GIS Project Proposal

Optimal Solar-Wind Plant Site Selection in Pakistan

Primary Users:

- Government officials, Solar/Wind energy companies, Environmental agencies

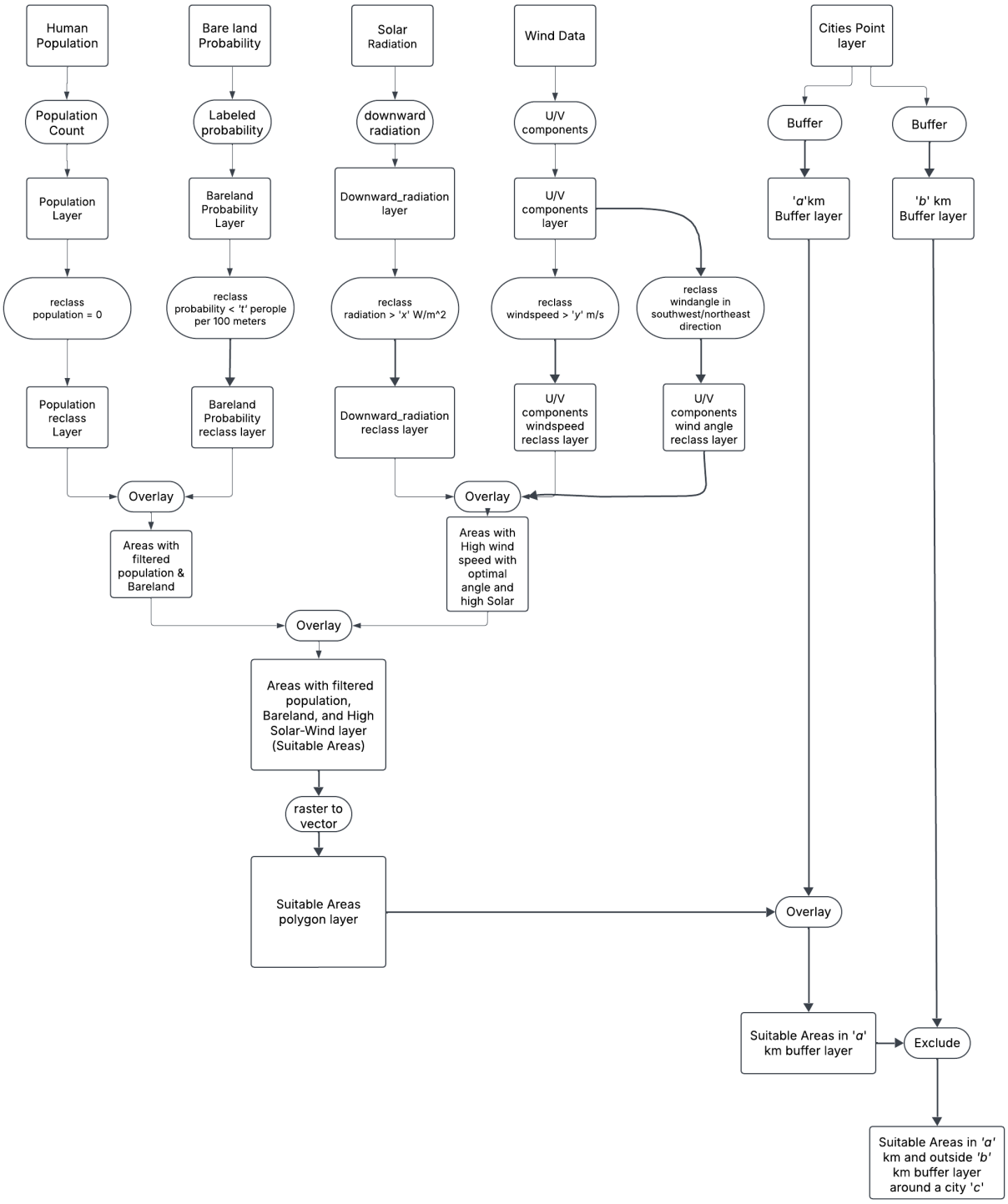
Decision Making Insights:

- Identify regions with high solar and wind energy potential for major cities in Pakistan.
- Analyze solar and wind potential using key factors like Wind speed/direction, Solar radiation and solar reflection, cloud cover, wind UV components. etc
- Select areas with low population density.
- Identify areas with the optimal balance of solar and wind potential based on the combined analysis of solar and wind data.
- Classify available land areas to ensure suitability for solar-wind plants, avoiding conflicts with existing land use (Selecting areas which are bare land).
- Converting the Raster data into vector data
- Create buffers around city point and obtain suitable areas within the buffer zone for a particular city.

