Project 2: Analyzing Green House Gases (GHG) Generated from Various sources

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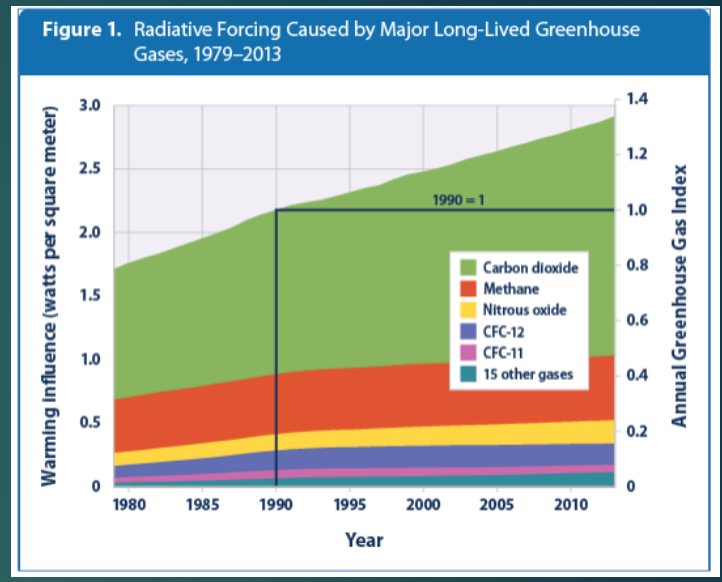
Background

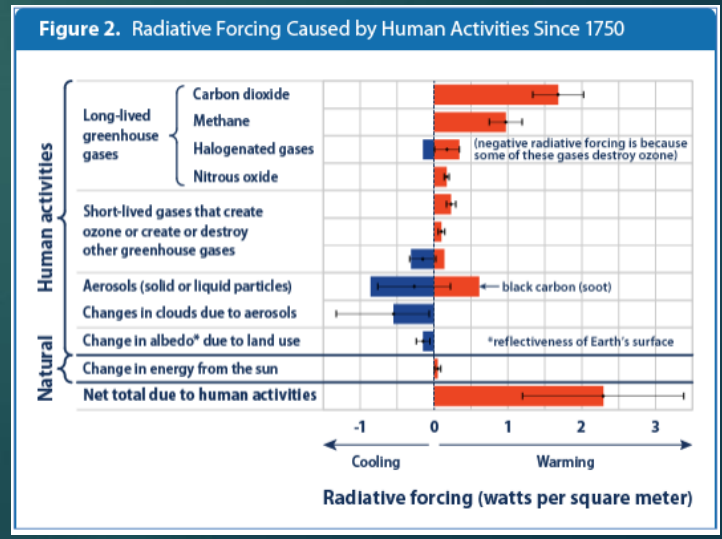
- Greenhouse Gases surely have increased earth's surface temperatures in the last couple decades.
- GHG (Green House Gases) are a mixture of CO2, CH4, N2O and other gases such as Hydrofluorocarbons, sulfur hexafluoride & water vapor.
- These gases absorb the heat radiated from Earth's surface and bounce some of it back on earth, eventually heating earth's surface.
- Apparently, it was found that these gases have differing global warming potentials when compared with CO2 (as CO2 is a direct by-product of burning O&G) – viz:
  - CH4 (Methane) molecule – 25 times the global warming potential of a CO2 molecule
  - N2O (Nitrous Oxide) - 298 times the global warming potential of a CO2 molecule
  - HFC (Hydrofluorocarbons) – 1430-14800 times the global warming potential of a CO2 molecule
  - Sulfur Hexafluoride – 22800 times the global warming potential of a CO2 molecule
- CH4, N2O and other gases like HCF etc. are a by-product of agriculture & Farming and are not directly related to burning of fossil fuels.

