfied: tabulate in c:\users\ompra\anaconda3\lib\site-packages (from
wbgapi) (0.8.9)
Requirement already satisfied: PyYAML in c:\users\ompra\anaconda3\lib\site-packages (from wb
gapi) (6.0)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\ompra\anaconda3\lib\site-pa
ckages (from requests->wbgapi) (1.26.7)
Requirement already satisfied: idna<4,>=2.5 in c:\users\ompra\anaconda3\lib\site-packages (f
rom requests->wbgapi) (3.2)
Requirement already satisfied: charset-normalizer~=2.0.0 in c:\users\ompra\anaconda3\lib\sit
e-packages (from requests->wbgapi) (2.0.4)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\ompra\anaconda3\lib\site-packa
ges (from requests->wbgapi) (2021.10.8)
Note: you may need to restart the kernel to use updated packages.
```

In [3]:
```
pip install wbdata
```

```
Requirement already satisfied: wbdata in c:\users\ompra\anaconda3\lib\site-packages (0.3.0)
Requirement already satisfied: requests>=2.0 in c:\users\ompra\anaconda3\lib\site-packages
(from wbdata) (2.26.0)
Requirement already satisfied: tabulate>=0.8.5 in c:\users\ompra\anaconda3\lib\site-packages
(from wbdata) (0.8.9)
Requirement already satisfied: decorator>=4.0 in c:\users\ompra\anaconda3\lib\site-packages
(from wbdata) (5.1.0)
Requirement already satisfied: appdirs<2.0,>=1.4 in c:\users\ompra\anaconda3\lib\site-packag
es (from wbdata) (1.4.4)
Requirement already satisfied: charset-normalizer~=2.0.0 in c:\users\ompra\anaconda3\lib\sit
```

```
e-packages (from requests>=2.0->wbdata) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\users\ompra\anaconda3\lib\site-packages (f
rom requests>=2.0->wbdata) (3.2)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\ompra\anaconda3\lib\site-pa
ckages (from requests>=2.0->wbdata) (1.26.7)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\ompra\anaconda3\lib\site-packa
ges (from requests>=2.0->wbdata) (2021.10.8)
Note: you may need to restart the kernel to use updated packages.
```

## Importing the libraries

In [4]:

```
import pandas as pd
import world_bank_data as wb
import wbgapi as wb
import wbdata as wb
pd.set_option('display.max_rows', 6)
wb.get_topic()
```

Out[4]:

| id | value |
|---|---|
| 1 | Agriculture & Rural Development |
| 2 | Aid Effectiveness |
| 3 | Economy & Growth |
| 4 | Education |
| 5 | Energy & Mining |
| 6 | Environment |
| 7 | Financial Sector |
| 8 | Health |
| 9 | Infrastructure |
| 10 | Social Protection & Labor |
| 11 | Poverty |
| 12 | Private Sector |
| 13 | Public Sector |
| 14 | Science & Technology |
| 15 | Social Development |
| 16 | Urban Development |
| 17 | Gender |
| 18 | Millenium development goals |
| 19 | Climate Change |
| 20 | External Debt |
| 21 | Trade |

In [5]:

```
wb.get_indicator(topic=5)