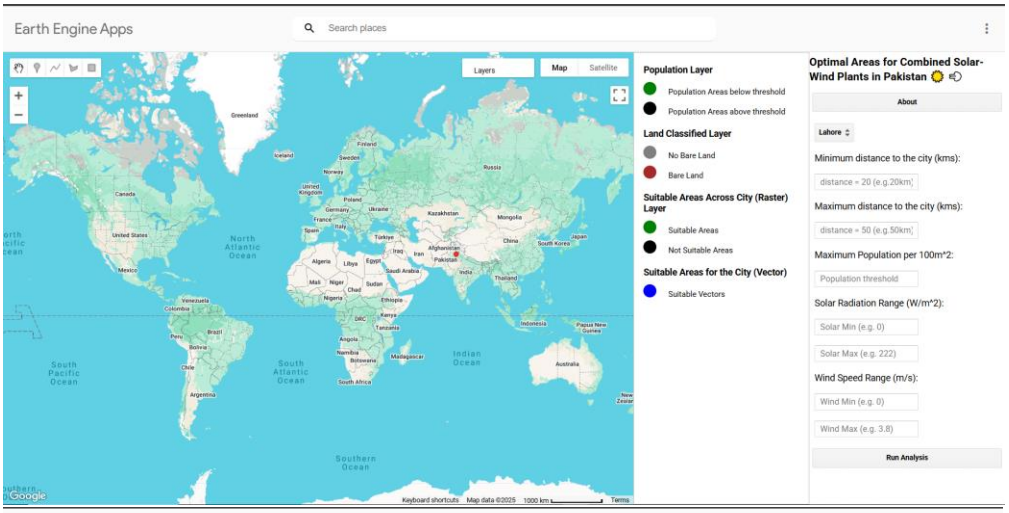
Datasets:

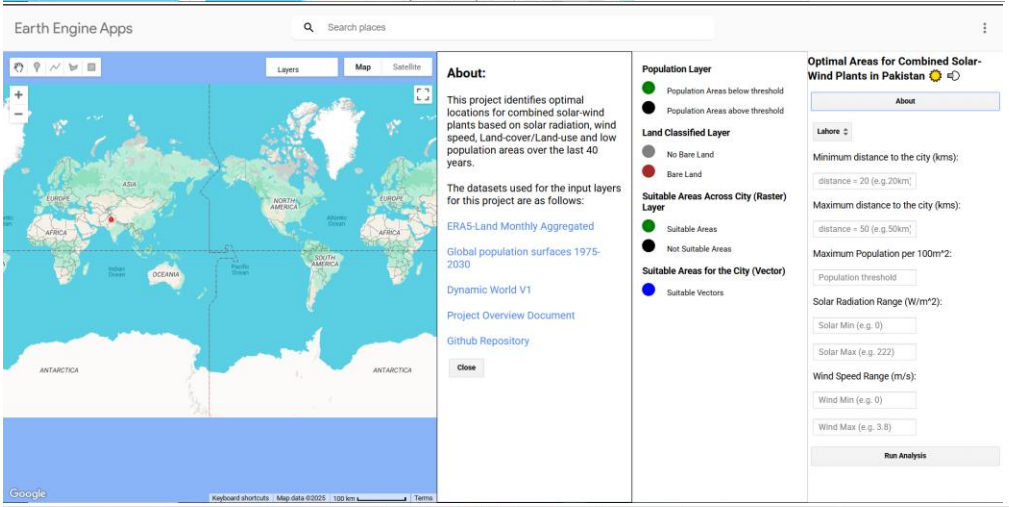
- **JRC GHSL P2023A GHS Built V** | Population | 2024 (Predicts till 2030)
- **ASTER AST L1T 003 & Google DynamicWorld V1** | Land Cover & Land use classification | 2025
- **NOAA CFSR** | wind speed, wind direction, solar radiation, and cloud fraction | 2018 to 2025

Cartographic Model:



App UI:


Earth Engine Apps
Search places
Layers
Map
Satellite
Population Layer
Population Areas below threshold
Population Areas above threshold
Land Classified Layer
No Bare Land
Bare Land
Suitable Areas Across City (Raster) Layer
Suitable Areas
Not Suitable Areas
Suitable Areas for the City (Vector)
Suitable Vectors
Optimal Areas for Combined Solar-Wind Plants in Pakistan
About
Lahore
Minimum distance to the city (kms):
distance = 20 (e.g.20km)
Maximum distance to the city (kms):
distance = 50 (e.g.50km)
Maximum Population per 100m^2:
Population threshold
Solar Radiation Range (W/m^2):
Solar Min (e.g. 0)
Solar Max (e.g. 222)
Wind Speed Range (m/s):
Wind Min (e.g. 0)
Wind Max (e.g. 3.8)
Run Analysis


