

## **Deliverable 2**

**Please provide one paragraph description of the goals of your project \***

Climate change, its parameters, and the resolutions built around it need constant monitoring. In order to gauge the effectiveness of actions carried out by individual players of the international community to tackle this threat and to assess the validity of measures currently in place, we seek to build a geospatial tool with two visualization components - 1) The trend of key climate indicators over time at the country level with special emphasis on how these trends vary around major climate change conventions, and 2) The trend of key economic indicators over the same time period. The comparison between economic and climate indicators will allow us to answer some very important questions- whether high output demanded by developed nations from developing nations negatively affects the climate indicators of the latter. The tool will also have the option of drawing a comparison between different countries as well as greater regions that encompass a group of countries.

**For each source of data that you expect to use, please list the source of data, who will be responsible for collecting data from that source, and a date by which you expect the work of gathering the data from that source to be complete.**

The project requires two data sources- Climate Indicators and Economic Parameters- for all countries since 1995. The climate data is obtained from [WorldBank API](#) for the following indicators:

1. Alternative and nuclear energy (% of total use)
2. Fossil Fuel energy consumption (% of total)
3. CO2 Emissions (metric tons per capita)
4. Forest cover
5. Total precipitation
6. Min temperature
7. Max Temperature

Economic Parameters are downloaded as a .csv file from the [IMF database](#). The analysis will include a panel data of the following variables:

1. Volume of imports
2. Volume of exports
3. GDP per capita
4. GDP growth
5. GINI Index (From WB Databank)

Dhruv Sinha will be working on collecting data on economic indicators and Kaveri Chhikara will be working on gathering data on Climate parameters. Data collection is expected to be complete by February 27, 2022.

**Please give a brief sketch of the work that needs to be done to complete your project (other than data collection), include a description of which team member(s) will be responsible for completing this work and the expected timeline for completion. (This is optional for now. We will require this to be filled out in Week #7 at your check-in)**

The deliverable will be an package/application which will consist of the following components:

1. Sqlite database with the relevant tables defined to hold economic data, climate data and a blend of the two by means of cross-dataset analysis
2. A script that executes
  - a. climate data extraction from the World Bank API, stores it in an intermediate data structure, performs data wrangling and ultimately injects it into the sqlite database.
  - b. Processes economic data downloaded and stored as csv files within the application directory and injects it into the database.
3. A Dash application embedded within to serve as the visualization tool. This will consist of the following viz components:
  - a. Visualization of climate and economic indicators(% change) for various countries on a World map leading up to and after the occurrence of a major climate conference. Dynamic filters will be in place for conference year, years of lag and type of indicator.
  - b. Comparative analysis between economic and climate indicators in the form of dynamic/interactive trend charts, correlations and regressions.
4. General structure and command line argument handling
5. Virtual environment packaging and install.sh setup
6. Final report

Task allocation and timelines:

Task (Point number from component list above)	Team member(s)	Deadline
1	Vishal	03/01/2022
2 (a)	Kaveri	03/05/2022
2 (b)	Dhruv	03/05/2022
3 (a)	Vishal and Kaveri	03/10/2022
3 (b)	Dhruv	03/10/2022
4	Vishal	03/11/2022
5	Kaveri	03/11/2022
6	Dhruv and Kaveri	03/13/2022

## WB Indicator Names and Code

Series Name	Series Code
GDP growth (annual %)	NY.GDP.MKTP.KD.ZG
GDP per capita (current US\$)	NY.GDP.PCAP.CD
Gini index (World Bank estimate)	SI.POV.GINI
CO2 emissions (kg per PPP \$ of GDP)	EN.ATM.CO2E.PP.GD
CO2 emissions (kt)	EN.ATM.CO2E.KT
CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC
Energy use (kg of oil equivalent) per \$1,000 GDP (constant 2011 PPP)	EG.USE.COMM.GD.PP.KD
Forest area (% of land area)	AG.LND.FRST.ZS
Forest area (sq. km)	AG.LND.FRST.K2
GDP per person employed (constant 2011 PPP \$)	SL.GDP.PCAP.EM.KD
GDP per unit of energy use (constant 2011 PPP \$ per kg of oil equivalent)	EG.GDP.PUSE.KD.PP.KD
Population, total	SP.POP.TOTL
Renewable internal freshwater resources per capita (cubic meters)	ER.H2O.INTR.PC
Trade (% of GDP)	NE.TRD.GNFS.ZS
Bird species, threatened	EN.BIR.THRD.NO
Electricity production from hydroelectric sources (% of total)	EG.ELC.HYRO.ZS
Electricity production from natural gas sources (% of total)	EG.ELC.NGAS.ZS
Electricity production from nuclear sources (% of total)	EG.ELC.NUCL.ZS
Electricity production from oil sources (% of total)	EG.ELC.PETR.ZS
Electricity production from coal sources (% of total)	EG.ELC.COAL.ZS
Electricity production from oil, gas and coal sources (% of total)	EG.ELC.FOSL.ZS
Electricity production from renewable sources, excluding hydroelectric (% of total)	EG.ELC.RNWX.ZS
Electricity production from renewable sources, excluding hydroelectric (kWh)	EG.ELC.RNWX.KH
Energy intensity level of primary energy (MJ/\$2011 PPP GDP)	EG.EGY.PRIM.PP.KD

Energy related methane emissions (% of total)	EN.ATM.METH.EG.ZS
Forest area (% of land area)	AG.LND.FRST.ZS
Forest area (sq. km)	AG.LND.FRST.K2
Forest rents (% of GDP)	NY.GDP.FRST.RT.ZS
Goods exports (BoP, current US\$)	BX.GSR.MRCH.CD
Goods imports (BoP, current US\$)	BM.GSR.MRCH.CD
Other greenhouse gas emissions (% change from 1990)	EN.ATM.GHGO.ZG
Other greenhouse gas emissions, HFC, PFC and SF6 (thousand metric tons of CO2 equivalent)	EN.ATM.GHGO.KT.CE
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	EN.ATM.PM25.MC.M3
PM2.5 pollution, population exposed to levels exceeding WHO Interim Target-1 value (% of total)	EN.ATM.PM25.MC.T1.ZS
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	EN.ATM.PM25.MC.ZS
PM2.5 pollution, population exposed to levels exceeding WHO Interim Target-2 value (% of total)	EN.ATM.PM25.MC.T2.ZS
PM2.5 pollution, population exposed to levels exceeding WHO Interim Target-3 value (% of total)	EN.ATM.PM25.MC.T3.ZS
SF6 gas emissions (thousand metric tons of CO2 equivalent)	EN.ATM.SF6G.KT.CE
Total greenhouse gas emissions (% change from 1990)	EN.ATM.GHGT.ZG
Total greenhouse gas emissions (kt of CO2 equivalent)	EN.ATM.GHGT.KT.CE