Introduction about MoonLight Energy Solutions

MoonLight Energy Solutions is committed to promoting efficiency and sustainability through targeted solar investments. This report summarizes the findings from a data analysis project aimed at identifying locations with the highest potential for solar energy adoption. The analysis leveraged data from three locations: benin-malanville, sierraleone-bumbuna, and togo-dapaong_qc.

Methodology:

- **Data Acquisition:** Solar radiation data (DHI, GHI, DNI) and other data's for the three locations was obtained and provided to me as .csv file from the engineering team
- **Data Cleaning and Preprocessing:** The data may have undergone cleaning steps to address missing values, outliers, or inconsistencies.
- **Descriptive Statistics:** Descriptive statistics were calculated for each variable (DHI, GHI, DNI) to understand central tendencies (mean, median) and variability (standard deviation).
- **Further Analysis:** additional analysis like boxplots, histograms, or correlation analysis were also performed on the dashboard and also in the notebooks.

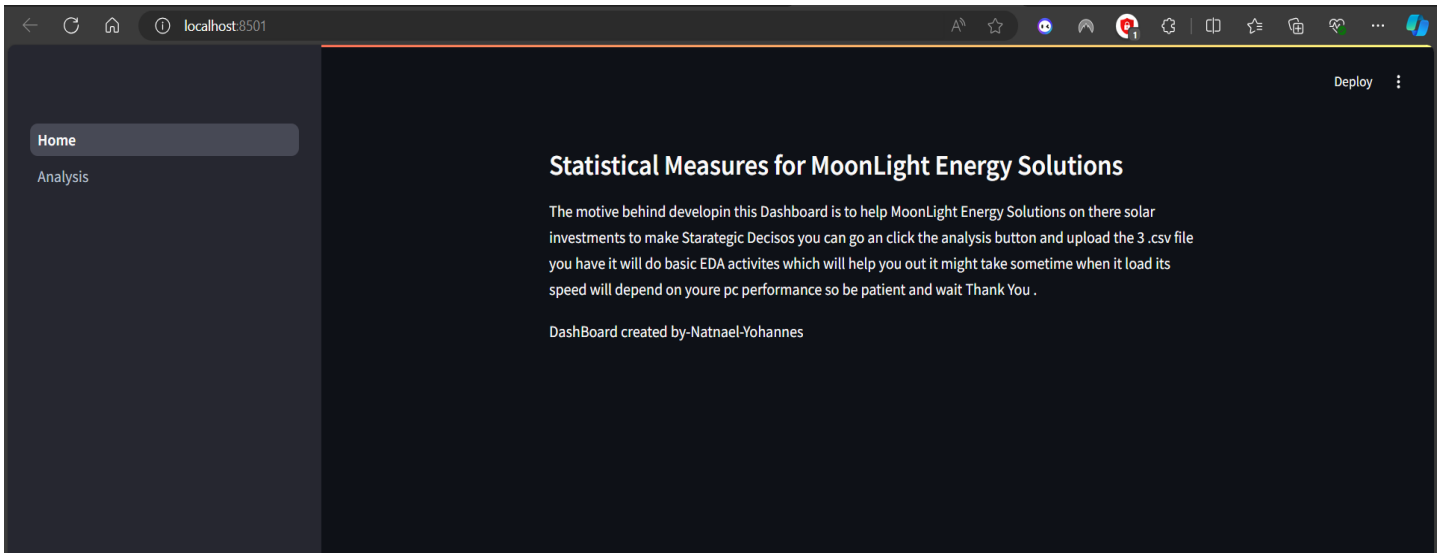
Findings:

- **Solar Radiation Potential:** All three locations exhibited significant solar radiation levels, as evidenced by the high mean values for GHI (Global Horizontal Irradiance).
- **Variability:** The high standard deviations across all locations indicate significant variation in solar radiation levels. This highlights the importance of considering historical data and potential seasonal fluctuations when making investment decisions.
- **Location Comparison:**
    - benin-malanville showed slightly higher average DHI and DNI compared to the others.
    - sierraleone-bumbuna had the lowest average GHI, suggesting potentially lower overall solar energy generation.
    - togo-dapaong_qc had the highest mean GHI and DNI, making it a strong candidate for solar investment. However, further investigation is needed to understand the minimum values of zero for DHI and GHI (potential data collection differences).

