

**INCLUSION OF  
RENEWABLE ENERGIES  
FOR ZENÚ INDIGENOUS  
COMMUNITIES IN SAN  
ANDRÉS DE SOTAVENTO,  
COLOMBIA.**



## SUMMARY

In 2021, the ECOCEANOS Corporation works in agreement with the Zenú indigenous community, located in the reservations of San Andrés de Sotavento, Colombia. This project aimed to include renewable energies for the mitigation of the effects of climate change, in the indigenous reservation that is home to 500 families, located 2 km from the Colombian Atlantic coast. The indigenous reservation is plagued by problems of basic needs; Among them, having electricity, vital to have access to social, professional and cultural opportunities. The ECOCEANOS Corporation and the University of the Caribbean carry out the installation of 50 photovoltaic kits to benefit 50 artisan indigenous mothers, thus having access to sewing machines for fabric manufacturing, hat making and also being able to cook in electric stoves in favor of the environment. This project impacts the community significantly, providing decent work opportunities (micro-enterprises) and capacity to participate in the development, implementation and evaluation of sustainable policies and measures aimed at combating climate change.

Keywords: Renewable energies, climate change, photovoltaics, inclusion.



## 1. INTRODUCTION.

The Zenú indigenous people are located mainly in the Caribbean region of Colombia, in the province of Córdoba and Sucre. They are also found in some areas of the Urabá region, in the department of Antioquia. Its original territory was located on the Caribbean coast of Colombia, but due to colonization and development projects, its territory has been significantly reduced.

The Zenú indigenous people are located in the reservations of San Andrés de Sotavento, in the department of Córdoba and El Volao, in Urabá. In turn, there are several small settlements in Sucre, Antioquia, and Chocó. Undoubtedly, the largest settlement center of the Zenú people is located in the department of Córdoba, in San Andrés de Sotavento.

The relationship between renewable energy development policies and communities living in poverty or marginalization is a complex issue, with numerous challenges ahead. A cleaner energy matrix is not necessarily more inclusive or equitable, an issue that becomes very latent in rural, vulnerable and indigenous contexts, where despite the use of local lands and natural resources, the benefits of the energy transition often advance on one side.

One way to contribute to the fight against climate change by Zenú indigenous communities is the inclusion of renewable energies, necessary to reduce the degradation of ecosystems, both terrestrial and aquatic and thus initiate an energy transition process capable of greatly curbing the negative effects of climate change. In this sense, it is vital to consider that the installation of solar panels for years has proven to be an innovative alternative to improve the quality of life of the most disadvantaged communities.

Para el caso específico del resguardo indígena Zenú en San Andrés de Sotavento, existe un lamentable precedente de malas prácticas y abusos que a ratos opacan los avances en materia de transición energética. El Estado Colombiano las empresas privadas, muchas veces intervienen en tierras que son de uso ancestral por parte de pueblos indígenas, sin tomar suficientemente en cuenta los estándares de derechos humanos y sin la consulta y participación adecuada de los pueblos afectados en el proceso. Lo anterior ha dado lugar a tensiones y conflictos durante varias décadas.

With regard to electrification in isolated areas, experience has shown that the implementation of small-scale renewable

solutions, deployed in a decentralized manner and in collaboration with local indigenous communities, are ideal and economically viable alternatives in sectors that are difficult to access. In this sense, materializing the socioeconomic benefits of renewable energies and ensuring the inclusion of historically marginalized populations in sustainable development are issues that can and should go hand in hand.

In an indigenous community like San Andres de Sotavento, renewable energy can foster micro-entrepreneurship, job creation and enhance the development of the local value chain. Obtaining clean energy allows mothers to head of household the production and marketing of indigenous handicraft products of the region, promoting the role of women in the economy and boosting the economic development of the area.

A human rights approach in the context of renewable energy and indigenous peoples requires a comprehensive view of international human rights and sustainable development standards. The 2030 Agenda has several Sustainable Development Goals (SDGs) that are relevant to this context,

including SDG 7 on affordable and clean energy and SDG 13 on climate action. These have to be implemented in accordance with universal human rights standards, most notably the International Labour Organization (ILO) Indigenous and Tribal Peoples Convention (ILO Convention No. 169), and the UN Guiding Principles on Business and Human Rights (UNEP).

