

Assessment of water-energy-waste resources in rural houses in Gran Canaria Island, as a tool for the climate change mitigation.

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Introduction

Rural tourism is one of the products with the greatest potential for growth within the tourist offer of the island of Gran Canaria (G.C.), as it combines sustainable development and respect for the natural environment. 78 rural houses of the region called “Medianías” have been analyzed. It represents 43% of rural houses in G.C.

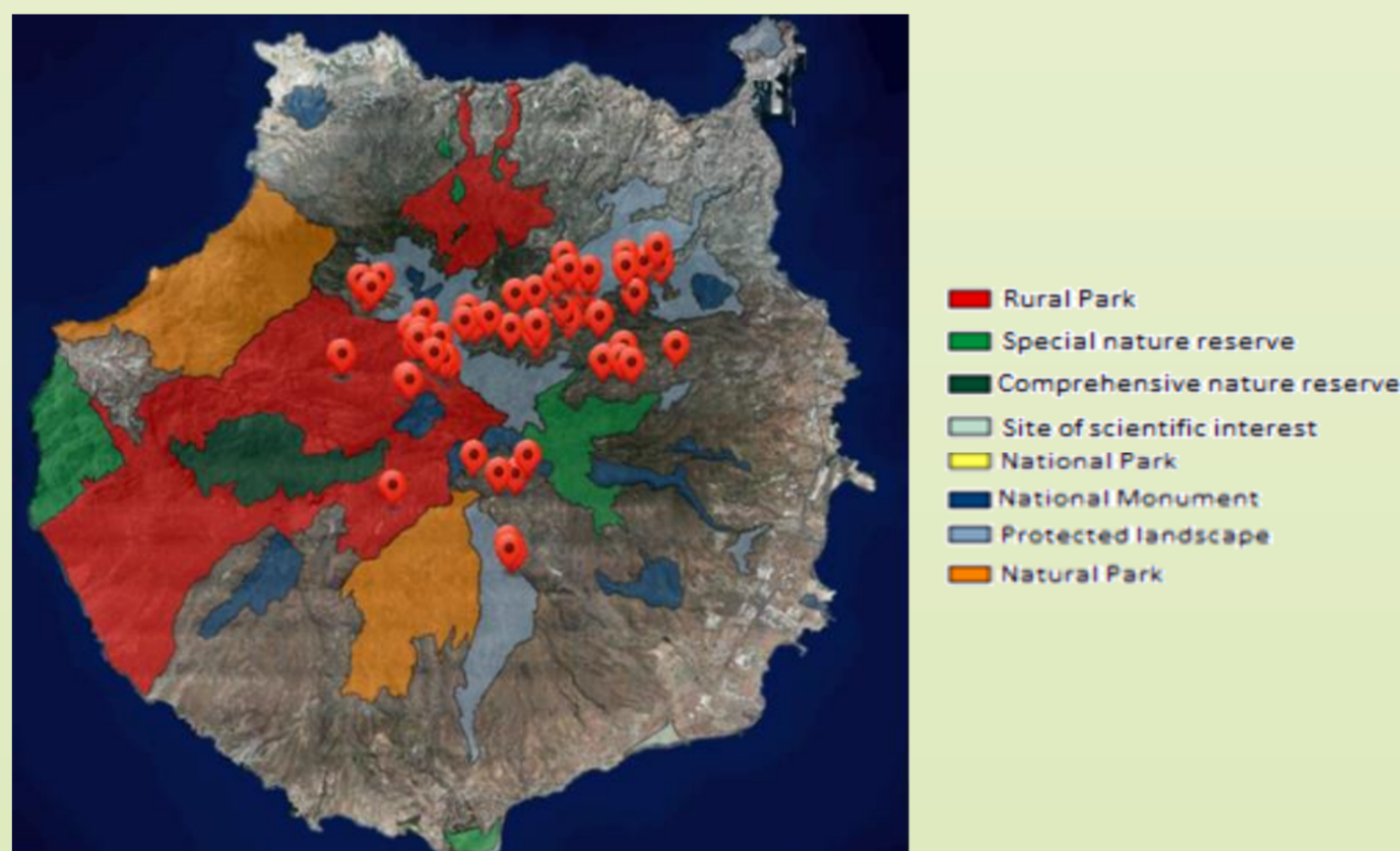


Figure 1. Location of the rural houses (in red), Protected Natural Areas, and Biosphere Reserve of G.C.