Source: https://climatechange.lta.org/get-started/learn/co2-methane-greenhouse-effect/

Project Proposal - Summary

- Per the graph published in the report (*source), the GHG have more or less doubled from 1980 to 2014 when this report was published.
- The Primary Project task is to:
  - Identify & Display the major "Specific" sources of emissions in agriculture & farming sector from data available from 1990 to 2019. (CH4 & N2O)
  - Identify & Display global GHG emissions to understand the Agricultural & Farming aspect from separate dataset.
  - Use Global Oil demand as a vague indicator to CO2 emissions for comparison purposes

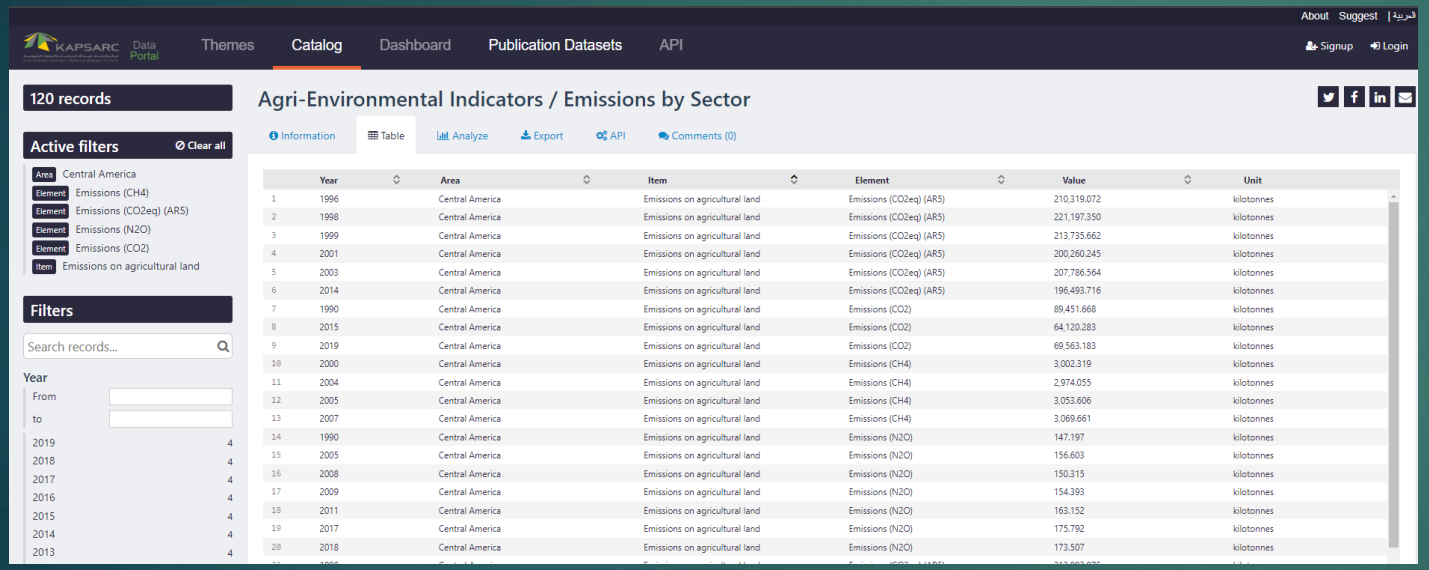




*Source: https://climatechange.lta.org/wp-content/uploads/cct/2015/02/EPA-climate-forcing-2014.pdf/

Data1 – Agriculture Emissions per sector

- DATA1: Available as CSV,JSON file or API with a html interactive page (We plan on using JSON file for the project)
  - https://datasource.kapsarc.org/explore/dataset/agri-environmental-indicators-emissions-by-sector/table/?disjunctive.area&disjunctive.item&disjunctive.element&sort=-item