```

Out[5]:

| id | name |
|---|---|
| EG.EGY.PRIM.PP.KD | Energy intensity level of primary energy (MJ/$2011 PPP GDP) |
| EG.ELC.ACCS.RU.ZS | Access to electricity, rural (% of rural population) |
| EG.ELC.ACCS.UR.ZS | Access to electricity, urban (% of urban population) |
| EG.ELC.ACCS.ZS | Access to electricity (% of population) |
| EG.ELC.COAL.ZS | Electricity production from coal sources (% of total) |
| EG.ELC.FOSL.ZS | Electricity production from oil, gas and coal sources (% of total) |
| EG.ELC.HYRO.ZS | Electricity production from hydroelectric sources (% of total) |
| EG.ELC.LOSS.ZS | Electric power transmission and distribution losses (% of output) |
| EG.ELC.NGAS.ZS | Electricity production from natural gas sources (% of total) |
| EG.ELC.NUCL.ZS | Electricity production from nuclear sources (% of total) |
| EG.ELC.PETR.ZS | Electricity production from oil sources (% of total) |
| EG.ELC.RNEW.ZS | Renewable electricity output (% of total electricity output) |
| EG.ELC.RNWX.KH | Electricity production from renewable sources, excluding hydroelectric (kWh) |
| EG.ELC.RNWX.ZS | Electricity production from renewable sources, excluding hydroelectric (% of total) |

```
EG.FEC.RNEW.ZS        Renewable energy consumption (% of total final energy consumption)
EG.GDP.PUSE.KO.PP     GDP per unit of energy use (PPP $ per kg of oil equivalent)
EG.GDP.PUSE.KO.PP.KD  GDP per unit of energy use (constant 2017 PPP $ per kg of oil equivale
nt)
EG.IMP.CONS.ZS        Energy imports, net (% of energy use)
EG.NSF.ACCS.RU.ZS     Access to non-solid fuel, rural (% of rural population)
EG.NSF.ACCS.UR.ZS     Access to non-solid fuel, urban (% of urban population)
EG.NSF.ACCS.ZS        Access to non-solid fuel (% of population)
EG.USE.COMM.CL.ZS     Alternative and nuclear energy (% of total energy use)
EG.USE.COMM.FO.ZS     Fossil fuel energy consumption (% of total)
EG.USE.COMM.GD.PP.KD  Energy use (kg of oil equivalent) per $1,000 GDP (constant 2017 PPP)
EG.USE.CRNW.ZS        Combustible renewables and waste (% of total energy)
EG.USE.ELEC.KH.PC     Electric power consumption (kWh per capita)
EG.USE.PCAP.KG.OE     Energy use (kg of oil equivalent per capita)
EN.ATM.CO2E.GF.ZS     CO2 emissions from gaseous fuel consumption (% of total)
EN.ATM.CO2E.LF.KT     CO2 emissions from liquid fuel consumption (kt)
EN.ATM.METH.EG.KT.CE  Methane emissions in energy sector (thousand metric tons of CO2 equiva
lent)
EN.ATM.METH.EG.ZS     Energy related methane emissions (% of total)
EN.ATM.NOXE.EG.KT.CE  Nitrous oxide emissions in energy sector (thousand metric tons of CO2
equivalent)
EN.ATM.NOXE.EG.ZS     Nitrous oxide emissions in energy sector (% of total)
EP.PMP.DESL.CD        Pump price for diesel fuel (US$ per liter)
