**Capstone ideas**

**Include a short description for each idea.**

* The description should briefly discuss the problem and the data you’ll use to solve it. At this point, there’s no need to outline specific methods and techniques.

**Idea I) What factors affect investments in renewable energy?**

**Potential explanatory variables**

1. Regulatory environment
   1. World Bank’s RISE indicator can be a proxy
2. Access to capital markets and macroeconomic stability
   1. We can define this by checking the sovereign ratings (S&P, Moody’s). If a country has BBB- or more, they can be considered as having good access and stable macro conditions.
   2. Size of the domestic stock market?
3. Size of domestic energy market - energy usage per year
   1. Large domestic market means higher demand for energy, including renewable energy.
4. Electricity price (kw/h) in domestic market (in USD or % of GDP per capita)
   1. If the electricity price is high there is a market incentive for investing in new generating capacity, including renewable energy.
5. Oil/Natural gas exporters vs. importers
   1. Oil/gas importers would have more incentive to develop renewable energy capacity than exporters.
6. Natural abundance of hydro/solar/wind
   1. Might be difficult to obtain a global data on all 3 of these. Maybe focus just on solar?

**Data needed:**

1. RISE indicators, World Bank. (rise.worldbank.org)
2. Sovereign ratings from S&P, Moody’s and Fitch (whichever has the most number of countries covered. Also, we can use the data from more than one of these sources to fill the gaps in data. Assumption is that the methodology is reasonably similar between the 3 rating agencies, so it is possible to use them interchangeably).
3. World Bank data, Electric power consumption (kWh per capita)
4. Statista.com data for Electricity price (kw/h) (available only for 23 countries).
5. World Bank data on oil/gas net imports. If a country is net exporter of ***either*** oil or gas, then it should be classified as exporter.
6. Global atlas for hydro/wind/solar

**Idea II) Predicting construction permit duration in NYC**

Obtaining a construction permit can be a major hurdle for new developments. Trying to understand the factor affecting the time required to obtain a building permit will help investors and construction firms to better plan their project.

**Who needs this?**

Real estate developers; NYC Department of Buildings.

**Potential explanatory variables**

1. Initial cost
2. Building type (residential, commercial, mixed use, etc.)
3. Floors
4. Total Construction Floor Area
5. Zip code (to control for different zoning rules)
6. Some 60 other parameters, need to think over and experiment.

**Data needed**

1. NYC building permits issued based on the type of building, zip code, floor height, construction cost estimate, etc. Data available at:

<https://data.cityofnewyork.us/Housing-Development/DOB-Job-Application-Filings/ic3t-wcy2>

**Idea III) Predict the price of solar energy produced per kw/h in different regions/countries of the world given the current level of solar power, investments, planned investments, etc.**

**Who needs this?**

World Bank, UN, national policy makers, solar energy ivestors.

**Potential explanatory variables and data needed**

* Current installed capacity of solar power (base to add on). World Bank data.
* Most recent investment (% of GDP) in solar power. World Bank data.
* Planned investments. Alternatively, calculate the growth rate of increase in in this indicator and extrapolate. Need to find this info.

**Result**

A heat map of countries color-coded based on the predicted price of solar energy production in 2030.