These instruments generate obligations for States and complementary responsibilities for companies, and guide the transition to renewable energy in a way that leaves no one behind and protects and respects the rights of indigenous peoples. The human rights approach also emphasizes participation, as indigenous peoples traditionally have a close relationship with the environment, and their knowledge of this could guide actions to combat climate change.



## 2. THREATS FROM THE ZENÚ INDIGENOUS COMMUNITY.

Alterations in weather patterns are due to climate variability and climate change. Recurrently, the extreme phases of climate variability bring anomalies (droughts or very rainy periods, among others) that turn out to be unfavorable (reduction in the availability of water and food, diseases, just to name a few) for the Zenú indigenous community.

It has been established that the impact of the extreme phases of climate variability and climate change on society is not homogeneous given that there are groups and sectors with a greater or lesser degree of vulnerability. The ECOCEANOS Corporation has detected that in adverse climatic conditions, the most vulnerable sector of the Zenú indigenous population are; women, children and the elderly.

The Zenú indigenous reservation located in San Andrés de Sotavento, Colombia, is affected by the illegal economy, but at the

### **3. PROJECT METHODOLOGY.**

One of the advantages of the Zenú indigenous reservation of San Andrés de Sotavento, is that it has an average irradiance of 4,575 kWh / m<sup>2</sup> day, which is

same time forms of resistance are generated that resort to tradition and community; to the collective. In particular, indigenous women artisans, due to the roles they play in community organization, live in a very direct way the consequences of the alteration, destruction of nature and lack of energy, in aspects such as access to water, the availability of resources that nature has traditionally provided and that, in the hands of women, They are transformed into food, clothing, or any other socially produced good. They are the ones who lead socialization processes and new strategies for the daily use of their resources.

To reduce this risk, the ECOCEANOS Corporation has joined forces with the Universidad Del Caribe to grant the artisan mothers of the Zenú indigenous community, the installation of 50 photovoltaic kits that will be very useful for daily household chores and achieve a dignified sustento without affecting the environment.

quite good for the implementation of the photovoltaic project, this irradiation is recorded by the entity Energie Repowering the Future with data obtained from IDEAM (See Figure 1).

Taking into account the above information, 2 expert engineers in renewable energies from the University of the Caribbean, Colombia, proposed the installation of 50 photovoltaic kits in the homes of 50 mothers heads of household artisans, for the use of electric stoves and sewing machines. The model was elaborated taking into account the peak hours of sunshine, the optimal orientation of the panels and irradiation captured (see Figure 2).

The model selected by the 2 experts was that of power generation per residential unit, a design designed to greatly facilitate issues related to the maintenance and cleaning of equipment. The model per residential unit is composed as follows:

- A. A small solar power plant composed of photovoltaic solar panels with a total capacity of 1 kWp (kilowatt-peak)
- B. The solar panels were connected to an inverter, which converts the direct current generated by the solar panels into alternating current for use in the home.
- C. A battery storage system that connects to the inverter to store the

energy generated during the day and use it when no sunlight is available.

- D. The solar panels were installed at a specific angle and orientation to maximize the amount of solar energy captured.
- E. The system was connected to an electricity meter to measure the energy generated and used in the home.
- F. The system is protected by a control panel and a
- G. Safety to ensure the safety of users and protect the system from overloads and short circuits.