EP.PMP.SGAS.CD        Pump price for gasoline (US$ per liter)
IC.ELC.DURS           Time to obtain an electrical connection (days)
IC.ELC.TIME           Time required to get electricity (days)
IC.FRM.BNKS.ZS        Firms using banks to finance investment (% of firms)
IC.FRM.OUTG.ZS        Value lost due to electrical outages (% of sales for affected firms)
IE.PPI.ENGY.CD        Investment in energy with private participation (current US$)
NY.ADJ.DMIN.CD        Adjusted savings: mineral depletion (current US$)
NY.ADJ.DMIN.GN.ZS     Adjusted savings: mineral depletion (% of GNI)
NY.ADJ.DNGY.CD        Adjusted savings: energy depletion (current US$)
NY.ADJ.DNGY.GN.ZS     Adjusted savings: energy depletion (% of GNI)
NY.ADJ.DRES.GN.ZS     Adjusted savings: natural resources depletion (% of GNI)
NY.GDP.MINR.RT.ZS     Mineral rents (% of GDP)
NY.GDP.NGAS.RT.ZS     Natural gas rents (% of GDP)
NY.GDP.PETR.RT.ZS     Oil rents (% of GDP)
NY.GDP.TOTL.RT.ZS     Total natural resources rents (% of GDP)
TM.VAL.FUEL.ZS.UN     Fuel imports (% of merchandise imports)
TM.VAL.MMTL.ZS.UN     Ores and metals imports (% of merchandise imports)
TX.VAL.FUEL.ZS.UN     Fuel exports (% of merchandise exports)
TX.VAL.MMTL.ZS.UN     Ores and metals exports (% of merchandise exports)
```

In [6]:

```
indicators = {"EG.ELC.ACCS.ZS":"Access_to_electricity(% of population", "EG.USE.ELEC.KH.PC":
```

In [7]:

```
LAMcountries = ['ARG','BLZ','BOL','BRA','CHL','COL','CRI','CUB','SLV','GTM','GUY','HTI','HND
          'JAM','MEX','NIC','PAN','PRY','PER','PRI','SUR','URY','VEN']
NAMcountries=['USA','CAN']
#regions=['LCN','WLD','NAC'] #WORLD = WLD; LAT AM AND CARRIBEAN = LCN; NAC=North America
regions=['NAC','WLD','LCN']
allcountries=LAMcountries+NAMcountries
allregions=allcountries+regions
```

## Building the data frame

In [8]:

```
df = wb.get_dataframe(indicators,country=allregions)
df
```

Out[8]:

| country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|---|
| Argentina | 2020 | NaN | NaN | NaN | NaN | NaN |
| | 2019 | 100.0 | NaN | NaN | NaN | NaN |
| | 2018 | 100.0 | NaN | NaN | NaN | NaN |
| ... | ... | ... | ... | ... | ... | ... |
| World | 1962 | NaN | NaN | NaN | 11.413496 | 3.418103e+06 |
| | 1961 | NaN | NaN | NaN | 10.727979 | 3.185843e+06 |
| | 1960 | NaN | NaN | NaN | 10.110440 | 3.025727e+06 |

1708 rows × 5 columns

In [9]:
```
df.shape
df.columns.values
df.info()
df.describe()
df.head()
df.head(10)
df.tail()
df.tail(10)
```

```
<class 'wbdata.api.WBDataFrame'>
MultiIndex: 1708 entries, ('Argentina', '2020') to ('World', '1960')
Data columns (total 5 columns):
 #   Column                                                Non-Null Count  Dtype  
---  ------                                                --------------  -----  