Objective

Define a tool for calculating EF to improve the decision for the application of RES-E in rural environments, to inventory the available water, waste and removable resources in G.C. and their applicability.

Methodology

Methodology has been developed focused on rural tourist accommodation, in which a comprehensive process is developed for the study of the water-energy-waste nexus, considering parameters of waste generation, energy consumption, occupied area and renewable energy generation.

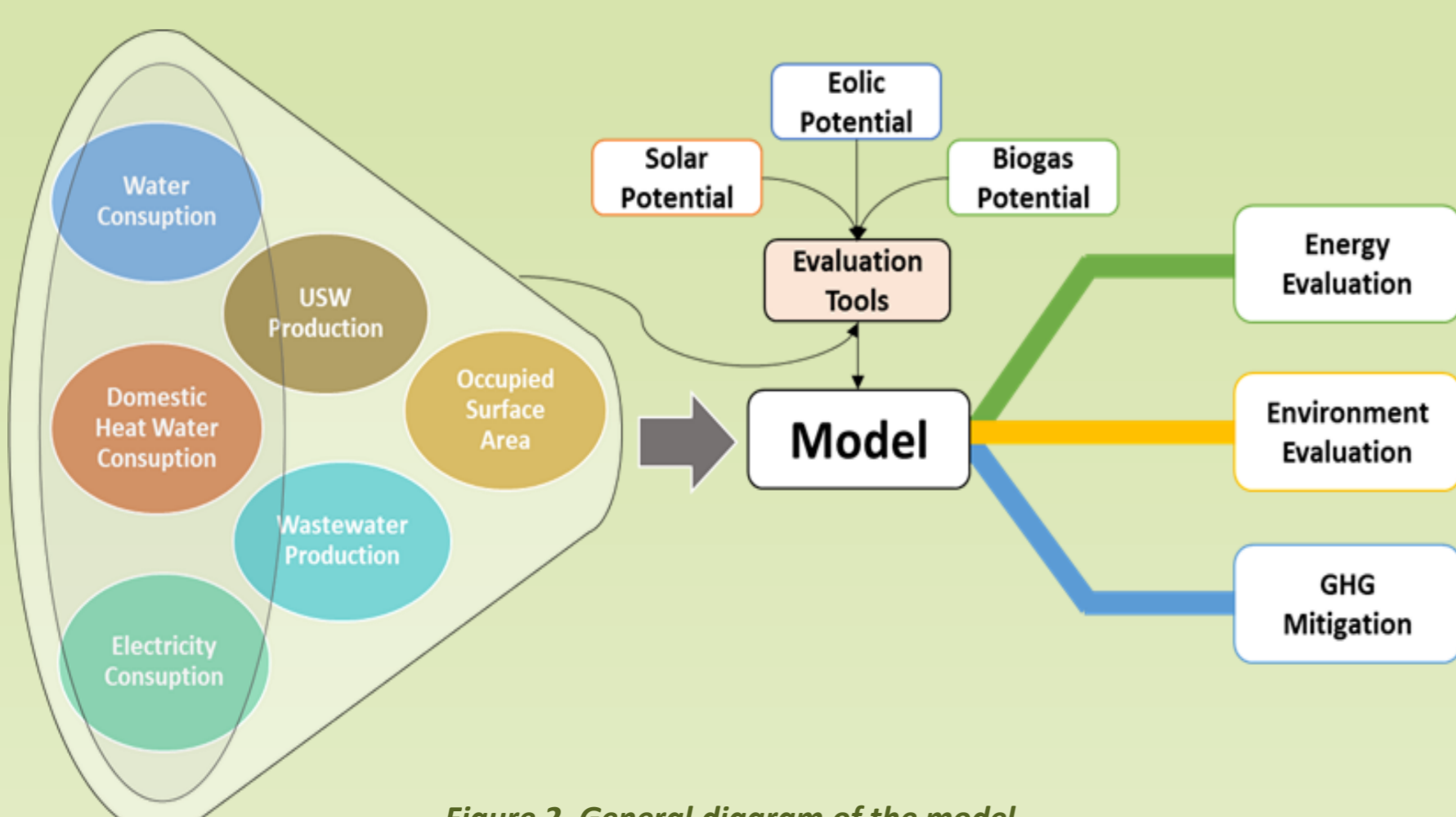


Figure 2. General diagram of the model.