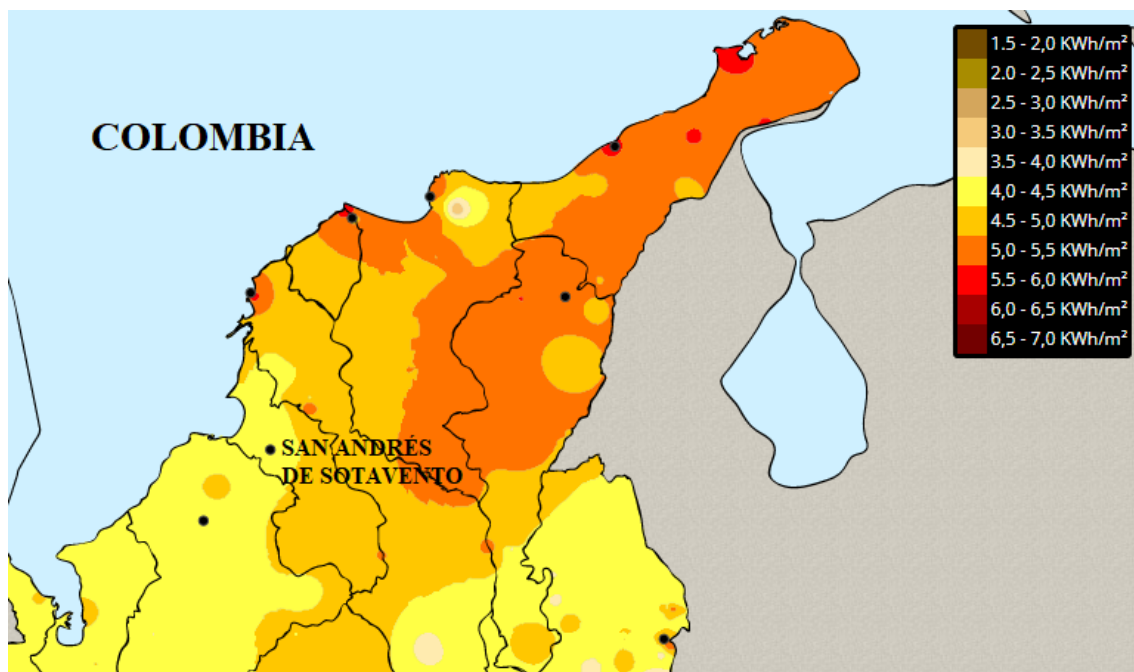


Figure 1. IDEAM.