 0   Access_to_electricity(% of population                 767 non-null    float64
 1   Electric power consumption (kWh per capita)           1104 non-null   float64
 2   Energy use (kg of oil equivalent per capita)          1118 non-null   float64
 3   CO2 emissions from gaseous fuel consumption (% of total)  1539 non-null   float64
 4   CO2 emissions from liquid fuel consumption (kt)       1539 non-null   float64
dtypes: float64(5)
memory usage: 138.5+ KB
```

Out[9]:

| country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|---|
| World | 1969 | NaN | NaN | NaN | 13.968217 | 5.673121e+06 |
| | 1968 | NaN | NaN | NaN | 13.642661 | 5.232388e+06 |
| | 1967 | NaN | NaN | NaN | 13.246163 | 4.808931e+06 |
| | ... | ... | ... | ... | ... | ... |
| | 1962 | NaN | NaN | NaN | 11.413496 | 3.418103e+06 |
| | 1961 | NaN | NaN | NaN | 10.727979 | 3.185843e+06 |
| | 1960 | NaN | NaN | NaN | 10.110440 | 3.025727e+06 |

10 rows × 5 columns

In [10]:
```
data = df.copy()
data.reset_index(inplace=True)
```

In [11]:
```
data['text']=data['country']+data['date'].map(str)
data
```

Out[11]:

| | country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) | |
|---|---|---|---|---|---|---|---|---|
| **0** | Argentina | 2020 | NaN | NaN | NaN | NaN | NaN | Argentin |
| **1** | Argentina | 2019 | 100.0 | NaN | NaN | NaN | NaN | Argentin |
| **2** | Argentina | 2018 | 100.0 | NaN | NaN | NaN | NaN | Argentin |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **1705** | World | 1962 | NaN | NaN | NaN | 11.413496 | 3.418103e+06 | Worl |
| **1706** | World | 1961 | NaN | NaN | NaN | 10.727979 | 3.185843e+06 | Worl |
| **1707** | World | 1960 | NaN | NaN | NaN | 10.110440 | 3.025727e+06 | Worl |

1708 rows × 8 columns

In [12]:
```
data1 = data.iloc[0:1647]
data1.tail(20)
```

Out[12]:

| | country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) | |
|---|---|---|---|---|---|---|---|---|
| **1627** | Venezuela, RB | 1979 | NaN | 1835.725703 | 1935.398581 | 39.260572 | 38829.863 | Venez RB |
| **1628** | Venezuela, RB | 1978 | NaN | 1542.598167 | 1921.267277 | 37.817638 | 35826.590 | Venez RB |
| **1629** | Venezuela, RB | 1977 | NaN | 1400.420513 | 1830.998332 | 39.424626 | 30040.064 | Venez RB |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **1644** | Venezuela, RB | 1962 | NaN | NaN | NaN | 19.776347 | 8049.065 | Venez RB |
| **1645** | Venezuela, RB | 1961 | NaN | NaN | NaN | 19.490149 | 11551.050 | Venez RB |
| **1646** | Venezuela, RB | 1960 | NaN | NaN | NaN | 16.661312 | 14895.354 | Venez RB |

20 rows × 8 columns

In [13]:
```
data1.head(10)
```

Out[13]:

| | country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) | |