Results and Discussion

- Average consumption of 9.46 kWh d⁻¹ for domestic hot water (DHW) at 60°C means an CF of 4.465 kgCO₂ d⁻¹ and an FE of 0.815 ha year⁻¹.
- Production of organic waste and wastewater represent a CF of 9.25 kg CO₂ d⁻¹ and an EF of 1.69 ha year⁻¹.
- Average electricity consumption of 23.89 kWh d⁻¹, this means an CF of 16.439 kgCO₂ d⁻¹ and an FE of 3.0 ha year⁻¹.

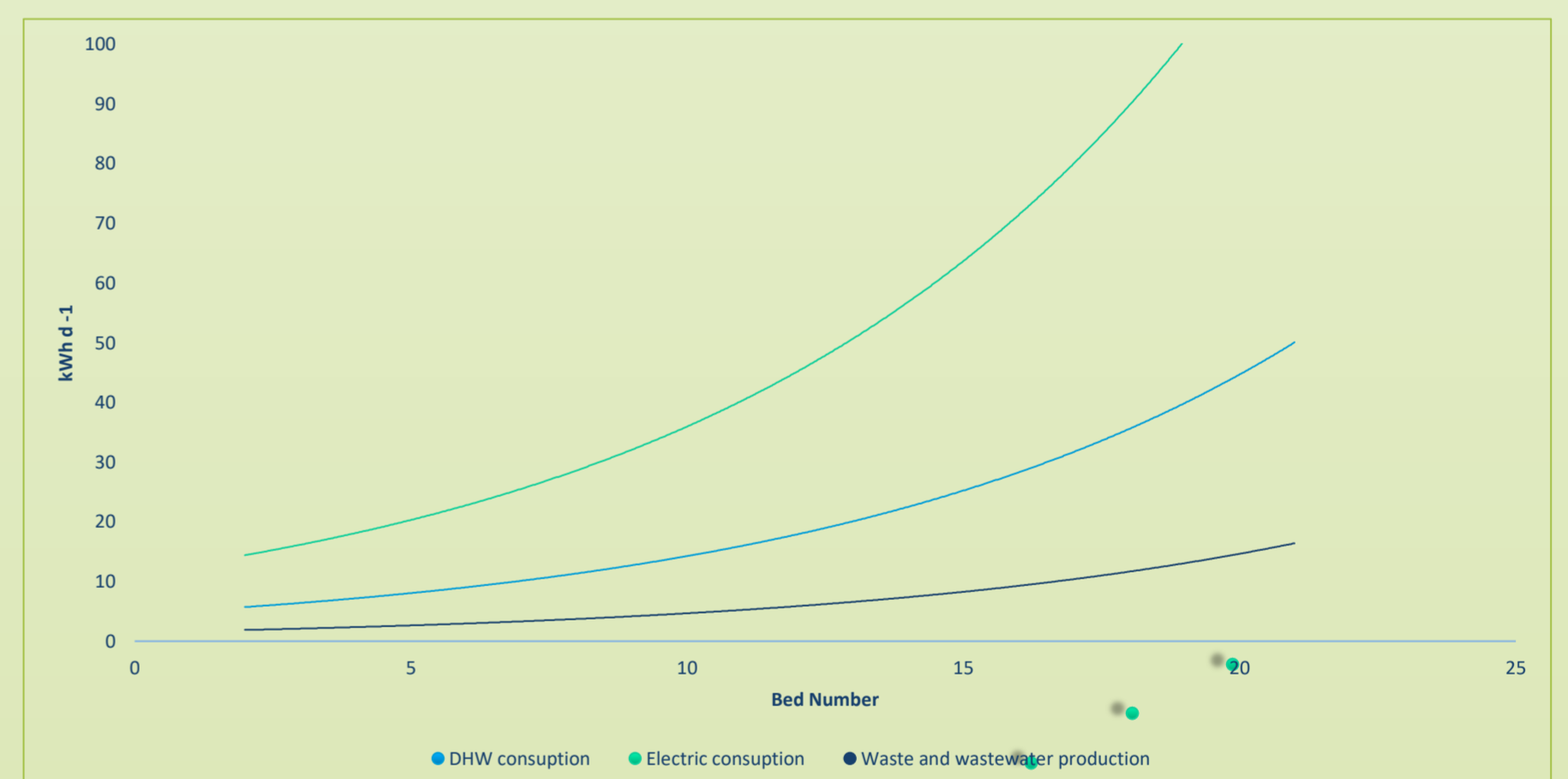


Figure 3. Consumption and generation of waste by type of rural house.