Earth Engine Apps
Search places
About:
This project identifies optimal locations for combined solar-wind plants based on solar radiation, wind speed, Land-cover/Land-use and low population areas over the last 40 years.
The datasets used for the input layers for this project are as follows:
ERA5-Land Monthly Aggregated
Global population surfaces 1975-2030
Dynamic World V1
Project Overview Document
Github Repository
Close
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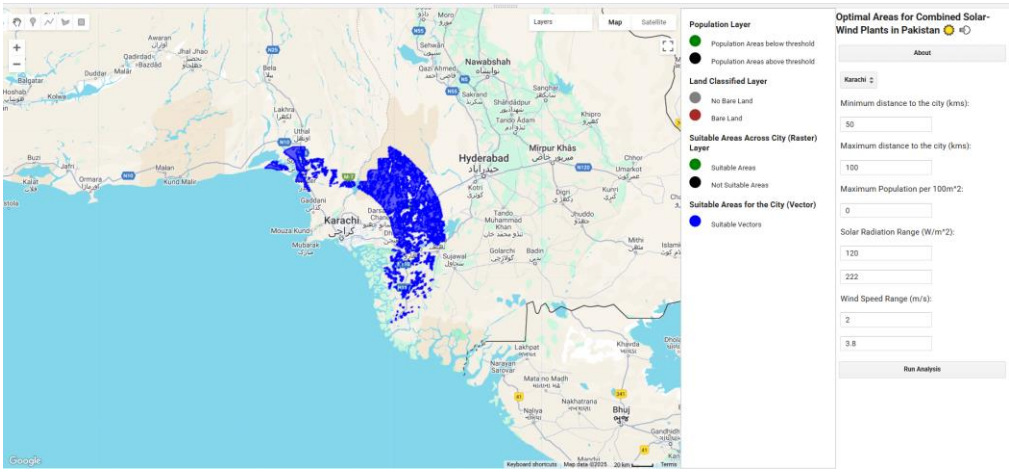
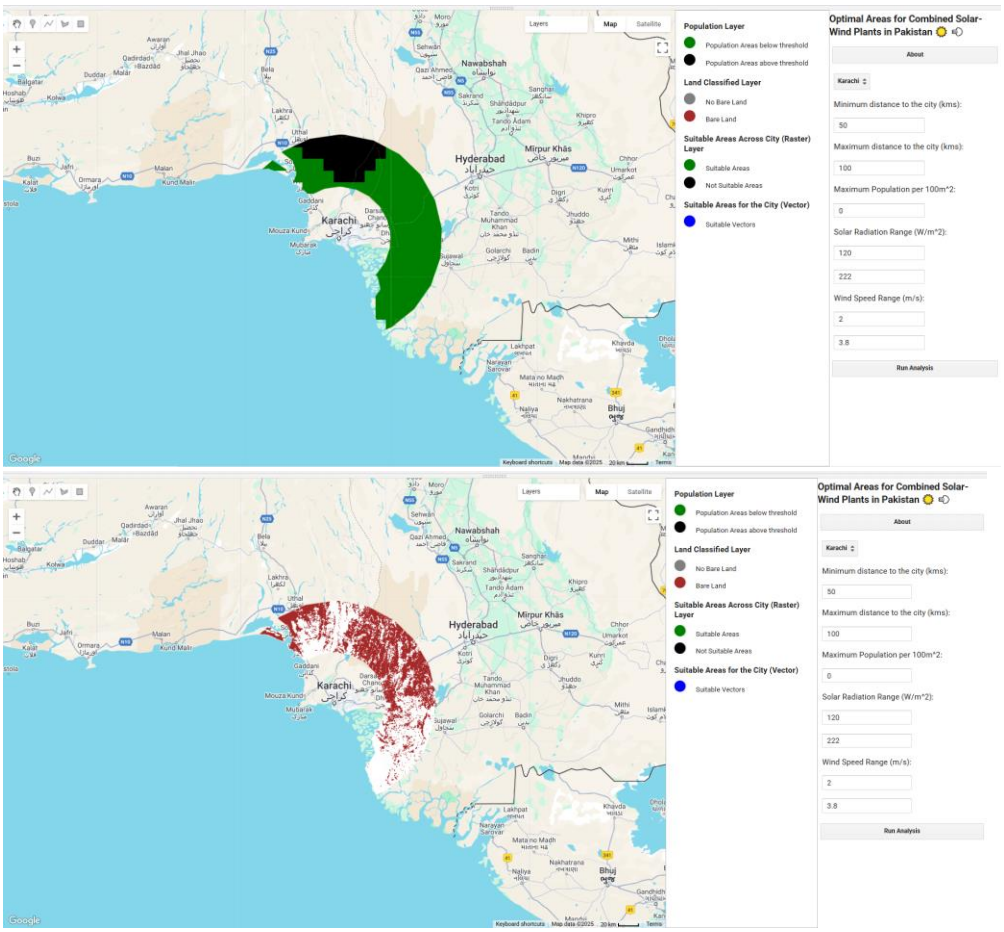

Nawabshah
Hyderabad
Mirpur Khas
Karachi
Bhuj
Optimal Areas for Combined Solar-Wind Plants in Pakistan
About
Karachi
Minimum distance to the city (kms):
50
Maximum distance to the city (kms):
100
Maximum Population per 100m^2:
0
Solar Radiation Range (W/m^2):
120
222
Wind Speed Range (m/s):
2
3.8
Run Analysis



URL: https://ee-jibranshiekh04.projects.earthengine.app/view/optimal-areas-for-combined-solar-wind-plants-for-pak