

PHOTOVOLTAIC SYSTEM AS ALTERNATIVE ENERGY SOURCE FOR NORTHEAST BRAZIL

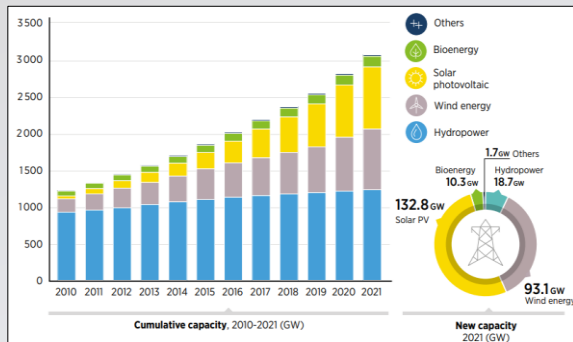
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Abbreviated abstract: Based on data on radiation and solar energy generation in Bahia, analyses were accomplished to evaluate the feasibility of implementing its use since this renewable energy source also shows itself interesting from a social point of view. However, it was ascertained that foster incentives need to be relevant to expand their use by families with unfavorable socioeconomic conditions.



Diversification of the Energy Matrix

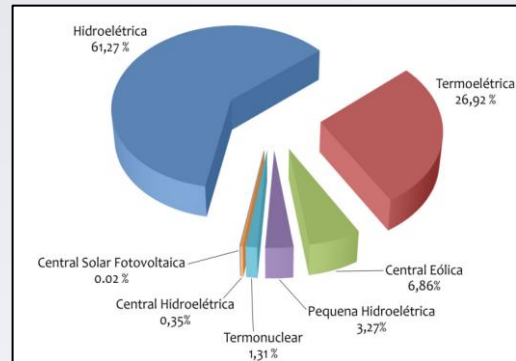


Picture 1 - Global generation of renewable electricity (IRENA, 2022).

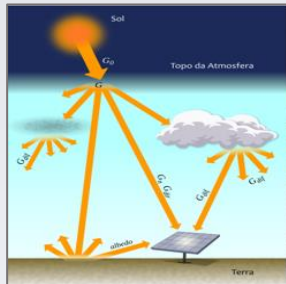
According to studies, there is a growing increase in the global use of solar energy. In this context, studies also carried out in Brazil have confirmed this increase.

To assess the potential of this model in the Brazilian energy matrix, the region of the state of Bahia was selected for the study presented since research carried out in the country suggests that the area has the most significant potential for generating and expanding this type of technology. Thus, the following steps for evaluating the hypothesis were performed:

- ❑ Insertion of the theoretical framework and research sources regarding the global expansion of the use of photovoltaic energy.
- ❑ Assessment of the economic-social and environmental impact of the model from the use and generation of solar energy.
- ❑ Treatment and cross-referencing of data provided by INMET on radiation and ANEEL of residential microgeneration consumers in the state of Bahia.
- ❑ Elaboration of temporal analyzes of the selected municipalities to validate the postulate regarding the current potential generation.



Picture 2. Brazilian Electric Matrix, (INPE, 2017).



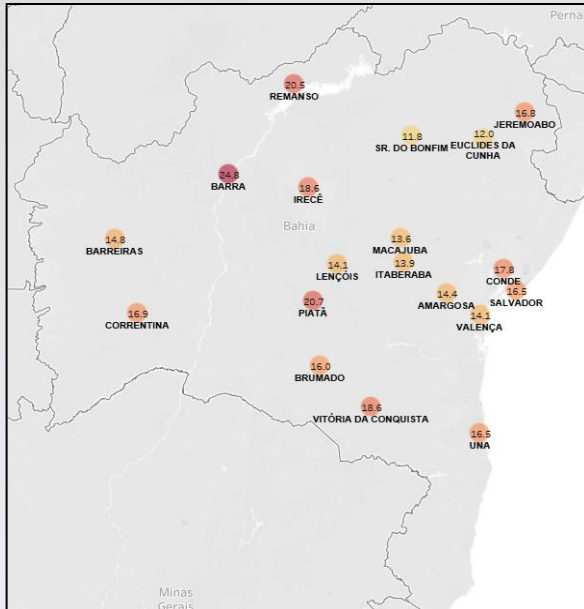
Picture 2 - Components of Solar Irradiance (Brazilian Solar Energy Atlas, 2017).