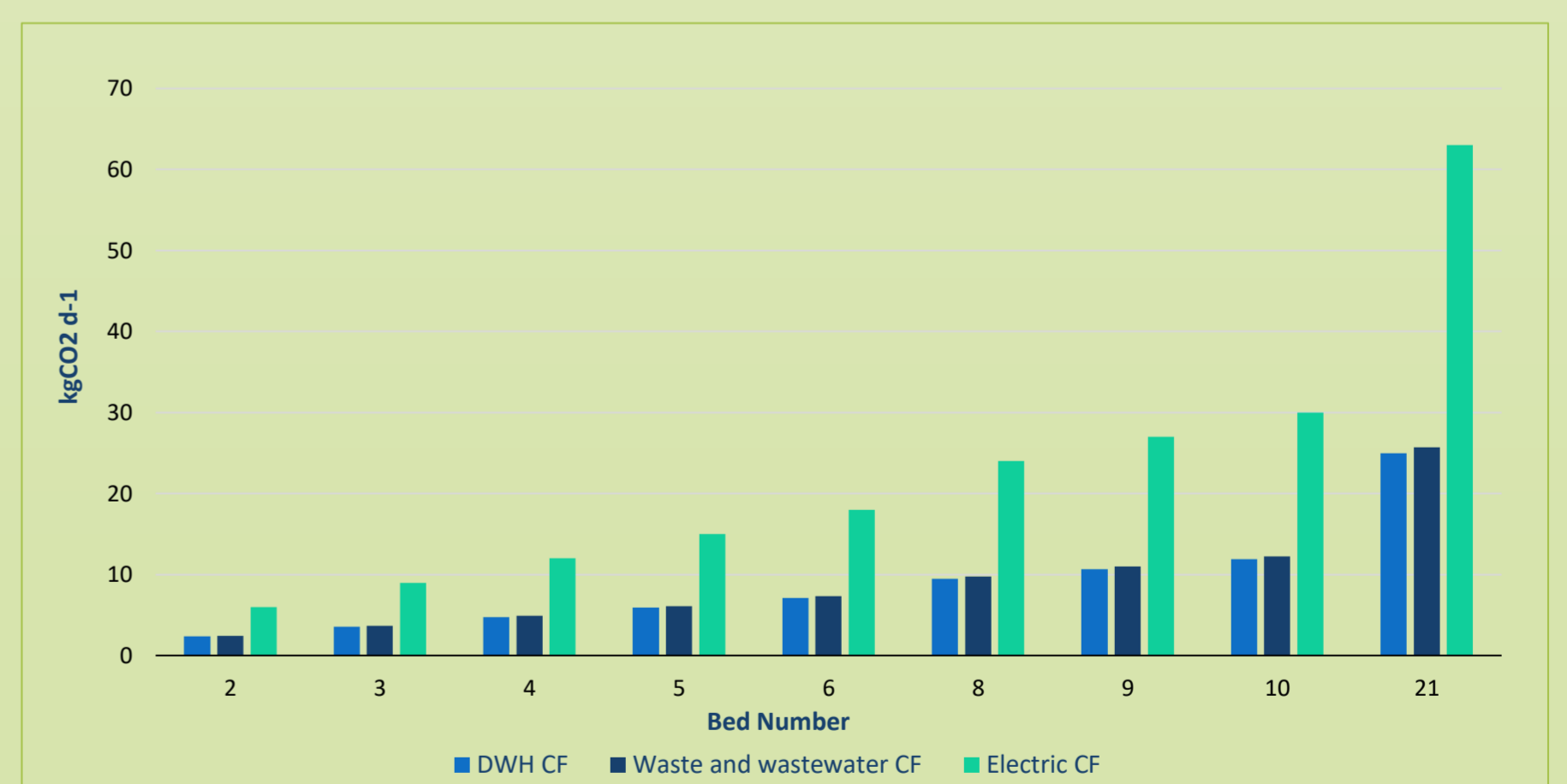


Figure 4. Carbon footprint before implementing renewable energy of DHW, electric consumption and organic waste and wastewater production in kg CO₂/day

Conclusions

Applying these renewable technologies can significantly reduce the carbon and ecological footprint of the activity of rural houses based on the available surface.

This contributes to achieving the energy and environmental objectives proposed by the EU to achieve decarbonization by 2050.