

Preliminary Assessment of Solar and Wind Potential in the CMCC

Context

Interest in the use of renewable energy in the CMCC has been expressed, but the area is home to many sites of natural or cultural importance and any development has to take them into account. Wind power is already exploited at Baldy Beacon and a project for solar development is planned by BECOL but there has not been a systematic assessment of the renewable potential in the CMCC yet.

The most promising sites for both solar and wind power development were determined in a first step by excluding the Chiquibul National Park and applying the criteria in Table 1, which resulted in the *good sites* in Figure 1. Then, further limitations and exclusions were applied to identify the *best sites*. These include a minimum distance of 400m to rivers and 500m to roads, a maximum distance of 10km to the transmission grid and roads and an exclusion of all sites that are categorized as ecosystem assets.

Table 1: Criteria to identify most suitable sites

	Solar	Wind
Slope	3%	10%
Aspect	135-225°	
GHI	1800 kWh/m ²	-
Mean speed	-	6.5 m/s
Power density	-	250 W/m ²

Key Findings

13 solar and 16 wind sites were identified as *good sites* under the criteria in Table 1, three and five of which respectively remained as *best sites*. This last group distinguishes itself from the *good sites* through its proximity to both the transmission grid and main road, i.e. the basic infrastructure, which is why all but one of the sites outside of the Mountain Pine Ridge Forest Reserve were excluded.

Solar

The solar irradiance (GHI) is very similar throughout the CMCC. Therefore, the *good sites* don't actually lead to a higher energy output but they are much easier to exploit due to shallower slopes. The *best sites* present an even bigger opportunity for sustainable power as sites too far from the basic infrastructure are excluded. The solar sites within the Mountain Pine Ridge forest in particular are very close to the transmission grid and the main road used by tourists. There is only one site that directly overlaps with an ecosystem asset; a solar site in the West of the Caracol Archaeological Reserve that overlaps with an area of agricultural development. One site on the border between the two forests is found within a flood zone and was excluded from the *best sites*, while two further sites were excluded because of their proximity to the main road. The site that has been identified by BECOL is not among the most suitable sites in this analysis because it receives rather

Key lessons

- Solar power is promising throughout the CMCC whereas careful site selection is essential for wind
- The *good sites* show little direct overlap with important assets and the *best sites* are distinguished by their proximity to basic infrastructure

little irradiation and is right on the river Rio On, which represents a risk of pollution.

Wind

There are large differences in the potential power output between the suitable wind sites as the mean wind speed can reach up to 7.2 m/s and the power output is proportional to the cube of the wind speed. Two clusters can be identified among the *good sites* with one outlier site. While the eastern cluster was excluded from the *best sites* due to its distance from the basic infrastructure, the power that could be generated by the same system is up to 36% higher. Installing a wind turbine in any of the suitable sites would not lead to viewshed impacts from any tourist attraction. On-site wind speed measurements of both clusters are suggested for a more precise determination of the potential.

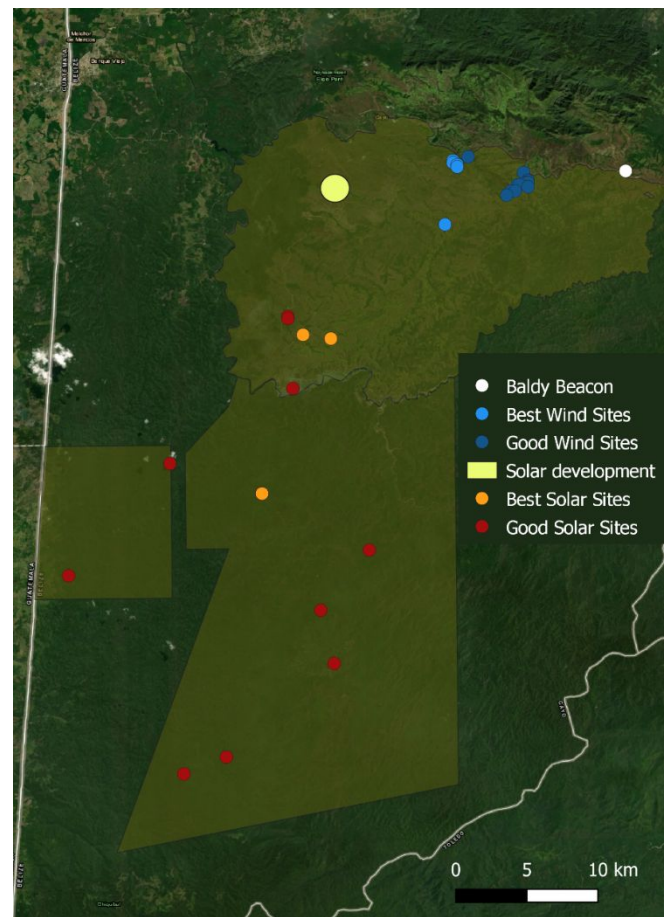


Figure 1: Most suitable sites for renewable development

References:

ESMAP & Solargis. (2020). *Global Solar Atlas*.
<https://globalsolaratlas.info/>

ESMAP & Technical University of Denmark (DTU). (2020).
Global Wind Atlas 3.0. <https://globalwindatlas.info/>