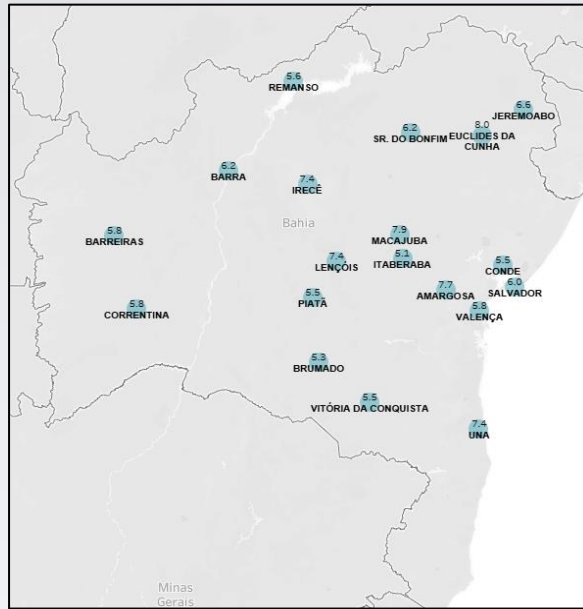
Picture 3. Automatic Data Collection Station (Brazilian Solar Energy Atlas, 2017).



Comparative data collection and analysis – State of Bahia



Picture 3. Solar radiation by region– (kW), (Own Authorship, 2020).



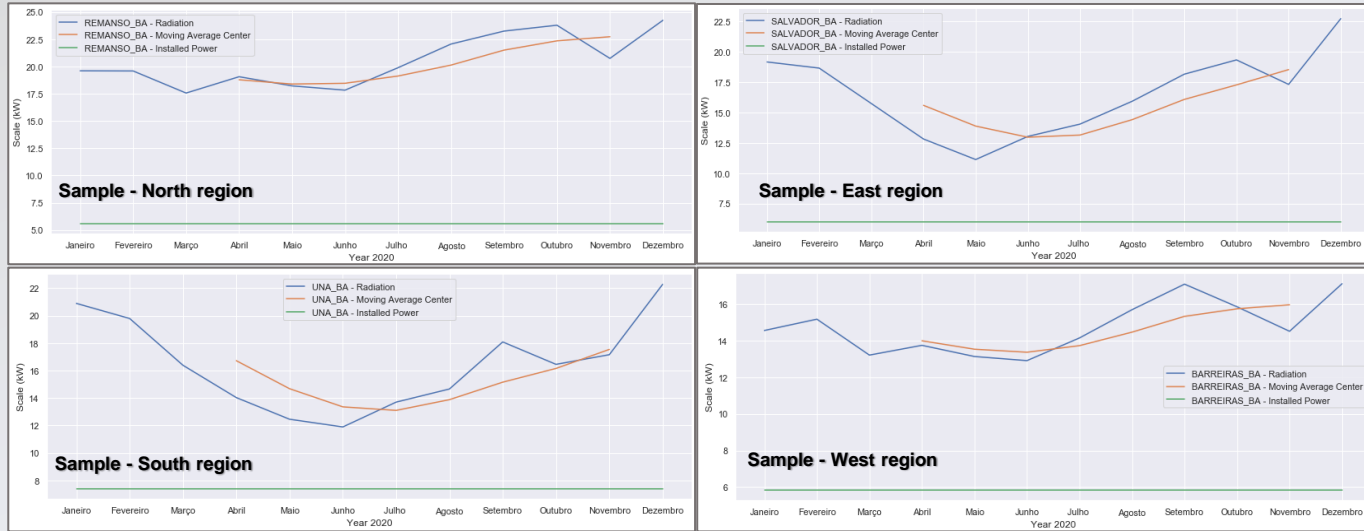
Picture 4. Installed power by region– (kW), (Own Authorship, 2021).

- ❑ The radiation data were obtained through environmental factors that condition the irradiation necessary for producing solar energy from photovoltaic panels.
- ❑ After processing the INMET and ANEEL data, we compared the results of the average annual radiation of the selected areas versus the maximum average power of generation of residential consumers (class B1).
- ❑ The comparison found that the radiation level exceeds the energy generation volume, which shows that the current amount of generation is lower than the generation potential from the radiation identified.



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Findings



Picture 6. Measurement of Radiation and Power, (Own Authorship, 2020).

Although the average of generated radiation is not stationary, according to the time series elaborated, it is possible to state that the transmitted radiation variance found in each analyzed city does not commit to the daily volume of radiation to be collected to ensure the required suitable amount to generation once the data allow us to interpret that the Bahia region has a natural potential for future investments in solar energy generation. Furthermore, photovoltaic energy is a technological model that, besides being sustainable for producing electricity, is fully integrated into the Brazilian energy matrix once renewable energy sources have been expanding their space in the process of generating electricity in Brazil.

Therefore, solar energy can become an essential economic and social vector to promote social equality and meet national demand since its surplus can contribute to reducing costs associated with the conventional generation and distribution of energy in the country.