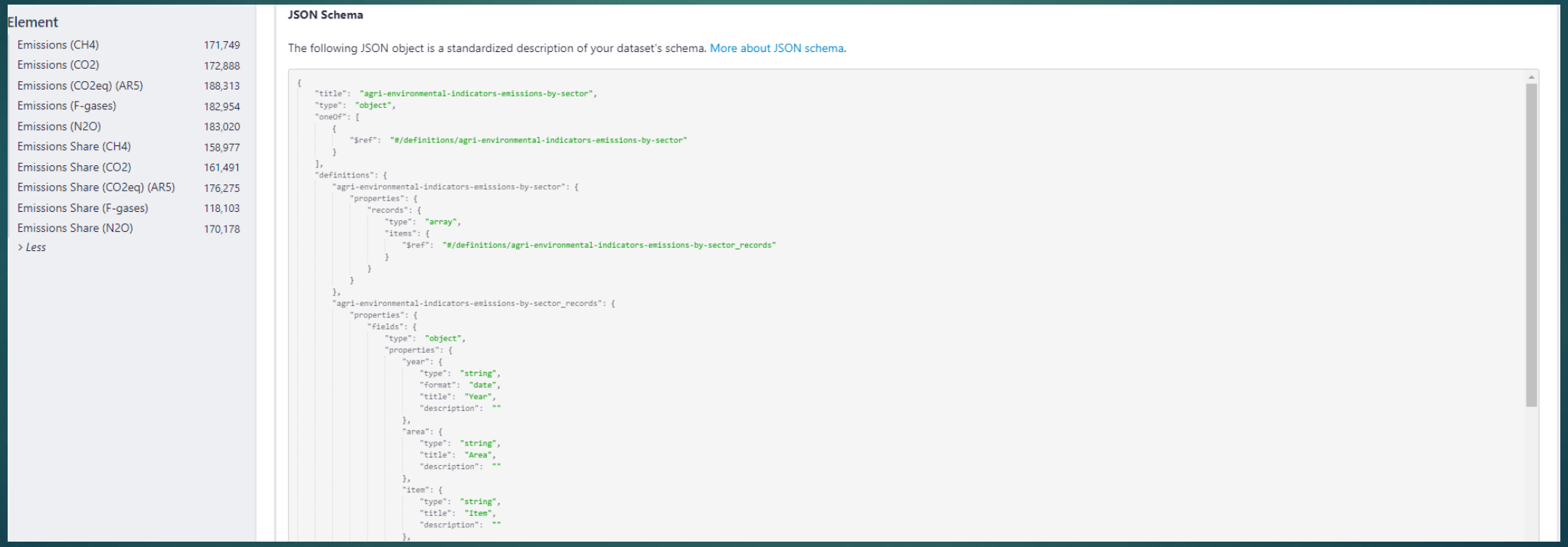


Data can be sorted with
– Year
- Area (Major countries)
- Items (Emission Sources or sectors)
- Elements (Specific Greenhouse Gases)

- Annual dataset with 6 columns which could be sorted by columns on right.
- This is the primary task for understanding Methane emissions from Agri & farming

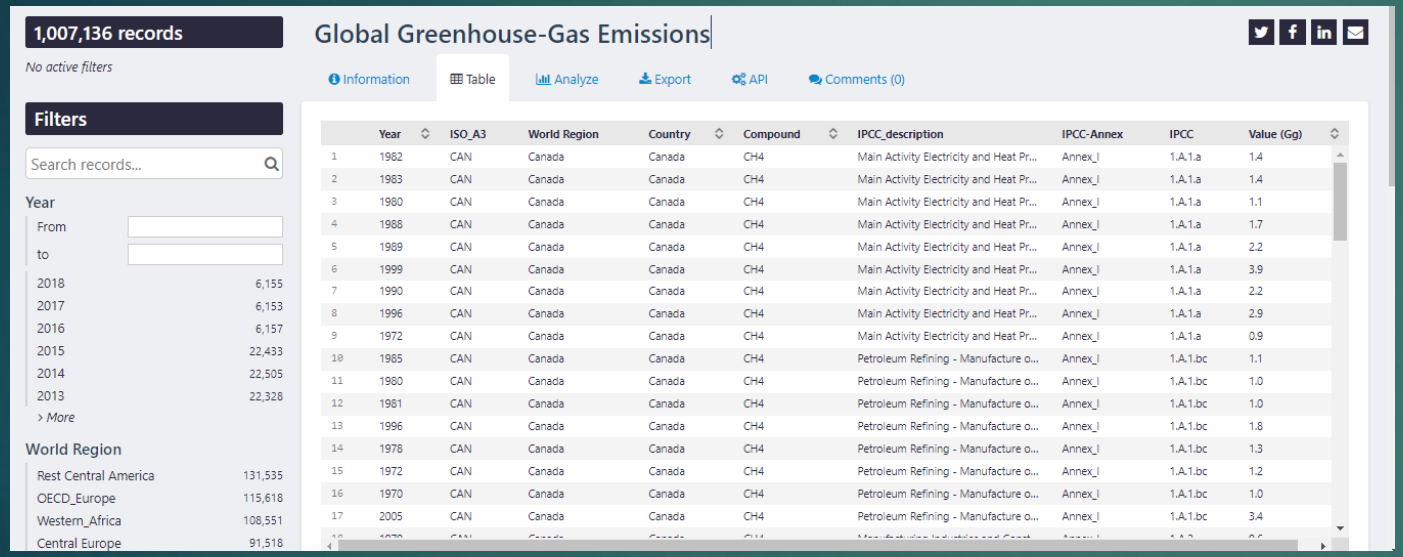
Data1– Emissions per sector

- DATA1: Available as CSV,JSON file or API with a html interactive page (We plan on using JSON file for the project)
  - https://datasource.kapsarc.org/explore/dataset/agri-environmental-indicators-emissions-by-sector/table/?disjunctive.area&disjunctive.item&disjunctive.element&sort=-item