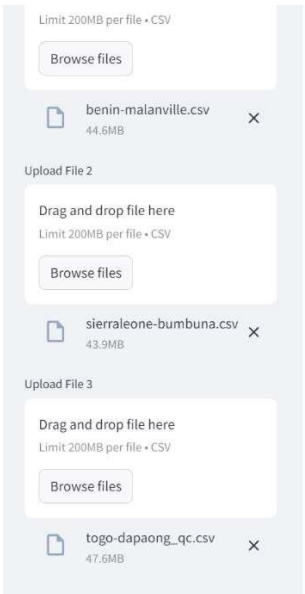
Recommendations:

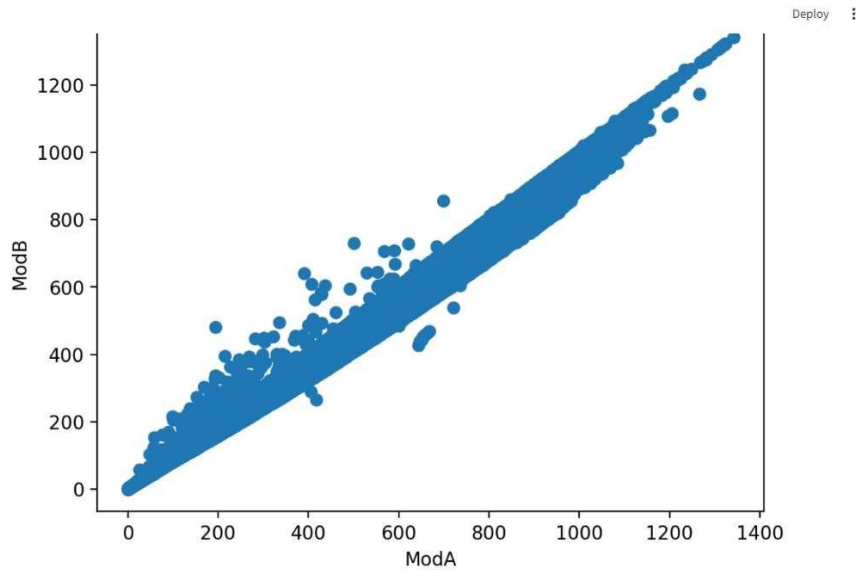
- Based on the initial analysis, togo-dapaong_qc appears to be the most promising location for initial solar investment due to its consistently high solar radiation levels.
- Further analysis with historical data and additional locations is recommended to create a comprehensive picture of solar energy potential across the target region.
- MoonLight can leverage visualization tools like dashboards built using Streamlit to present the findings interactively, allowing stakeholders to explore data from different locations and make informed decisions.

Photos from Home



Photos from analysis





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sierraleone-bumbuna.csv
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Deploy

RH	-0.5467	-0.5488	-0.4319	-0.5647	-0.5578	-0.7919	1	-0.4712	-0.4837	-0.4164	-0.3487	-0.5097	0.5714
WS	0.3713	0.3115	0.3472	0.3665	0.3648	0.5392	-0.4712	1	0.9739	0.7301	0.5662	0.6431	-0.2913
WSgust	0.4114	0.3421	0.386	0.4067	0.405	0.5571	-0.4837	0.9739	1	0.8406	0.6272	0.7	-0.2762
WSstdev	0.4125	0.3387	0.3904	0.4098	0.4084	0.484	-0.4164	0.7301	0.8406	1	0.6937	0.7245	-0.1912

Dataset 3:

