Emission Explorer

Alicia Dawn Taylor; Namra Ghafoor; Sharvari Sunil Mhatre; Shweta Saxena

Georgia Institute of Technology

{ataylor366; nghafoor6; smhatre34; ssaxena71}

Project Objective

- Create a data-driven visualization approach that will facilitate strategies to achieve the United States Federal Government's goal of reducing Greenhouse Gases (GHGs) and achieving carbon net neutrality by 2050
- Identify the geographical areas with the least renewable energy and forecast future statistics using an analytical approach to create tools for visualization of the eGRID dataset to assist stakeholders with decision-making for continuous improvement.

Current Greenhouse Gas Emission Reduction Strategies

Passage of laws like the Inflation Reduction Act

Improved passenger vehicle standards

EPA regulations on oil and gas

Methodology

1 Interactive USA map

- Explore current data
- Identify outliers
- Tools used will be Excel, Tableau, python
- Use user-centered design (Tsou, 2013)

2 Predictive Modeling

- Time series modeling based on previous research on GHG emissions and energy
- Forecast future and overcome data limitation of data over a year old
- Tools used will be python and Excel

Methodology Continued…

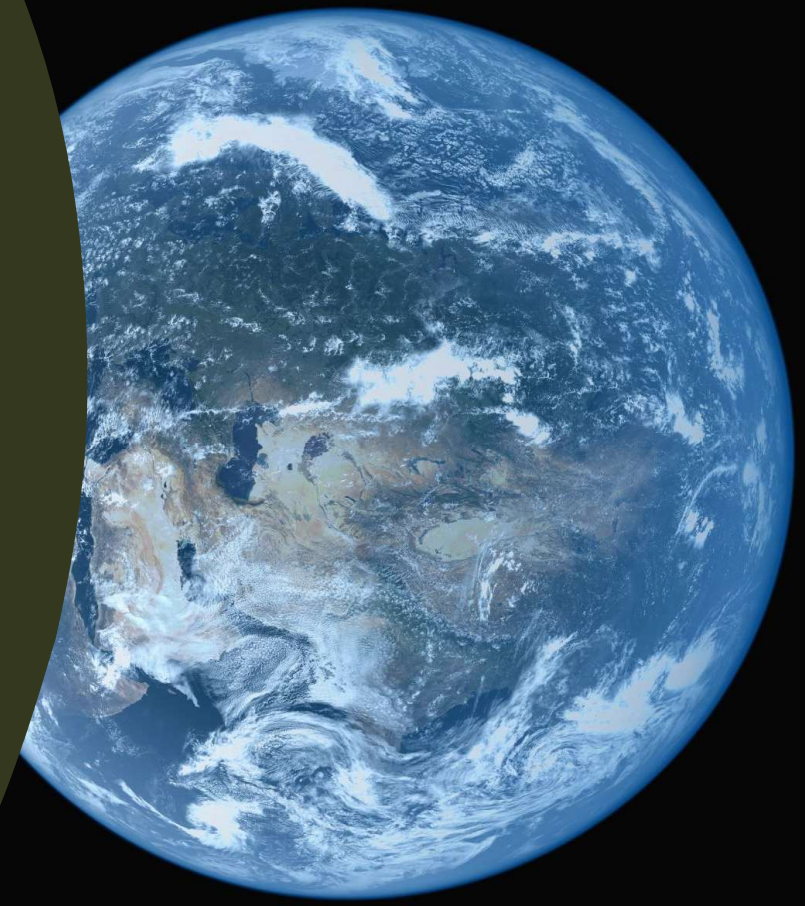
3

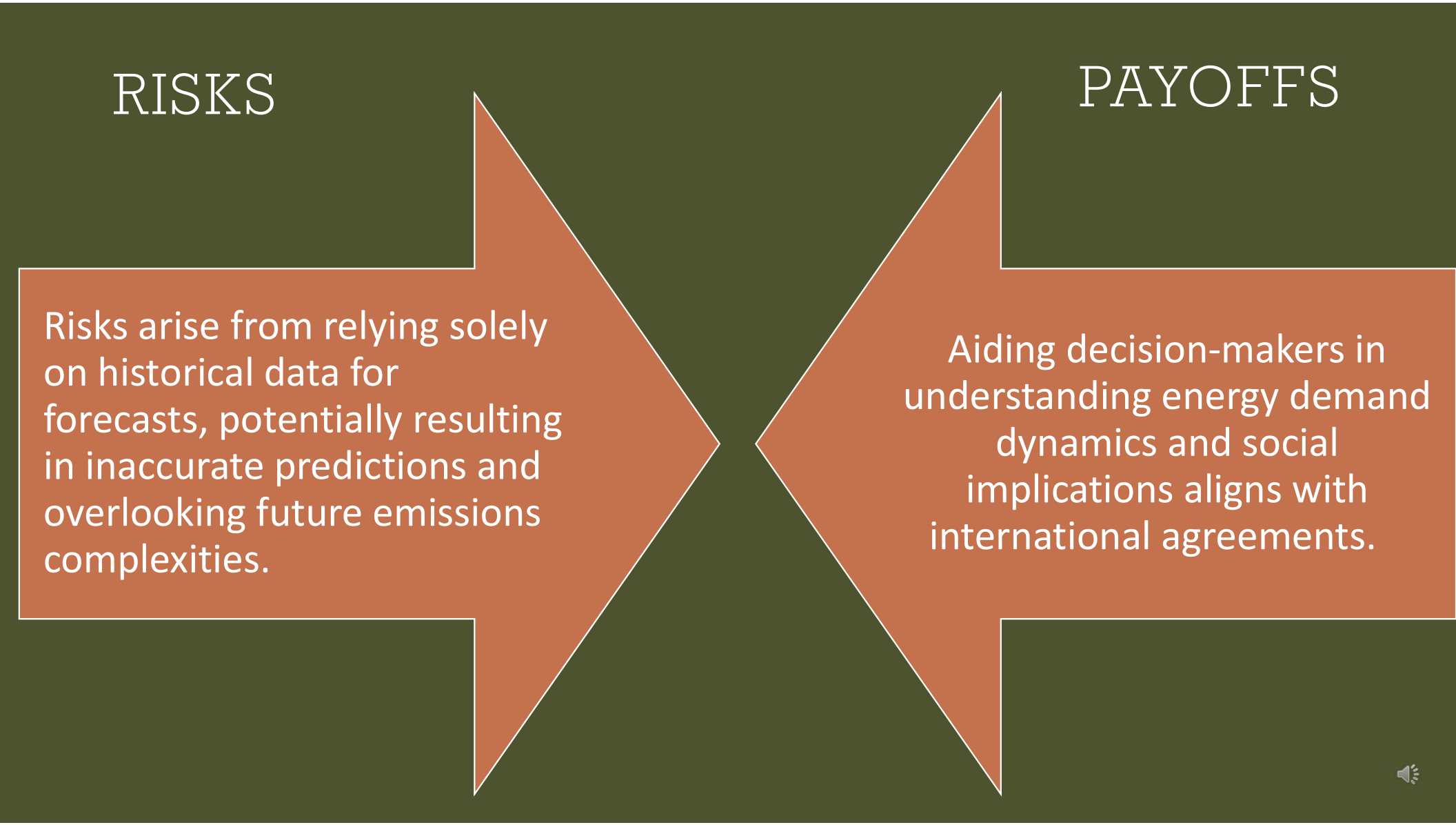
Relationship Modeling

- Explore the relation between demographic factions and emissions for socio-environmental awareness
- Verify IPAT equation i.e., I=PxAxT where I = Environmental Impact, P= Population, A= Consumption, T= impact per consumption (O'Neil, 2012)
- Use 'Environmental Kuznets Curve' to identify shape of the relationship between income and environmental harm (Grossman, 2010)
- Use identified shape to help plan for future emissions reduction success