Data2– Global Greenhouse Emissions

- DATA2: Available as CSV, JSON file or API with a html interactive page
- We plan to use JSON
  - https://datasource.kapsarc.org/explore/dataset/emissions_agriculture_energy_e_all_data_norm/table/?disjunctive.item&disjunctive.element

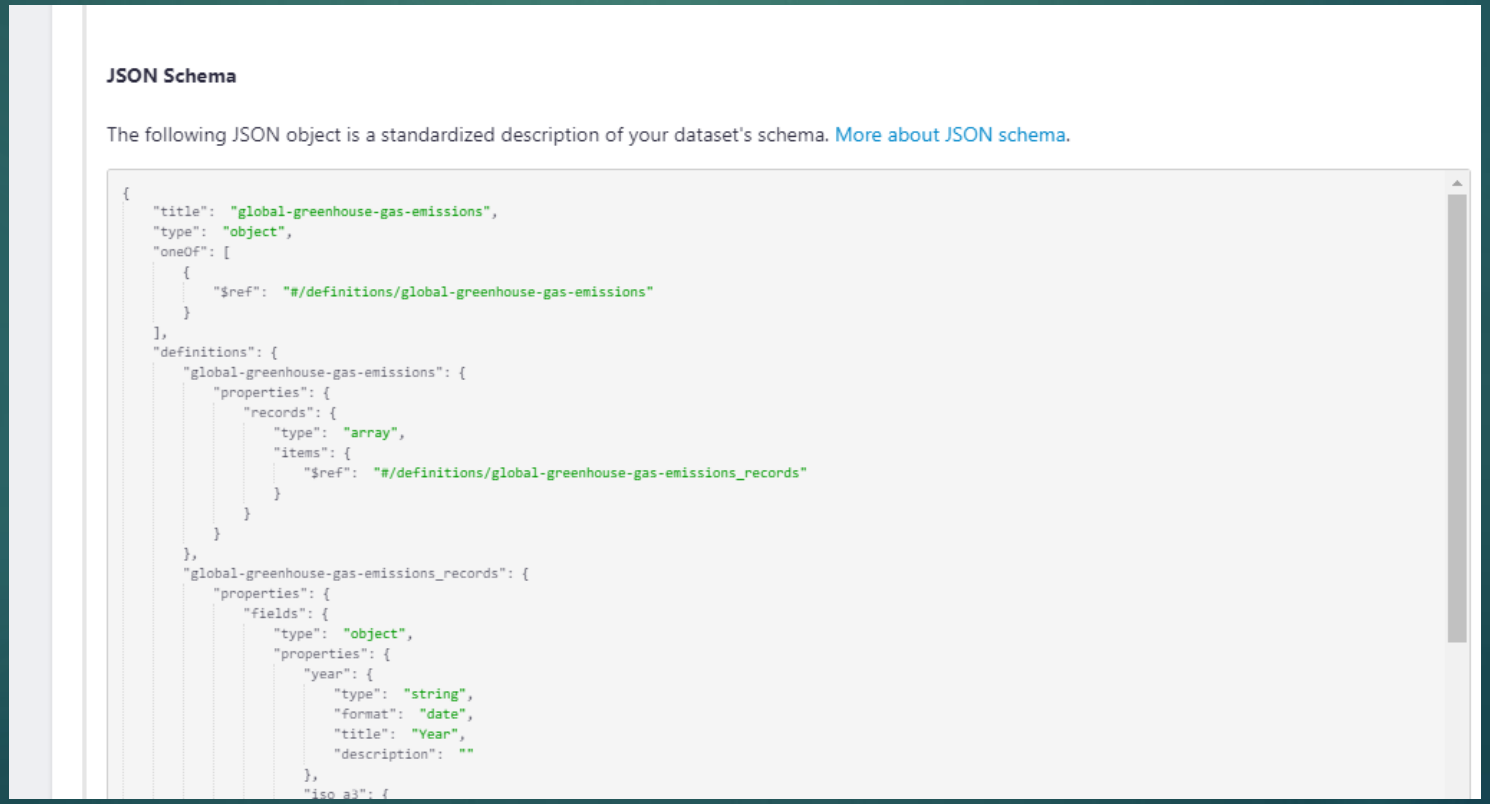


- Annual dataset with 9 columns which could be sorted by columns on right.
- This data helps understand global emissions from all industries to compare with Agri industry