	GHI	DNI	DHI	ModA	ModB	Tamb	RH	WS	WSgust	WSstdev	WD	WDstdev	BP	Cle
GHI	1	0.8773	0.8521	0.995	0.9954	0.5625	-0.2581	0.4217	0.4439	0.3996	0.0899	0.4793	0.0591	0
DNI	0.8773	1	0.5327	0.8897	0.8897	0.5045	-0.3279	0.3667	0.3849	0.3434	-0.0179	0.3975	0.0475	0
DHI	0.8521	0.5327	1	0.833	0.8326	0.4898	-0.155	0.3906	0.4105	0.367	0.1541	0.4543	0.0523	0
ModA	0.995	0.8897	0.833	1	0.9996	0.5611	-0.287	0.4203	0.4426	0.3986	0.0572	0.4725	0.0642	0
ModB	0.9954	0.8897	0.8326	0.9996	1	0.5561	-0.2801	0.4215	0.4436	0.399	0.0611	0.4721	0.0687	0
Tamb	0.5625	0.5045	0.4898	0.5611	0.5561	1	-0.4004	0.1971	0.2211	0.2271	0.0949	0.3614	-0.5208	0
RH	-0.2581	-0.3279	-0.155	-0.287	-0.2801	-0.4004	1	-0.1476	-0.1311	-0.0757	0.5213	-0.0759	0.2252	-0
WS	0.4217	0.3667	0.3906	0.4203	0.4215	0.1971	-0.1476	1	0.9776	0.728	0.1647	0.5051	0.0879	0
WSgust	0.4439	0.3849	0.4105	0.4426	0.4436	0.2211	-0.1311	0.9776	1	0.8274	0.1855	0.562	0.086	0
WSstdev	0.3996	0.3434	0.367	0.3986	0.399	0.2271	-0.0757	0.728	0.8274	1	0.2409	0.5936	0.0654	0

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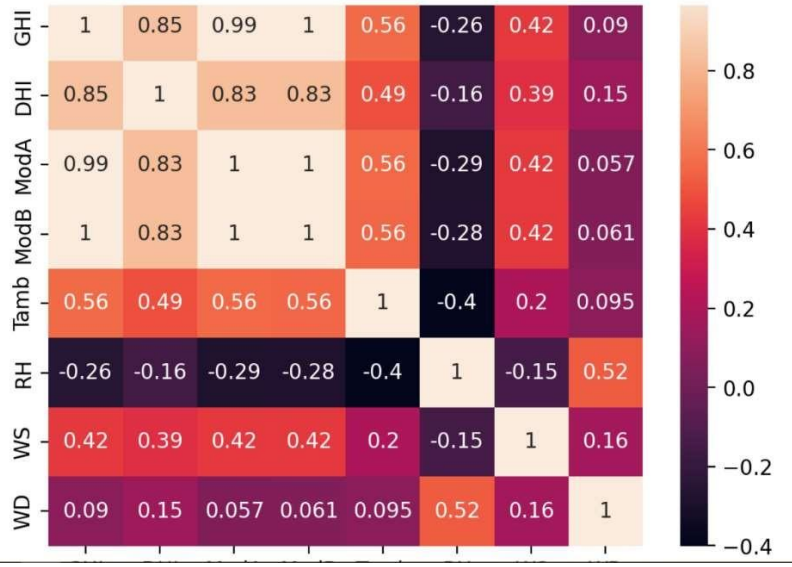

Conclusion:

This initial data analysis provides valuable insights into solar radiation potential across three locations. By continuing with the recommended next steps, MoonLight Energy Solutions can make data-driven decisions to optimize solar investments, promoting efficiency and sustainability in its target markets.

References

Doesn’t include YouTube videos: -

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https://datalore-forum.jetbrains.com/t/use-pip-or-conda-to-install-openpyxl/1111

https://www.statology.org/no-module-named-plotly/

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Gitlink: - https://github.com/Nat1-Y/MoonLight_Energy_Solutions/tree/task1