

4 CONCLUSIONS

The solar potential that characterizes the municipality of El Zulia is higher than the world average and the national average, making it a location with optimal conditions for installing the photovoltaic solar energy system that meets the needs of the population and mainly household consumption and small agricultural production units that characterize the region. Furthermore, the high rates of solar radiation received in the municipality of El Zulia allowed the dimensioning of an efficient and low-cost photovoltaic solar system that takes advantage of the number of peak hours and responds to the average demand of households.

The technical characteristics of the photovoltaic system were under the high solar potential available and allowed to maintain a relatively low level of investment costs, which was crucial for determining that the project has financial viability with a projection of 25 of operation. The investment recovery is in approximately four years, thus finding an energy reduction of 50% as has been reported by other authors in this area of research. It is estimated that the relationship between annual savings and the value paid by homes for electricity service will stimulate the perceived benefit, and they will be willing to install photovoltaic solar systems for microgeneration, making the project manager discount the cost of the initial investment through the cash flow accumulated during the 25 years of operation of the system.

A long-term limitation for implementing the research project is the constant increase in materials due to the rise in the dollar and the changing energy market that, in the case of Colombia, the materials must be exported from abroad.

At an environmental level, the development of the project in the municipality of El Zulia in Colombia offers a positive impact represented by 10,009,978 kg CO₂ eq / kWh that is avoided each year, which adds up to 250,249 Ton CO₂ eq / kWh for the 25 years of operation of the residential photovoltaic solar power generation project.

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