Data can be sorted with
– Year
- World Region
- Country
- Elements (Specific Greenhouse Gases)
- The IPCC_Description column provides sector

Data 2– Global Greenhouse Emissions

- DATA2: Available as CSV, JSON file or API with a html interactive page
- We plan to use JSON (Schema is provided in Introduction Tab)
  - https://datasource.kapsarc.org/explore/dataset/emissions_agriculture_energy_e_all_data_norm/table/?disjunctive.item&disjunctive.element



JSON Schema

The following JSON object is a standardized description of your dataset's schema. More about JSON schema.


```
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    "title": "global-greenhouse-gas-emissions",
    "type": "object",
    "oneOf": [
        {
            "$ref": "#/definitions/global-greenhouse-gas-emissions"
        }
    ],
    "definitions": {
        "global-greenhouse-gas-emissions": {
            "properties": {
                "records": {
                    "type": "array",
                    "items": {
                        "$ref": "#/definitions/global-greenhouse-gas-emissions_records"
                    }
                }
            }
        },
        "global-greenhouse-gas-emissions_records": {
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                "fields": {
                    "type": "object",
                    "properties": {
                        "year": {
                            "type": "string",
                            "format": "date",
                            "title": "Year",
                            "description": ""
                        },
                        "iso_a3": {
```
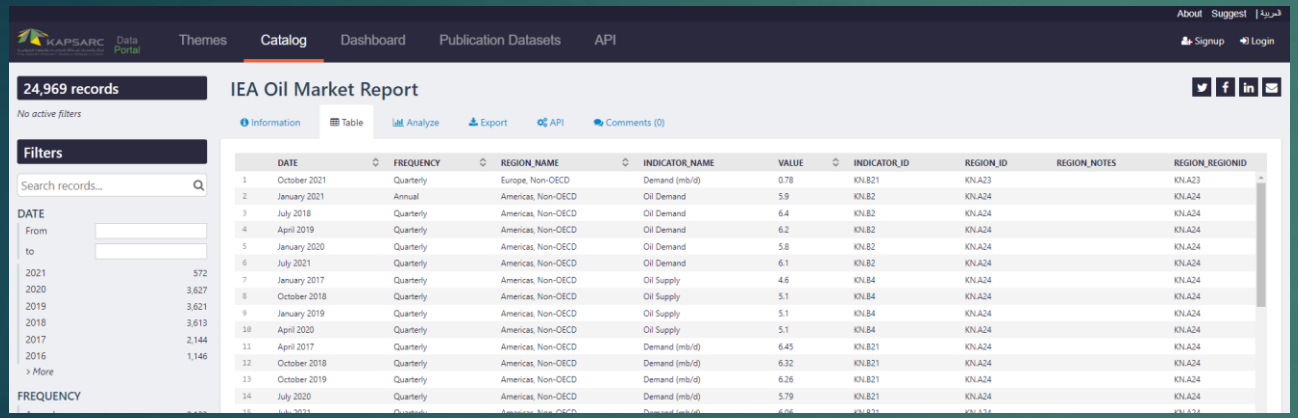
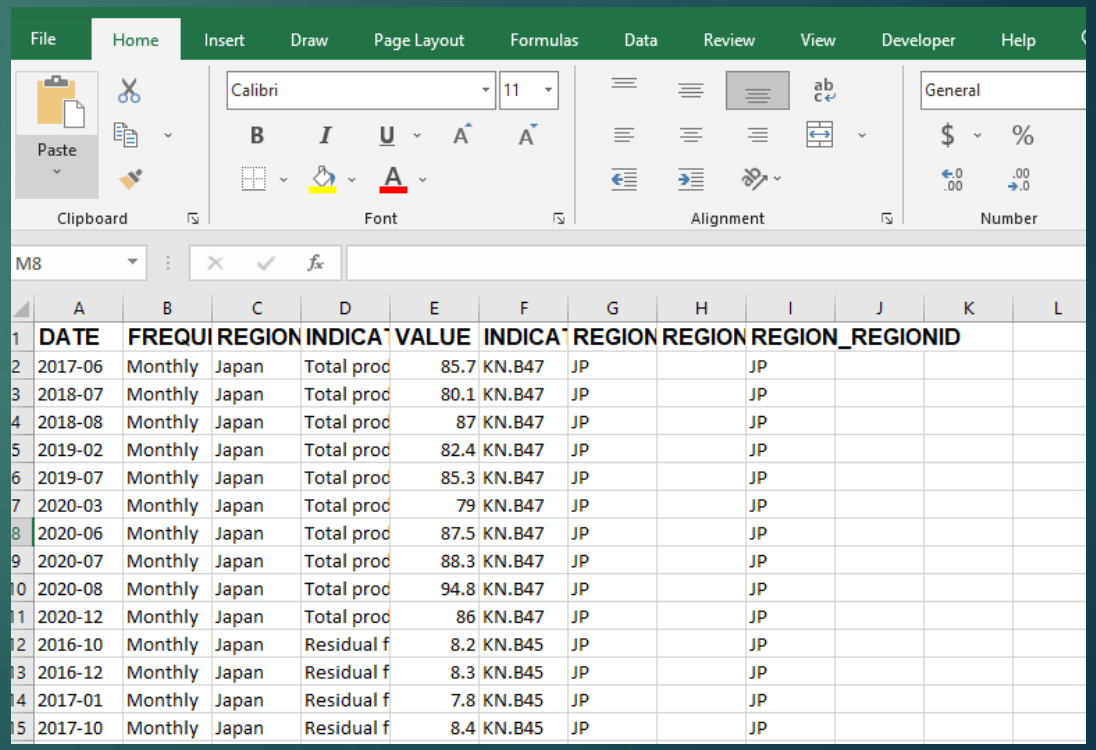

