First is our Project Background

Why We Designed This Project？

Energy Status: Despite the unanimous adoption of the 'The 2030 Agenda for Sustainable Development' in 2015,

it now appears unattainable, with some indications of worsening instead of improvement.

The United Nations had planned a 45% reduction in carbon emissions from 2010 to 2030, but it now appears that there will be an increase of 10% instead.

Design Approach

By tapping into the potential for new energy generation in certain regions, we aim to gradually replace the dominant position of traditional energy sources, taking a further step towards net-zero emissions by 2050.

Design Objectives

Using publicly available data and models based on various parameters to find suitable clean energy sources for specific regions.

Challenges

data level

Global power station data

Global natural data such as wind speed, solar radiation, temperature

Population data, economic data, electricity usage data of countries and their regions

Nighttime illumination data, and more

model level

Can we integrate large-scale models? Are there options for creating effective machine learning models or expert models?

Implementation Status

In practice, only NASA's climate data, which includes temperature, precipitation, sunlight, wind speed, and atmospheric pressure data, have been integrated to develop an initial expert model. This model can provide a basic forecast of whether the target region has the potential for photovoltaic or wind power generation.

The model utilizes NASA's datasets to fit the suitable locations for establishing wind farms based on wind speed, wind direction, temperature, pressure, and snow depth data.

In the map, locations leaning towards the red direction correspond to more suitable wind farm sites. The green coordinates on the map represent the positions of the currently constructed wind farms, which closely align with the fitting results.

Using surface shortwave downward irradiance, sunshine duration index, sea-level atmospheric pressure, and direct solar radiation parameters, a model has been developed to predict the feasibility of deployment. the result show that Eurasian transition zone is a good choice.