Project Impact

- Half of the United States cooperating towards climate change could result in a 68% reduction in carbon (Galan-Martin, et al., 2018)
- Decreased carbon emissions will lead to more global cooperation and slow down the impact of average temperature increase on Earth's ecosystems




RISKS
Risks arise from relying solely on historical data for forecasts, potentially resulting in inaccurate predictions and overlooking future emissions complexities.
PAYOFFS
Aiding decision-makers in understanding energy demand dynamics and social implications aligns with international agreements.

Cost Analysis and Timeline for Implementation

Acquiring additional datasets beyond eGRID may involve costs, but much energy information is publicly available, with expenses revolving around time and computing resources.

States have unique opportunities for energy generation, with hydroelectric and solar power poised to support substantial energy replacement goals by 2030 and achieve complete replacement by 2050.

Checks for Success

- Progress report completion will be the midterm "exam"
- Final poster presentation and report will be the final "exam"

Task	Start Date	End Date	Team Members
Form Project Team	1/12/2024	1/17/2024	Sharvari with input from rest
Decide on Topic	1/17/2024	1/30/2024	All
Data Collection	1/17/2024	1/30/2024	All
Proposal Document	1/30/2024	2/25/2024	All
Proposal Presentation Slides and Video	2/25/2024	2/28/2024	Alicia with input from rest
Data Preparation and Cleaning	3/1/2024	3/5/2024	All
Model Creation	3/5/2024	3/15/2024	All
Develop Plan for Visualization	3/15/2024	3/22/2024	All
Progress Report	3/22/2024	3/29/2024	All
Final Report	3/29/2024	4/19/2024	All
Poster	3/29/2024	4/19/2024	All

All team members have contributed a similar amount of effort.