**Capstone Three: Project Ideas and Proposal**

**Idea 1:**

1. **Solar Power Forecasting with Neural Networks:** Use solar power generation data from NREL and weather data to train a neural network for short-term and long-term solar power forecasting. The model would predict solar energy output to help optimize energy grid operations and minimize reliance on fossil fuels. The client could be a client that specializes in some type of solar, glass or mirror panels to explore where it needs to find new clients; or a land owner with high energy demand in a particular region interested in converting to renewable energy resources.
2. **Data Sources Possibilities**: [**https://data.nrel.gov/submissions/54**](https://data.nrel.gov/submissions/54)

Data details:The data provides temperature, pressure, air density, irradiance, and surface temperature data for the continental US sub-hourly.

1. **Anticipated data science approach**: Explore different models inNeural Networks

**Idea 2:**

1. **Wind Farm Power Generation with Neutral Networks:** Access wind speed, wind direction, and power generation data from wind farms. Develop a neural network-based model to optimize wind turbine operations by predicting wind conditions and adjusting turbine settings for maximum energy output. This project can contribute to efficient wind energy utilization. The client could be a client that specializes in wind turbines to explore where to explore and offer their product; or a land owner in a particular region with an energy demand interested in converting to renewable energy resources.
2. **Data source Possibilities:** [**https://data.nrel.gov/submissions/54**](https://data.nrel.gov/submissions/54)**.** Data details: “The WIND Toolkit provides meteorological conditions and turbine power for more than 126,000 land-based and offshore wind sites across the continental United States, and the SIND Toolkit provides sub-hourly solar power data designed to assist researchers and utilities in solar generation integration studies This data set includes meteorological variables, including wind speed, direction, temperature, pressure, air density, irradiance, and surface temperature. Parameters such as wind profiles, atmospheric stability, and solar radiation data are also included.” <https://www.osti.gov/dataexplorer/biblio/dataset/1471687>
3. **Anticipated data science approach:** Explore different models inNeural Networks

**Idea 3:**

1. **Renewable Energy Integration:** Combine datasets related to solar, wind, and other renewable energy sources, along with electricity demand data. Build a neural network that optimizes the integration of various renewable sources into the energy grid, ensuring a stable and eco-friendly power supply while minimizing reliance on non-renewable resources or fossil fuels. This idea brings together
2. **Data source Possibilities:**

As previous two ideas: WIND Toolkit [**https://data.nrel.gov/submissions/54**](https://data.nrel.gov/submissions/54)**.**

Hourly Electric Grid Monitor:

<https://www.eia.gov/electricity/gridmonitor/dashboard/electric_overview/US48/US48>

US Energy Information Agency Open Data: <https://www.eia.gov/opendata/index.php#bulk-downloads>

1. **Anticipated data science approach:** Explore different models inNeural Network