Data 3– Global Oil& Gas Demand

- DATA3: Available as CSV, JSON file or API with a html interactive page
- We plan to use CSV (Convert xls to CSV)
  - https://datasource.kapsarc.org/explore/dataset/iea-oil-market-report-2001-2016/information/?disjunctive.frequency&disjunctive.region_name&disjunctive.indicator_name





	A	B	C	D	E	F	G	H	I	J	K	L
1	DATE	FREQUI	REGION	INDICA	VALUE	INDICA	REGION	REGION	REGION_REGIONID			
2	2017-06	Monthly	Japan	Total prod	85.7	KN.B47	JP		JP			
3	2018-07	Monthly	Japan	Total prod	80.1	KN.B47	JP		JP			
4	2018-08	Monthly	Japan	Total prod	87	KN.B47	JP		JP			
5	2019-02	Monthly	Japan	Total prod	82.4	KN.B47	JP		JP			
6	2019-07	Monthly	Japan	Total prod	85.3	KN.B47	JP		JP			
7	2020-03	Monthly	Japan	Total prod	79	KN.B47	JP		JP			
8	2020-06	Monthly	Japan	Total prod	87.5	KN.B47	JP		JP			
9	2020-07	Monthly	Japan	Total prod	88.3	KN.B47	JP		JP			
10	2020-08	Monthly	Japan	Total prod	94.8	KN.B47	JP		JP			
11	2020-12	Monthly	Japan	Total prod	86	KN.B47	JP		JP			
12	2016-10	Monthly	Japan	Residual f	8.2	KN.B45	JP		JP			
13	2016-12	Monthly	Japan	Residual f	8.3	KN.B45	JP		JP			
14	2017-01	Monthly	Japan	Residual f	7.8	KN.B45	JP		JP			
15	2017-10	Monthly	Japan	Residual f	8.4	KN.B45	JP		JP			

Project Proposed Tasks / strategy

- Identify major countries with max GHG emissions (select globally)
- Understand total emissions per year for all sectors
- Work with dataset with Agriculture & farming for those countries and identify total emissions of methane, nitrous oxide and other gases
  - Display with graphs (optional – depending on available time)
- Work with oil Demand CSV to generate yearly oil demand got the selected countries.
- Load the data into SQL database – as many tables required depending on find…