|---|---|---|---|---|---|---|---|---|
| **0** | Argentina | 2020 | NaN | NaN | NaN | NaN | NaN | Argentina2 |
| **1** | Argentina | 2019 | 100.000000 | NaN | NaN | NaN | NaN | Argentina2 |
| **2** | Argentina | 2018 | 100.000000 | NaN | NaN | NaN | NaN | Argentina2 |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **7** | Argentina | 2013 | 99.356224 | 2967.376558 | 1967.021678 | 49.366988 | 90835.257 | Argentina2 |
| **8** | Argentina | 2012 | 99.228859 | 3000.603523 | 1936.803540 | 53.469638 | 85657.453 | Argentina2 |
| **9** | Argentina | 2011 | 99.080200 | 2929.075029 | 1952.051053 | 52.274299 | 86977.573 | Argentina2 |

10 rows × 8 columns

In [14]:
```
data2=data1.dropna()
data2
```

Out[14]:

| | country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) | |
|---|---|---|---|---|---|---|---|---|
| **6** | Argentina | 2014 | 100.000000 | 3074.702071 | 2029.922825 | 53.744348 | 87586.295 | Argen |
| **7** | Argentina | 2013 | 99.356224 | 2967.376558 | 1967.021678 | 49.366988 | 90835.257 | Argen |
| **8** | Argentina | 2012 | 99.228859 | 3000.603523 | 1936.803540 | 53.469638 | 85657.453 | Argen |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **1612** | Venezuela, RB | 1994 | 98.323334 | 2665.759795 | 2324.974122 | 45.391298 | 63494.105 | Ve |
| **1613** | Venezuela, RB | 1993 | 98.239532 | 2697.686148 | 2049.504018 | 36.197225 | 69302.633 | Ve |
| **1614** | Venezuela, RB | 1992 | 97.820203 | 2689.309414 | 2249.819897 | 18.476779 | 73831.378 | Ve |

537 rows × 8 columns

In [15]:
```
data2.shape
data2.describe()
```

Out[15]:

| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **count** | 537.000000 | 537.000000 | 537.000000 | 537.000000 | 5.370000e+02 |
| **mean** | 88.330460 | 3201.388654 | 1943.707057 | 14.270363 | 3.015548e+05 |
| **std** | 14.929808 | 4566.648445 | 2385.349097 | 16.009996 | 6.743868e+05 |
| **...** | ... | ... | ... | ... | ... |
| **50%** | 94.664978 | 1513.158055 | 1022.160344 | 7.076101 | 2.083589e+04 |
| **75%** | 98.820000 | 2602.250605 | 1599.516711 | 25.213470 | 2.057297e+05 |
| **max** | 100.000000 | 17264.736744 | 8455.547014 | 67.060262 | 2.699517e+06 |

8 rows × 5 columns

In [16]:
```
data3=data2.sort_values(by='date', ascending='True')
data3
```

Out[16]:

| | country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) | |
|---|---|---|---|---|---|---|---|---|
| **396** | Colombia | 1990 | 89.900000 | 871.593984 | 731.743962 | 17.149192 | 31136.497 | Colo |
| **1006** | North America | 1990 | 100.000000 | 12158.089105 | 7667.611043 | 21.453940 | 2200111.992 | Am |
| **30** | Argentina | 1990 | 92.154800 | 1303.978019 | 1412.179959 | 43.317907 | 59236.718 | Arge |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **1470** | Uruguay | 2014 | 99.657085 | 3085.189883 | 1386.018099 | 1.410385 | 6233.900 | Uru |