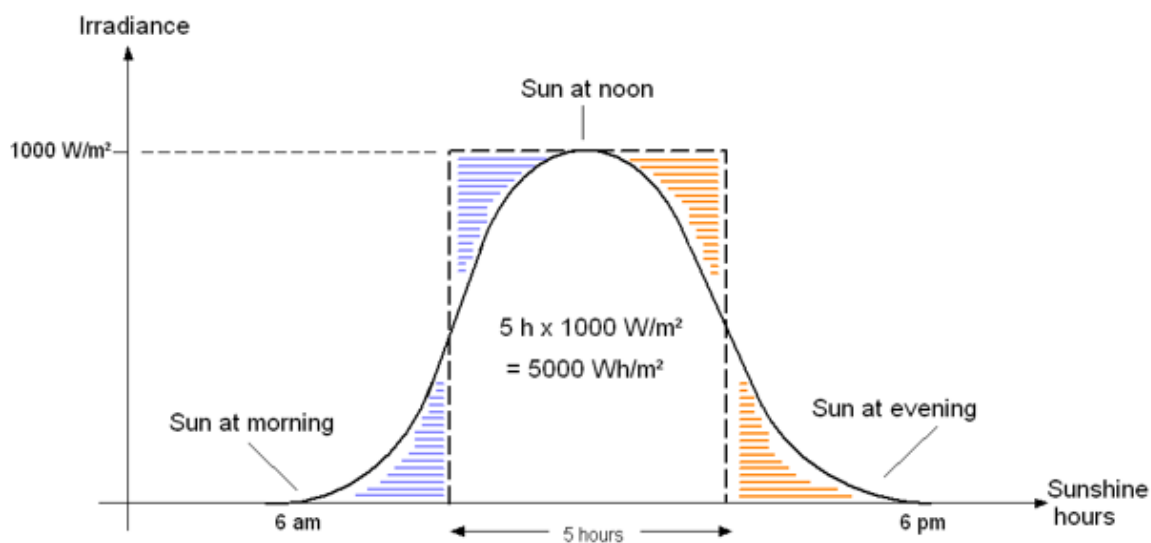
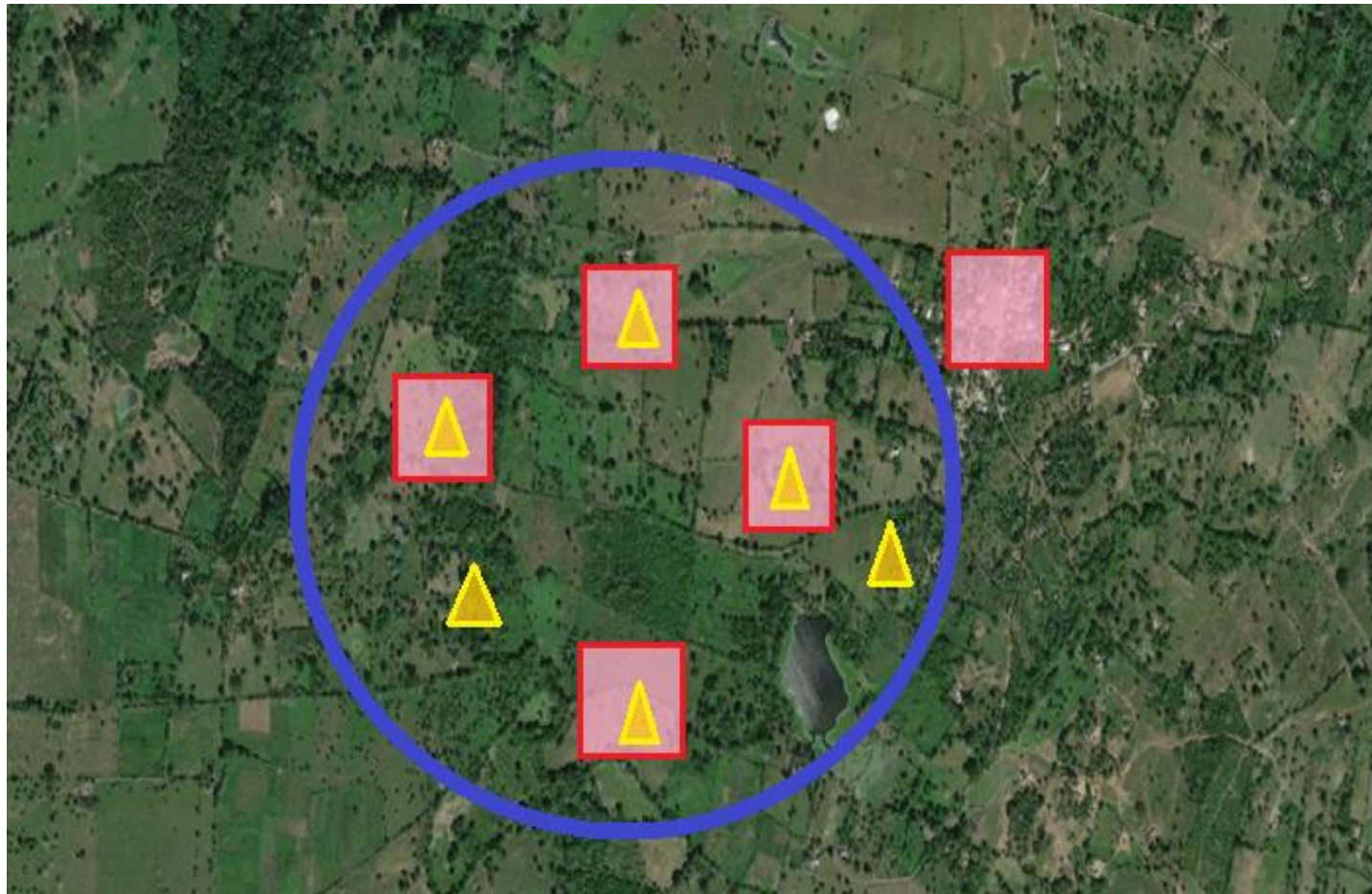





Figure 2. Incident irradiation on the earth's surface is observed to vary levels throughout the day.

#### 4. MAP OF PROJECT AREA.



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#### Conventions

	Project area
	Solar panels installed
	Zenú indigenous town

#### Scale



**1cm = 50,000m**

**1. Departments:** Córdoba, Sucre.

**2. Country:** Colombia.

**3. Geographical coordinates**

San Andrés de Sotavento,  
Colombia:

9°09'28.9"N 75°31'04.6"W,

9°08'20.7"N 75°31'23.2"W.

9°09'09.9"N 75°29'30.0"W,

9°08'27.6"N 75°29'42.0"W.