| **555** | Guatemala | 2014 | 85.494371 | 601.189731 | 863.568935 | 0.000000 | 9739.552 | Guate |
| **6** | Argentina | 2014 | 100.000000 | 3074.702071 | 2029.922825 | 53.744348 | 87586.295 | Arge |

537 rows × 8 columns

In [17]:
```
data3.describe()
```

Out[17]:

| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **count** | 537.000000 | 537.000000 | 537.000000 | 537.000000 | 5.370000e+02 |
| **mean** | 88.330460 | 3201.388654 | 1943.707057 | 14.270363 | 3.015548e+05 |
| **std** | 14.929808 | 4566.648445 | 2385.349097 | 16.009996 | 6.743868e+05 |

| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **...** | ... | ... | ... | ... | ... |
| **50%** | 94.664978 | 1513.158055 | 1022.160344 | 7.076101 | 2.083589e+04 |
| **75%** | 98.820000 | 2602.250605 | 1599.516711 | 25.213470 | 2.057297e+05 |
| **max** | 100.000000 | 17264.736744 | 8455.547014 | 67.060262 | 2.699517e+06 |

8 rows × 5 columns

In [18]:
```
dataw = data.iloc[1648:1708]
dataworld = dataw.dropna()
dataworld
```

Out[18]:

| | country | date | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) | te |
|---|---|---|---|---|---|---|---|---|
| **1653** | World | 2014 | 85.552847 | 3128.298712 | 1919.991765 | 20.336427 | 1.036714e+07 | World20 |
| **1654** | World | 2013 | 85.031065 | 3106.981734 | 1894.112059 | 20.170828 | 1.020665e+07 | World20 |
| **1655** | World | 2012 | 84.745819 | 3047.755531 | 1891.700426 | 20.216118 | 1.013381e+07 | World20 |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **1667** | World | 2000 | 78.736034 | 2386.825244 | 1637.205968 | 20.662066 | 9.274896e+06 | World20 |
| **1668** | World | 1999 | 74.708477 | 2317.327280 | 1623.839599 | 20.716253 | 9.044144e+06 | World19 |
| **1669** | World | 1998 | 73.406490 | 2284.670692 | 1611.335079 | 19.885250 | 8.898867e+06 | World19 |

17 rows × 8 columns

In [19]:
```
dataworld.describe()
```

Out[19]:

| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **count** | 17.000000 | 17.000000 | 17.000000 | 17.000000 | 1.700000e+01 |
| **mean** | 80.826483 | 2705.724699 | 1768.351915 | 20.263791 | 9.692576e+06 |
| **std** | 3.338761 | 288.516132 | 108.412889 | 0.286536 | 4.133745e+05 |
| **...** | ... | ... | ... | ... | ... |
| **50%** | 81.251031 | 2732.640247 | 1796.215452 | 20.216118 | 9.779347e+06 |
| **75%** | 82.765005 | 2958.343199 | 1874.657688 | 20.438915 | 9.955128e+06 |
| **max** | 85.552847 | 3128.298712 | 1919.991765 | 20.716253 | 1.036714e+07 |

8 rows × 5 columns

In [20]:
```
data3.corr()
```

Out[20]:

| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **Access_to_electricity(% of population** | 1.000000 | 0.428142 | 0.426809 | 0.365172 | 0.307581 |