## 5. SKILLS DEVELOPMENT WITH THE INDIGENOUS COMMUNITY, THROUGH TRAINING AND WORKSHOPS.

While evidence clearly indicates that the Zenú indigenous community needs to play a critical role for climate action to succeed, obstacles remain that prevent the non-use of renewable energy to unleash its full potential. Addressing these obstacles is an important first step towards achieving a just energy transition, meeting the Sustainable Development Goals and addressing the threats posed by climate change. The necessary actions are:

- a) **Social protection, sustainable enterprise creation and livelihood generation for indigenous peoples with a view to simultaneously addressing poverty and environmental degradation.**

Indigenous peoples' vulnerability to social, economic and environmental impacts can be significantly reduced by including them in mainstream social protection schemes and implementing more targeted programmes. Selected fee-for-service

programmes can contribute to climate change mitigation and adaptation. Effective social protection coverage can enable communities to face more risks and invest in their own productive capacity, providing them with the potential to promote innovation and entrepreneurship, two fundamental prerequisites for green growth.



Social protection schemes that combine environmental and social objectives in a participatory framework for natural resource management can play an important role in strengthening the rights of indigenous peoples and achieving conclusive environmental outcomes.

Such regimes also provide the security people need to take risks and invest in their own productive capacity, thereby enabling innovations and entrepreneurship based on traditional knowledge and practices. One example is Brazil's Bolsa Verde programme, which combines an existing social protection programme (Bolsa Família) with

a fee-based approach for environmental services. The programme aims to reduce extreme poverty while maintaining forest cover. Eligible families receive R\$ 300 every three months for an initial period of up to two years and commit to participate in sustainable activities to protect natural resources. The implementation of social protection programmes such as the Green Exchange requires training in sustainable development and forest management.

This practice can be further developed to promote decent work and green employment opportunities, which in turn are critical to developing and maintaining indigenous peoples' knowledge and livelihood strategies, as well as for improving their working conditions. Sustainable enterprise creation and livelihood generation are also critical to promoting decent work opportunities for indigenous peoples and harnessing their potential as agents of change. For example, cooperatives and other indigenous peoples' social and solidarity economy enterprises and organizations have been shown to improve environmental conservation based on traditional knowledge, while fostering innovation, providing a sustainable source of income and livelihoods and promoting their capacity to defend their rights. Therefore, facilitate skills development and

training to increase income-generating capacities, with particular emphasis on supporting the economic activities of indigenous women and youth, including through closer linkages with the market; support innovation; Building sustainable enterprises, including cooperatives, and creating green jobs based on traditional knowledge is key to lifting people out of poverty and achieving green employment.

#### **b. Recognition of rights and promotion of gender equality.**

The ratification and effective implementation of Convention No. 169 are key steps to ensure that the rights of indigenous peoples are promoted, secured, respected and protected. For countries that have ratified it, the Convention constitutes a legally binding benchmark monitored by the ILO, and complements the Paris Agreement. The United Nations General Assembly, in the outcome document of the 2014 World Conference on Indigenous Peoples, encourages ratification of the Convention. As stated in the ILO Handbook on Convention No. 169, "The rights and concerns of indigenous and tribal peoples have taken on unprecedented importance, as they are embedded in the global debate on human rights, governance, poverty reduction and economic development,

social economy, climate change, sustainable development and environmental protection".

Safeguarding the rights of indigenous peoples depends on strong consultation and participation mechanisms to ensure effective participation at all levels of decision-making, particularly with regard to national development plans and climate action. This also entails the formulation, with the participation of indigenous peoples, particularly women and youth, of public policies aimed at addressing their specific social and economic vulnerabilities and creating opportunities for them to pursue their own development priorities. The creation of effective national consultation mechanisms is crucial. Article 6(1) of Convention No. 169 calls for consultation of the peoples concerned, through appropriate procedures and in particular through their representative institutions, whenever legislative or administrative measures are envisaged which may directly affect them.

Inevitably, the participation of indigenous women in decision-making is key to overcoming gender inequality and discrimination. Zenú indigenous women play an important role in securing livelihoods and income, and their

employment status and economic contributions must enjoy greater visibility. Indigenous women are at a disadvantage vis-à-vis men in terms of community economic decisions; For example, they are often offered less time to farm their land. Efforts to close these gaps that limit indigenous women's participation in decision-making at all levels and to promote their access to opportunities for sustainable livelihoods and income are critical to the empowerment of indigenous women, who play a significant role in sectors such as agriculture and forestry. The voice and economic, social and political contributions of Zenú indigenous women are critical for climate action to be effective and development to be sustainable.

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