| **Electric power consumption (kWh per capita)** | 0.428142 | 1.000000 | 0.989543 | 0.366663 | 0.712610 |
| **Energy use (kg of oil equivalent per capita)** | 0.426809 | 0.989543 | 1.000000 | 0.397099 | 0.771272 |
| **CO2 emissions from gaseous fuel consumption (% of total)** | 0.365172 | 0.366663 | 0.397099 | 1.000000 | 0.247726 |
| **CO2 emissions from liquid fuel consumption (kt)** | 0.307581 | 0.712610 | 0.771272 | 0.247726 | 1.000000 |

In [21]:
```
data3['date']=pd.to_numeric(data3['date'])
```

In [22]:
```
print(data3['date'].corr(data3['Access_to_electricity(% of population']))
```

```
0.19089298637428545
```

In [23]:
```
dataworld.corr()
```

Out[23]:

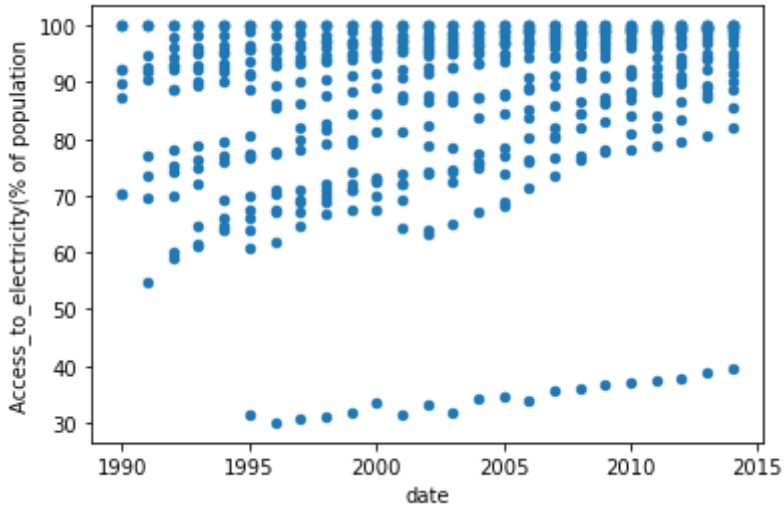
| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **Access_to_electricity(% of population** | 1.000000 | 0.927149 | 0.913741 | -0.220728 | 0.954869 |
| **Electric power consumption (kWh per capita)** | 0.927149 | 1.000000 | 0.992909 | -0.373846 | 0.956836 |
| **Energy use (kg of oil equivalent per capita)** | 0.913741 | 0.992909 | 1.000000 | -0.427884 | 0.962349 |
| **CO2 emissions from gaseous fuel consumption (% of total)** | -0.220728 | -0.373846 | -0.427884 | 1.000000 | -0.336303 |

| | Access_to_electricity(% of population | Electric power consumption (kWh per capita) | Energy use (kg of oil equivalent per capita) | CO2 emissions from gaseous fuel consumption (% of total) | CO2 emissions from liquid fuel consumption (kt) |
|---|---|---|---|---|---|
| **CO2 emissions from liquid fuel consumption (kt)** | 0.954869 | 0.956836 | 0.962349 | -0.336303 | 1.000000 |

In [24]:
```
import pandas as pd
import numpy as np
```

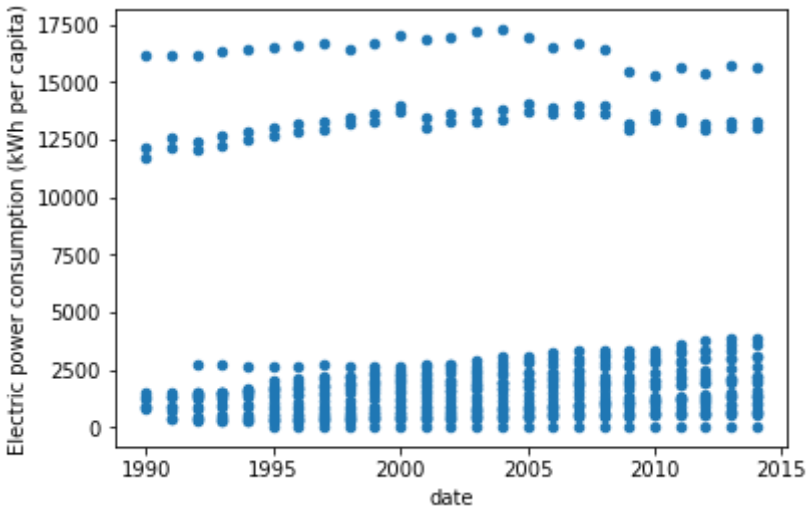
In [25]:
```
data3.plot.scatter(x="date", y="Access_to_electricity(% of population")
```

Out[25]:
```
<AxesSubplot:xlabel='date', ylabel='Access_to_electricity(% of population'>
```



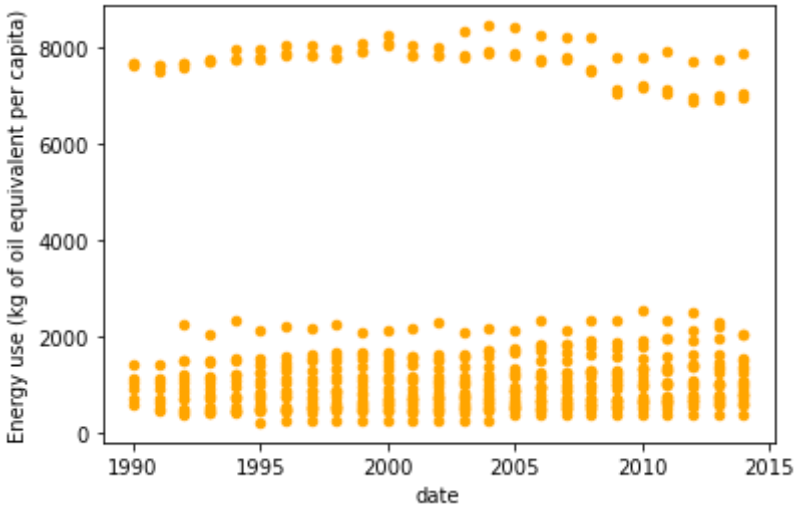

In [26]:
```
data3.plot.scatter(x="date", y="Electric power consumption (kWh per capita)")
```

Out[26]:
```
<AxesSubplot:xlabel='date', ylabel='Electric power consumption (kWh per capita)'>
```



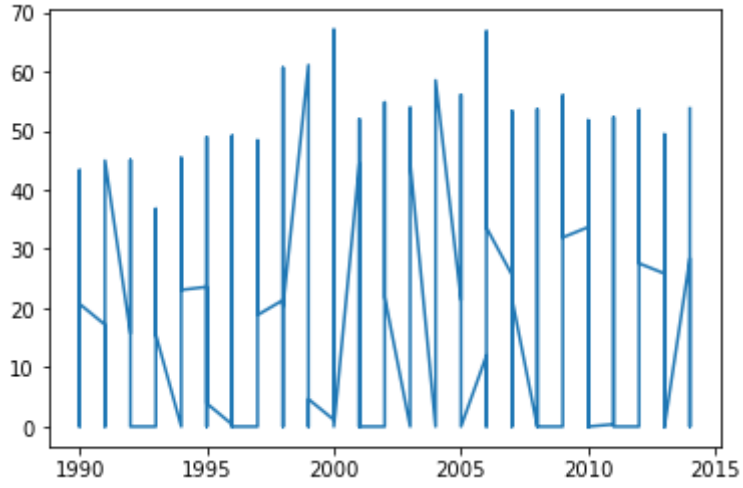

In [27]:
```
data3.plot.scatter(x="date", y="Energy use (kg of oil equivalent per capita)", color="orange
```

Out[27]:
```
<AxesSubplot:xlabel='date', ylabel='Energy use (kg of oil equivalent per capita)'>
```




In [28]:
```
import matplotlib.pyplot as plt
plt.plot(data3['date'], data3['CO2 emissions from gaseous fuel consumption (% of total)'])
```

Out[28]:
```
[<matplotlib.lines.Line2D at 0x101e7882b50>]
```




In [29]:
```
dataworld.plot.scatter(x="date", y="CO2 emissions from gaseous fuel consumption (% of total)
```