

IEA SHC Welcomes SICREEE & Its Central America Members

The Regional Centre for Renewable Energy and Energy Efficiency of SICA (SICREEE) member countries are Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. SICREEE opened its doors in 2021 with the support of the Austrian Development Agency (ADA), the United Nations Industrial Development Organization (UNIDO), and in coordination with the General Secretariat of the Central American Integration System (SG-SICA).

SICREEE is a member of the Global Network of Sustainable Energy Centres (GN-SEC), a powerful global south-south multi-stakeholder partnership coordinated by the Department of Energy of UNIDO in collaboration with various regional economic communities and organizations. The regional centres respond to the urgent need for enforced south-south cooperation and regional capacities to promote inclusive and sustainable energy industries and markets in developing and transformation countries in the post-2015 era. The centres count on the high-level support of national Energy Ministers and act in response to the individual needs of the respective governments.

Motivation

SICREEE's partner countries have made considerable progress in creating national environments to promote renewable energy (RE) and energy efficiency (EE). And now, working under the umbrella of this regional organization, countries can begin to tackle some underlying challenges, including political and legislative barriers, social conflicts that arise in RE projects, lack of EE standards, and financial barriers to investment. Changes in these areas would have a real impact on investments and create a more vibrant market and industrial sector.

"Contributing to the promotion of ER&EE at the regional level for the implementation of transformative projects in industrial, commercial, service and residential sectors, that support the market for innovative technologies is the SICREEE's objective," says María Eugenia Salaverría, SICREEE Programme Officer. Adding that, "to boost the growth of solar thermal in Central America, we have joined the IEA SHC Programme along with six other regional Sustainable Energy Centres. For me, this new partnership with its access to a global team of experts will help to expand the use of solar thermal in small-scale industries and beyond in this region."

SICREEE focuses on capacity building, knowledge and data management, awareness-raising, and investment and business promotion in the energy sector. SICREEE is aware that sustainable energy investments and appropriate regulations and standards go hand in hand with the need for local institutional capacity and a qualified workforce.

SICREEE Partner Countries

- Belize
- Costa Rica
- Dominican Republic
- El Salvador
- Guatemala
- Honduras
- Nicaragua
- Panama



▲ Figure 1. SICREEE's focus areas.

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The governments of the SICA countries have established innovative energy policies to promote renewable energy, a culture of energy efficiency, and the reduction of CO₂ emissions in the energy sector. As part of these policies, investment in renewable energy projects for electricity generation is being promoted, as well as distributed generation, especially with solar technologies. Other solar activities in the SICA region are solar thermal projects to improve small rural industrial processes.

SICREEE's priority activities include solar energy because of the tremendous solar potential in SICA countries and its expertise in implementing solar technologies in urban and rural areas. Among the knowledge areas of the SICREEE are business models design and evaluation, energy policy advice and advocacy, capacity building, gender and energy, as well as characterization and technical quality of photovoltaic (PV) technology, mini-grids and Solar Home Systems (SHSs) of Second and Third Generation, distributed generation, and solar thermal technical issues (see Figure 1).

A Snapshot of Solar in SICA Countries

Located in an area privileged by solar irradiation, SICA countries have great potential for using solar energy. With a global irradiation of 4.6 to 6.2 KWh/m² /daily, the countries can generate electricity as well as use it for thermal uses as space heating, air conditioning, hot water, industrial process heat, drying, and so on (as shown in Figure 2).

The use of solar energy in the region supports countries to reduce their carbon emissions and, at the same time, empowers vulnerable communities, mainly in remote areas, facilitating their access to electricity.

According to data provided by the Ministries of Energy, solar energy use in SICA countries is significantly increasing; in just six years, the installed capacity grew from 50 MWp in 2014 to 1,575 MWp in 2020. The detailed situation of some SICA countries is highlighted below.

Guatemala has installed 91.5 MWp of PV capacity, of which 80 MWp corresponds to large-scale systems and 11.5 MWp for distributed generation. The largest solar plants in the country are Horus I and Horus II, with 50 MWp and 30 MWp.

The country has also increased household solar energy use, both as distributed generation for self-consumption and energy access. In addition, small and medium businesses and industries are exploring different alternatives to generate electricity with PV systems to take advantage of the Technical Standard for self-producing users approved by the government. (CNEE, 2014, Norma Técnica de Generación Distribuida Renovable y Usuarios Autoprodutores con Excedentes de Energía).

In this country, solar thermal energy represents an emerging industry; however, it is possible to find two types of technologies for solar heating systems: non-pressurized and pressurized. The first is used in the residential sector because it is pressure and easy to install, and the second is commonly applied in the industrial and service sectors. In addition, solar thermal energy is also utilized to dry grains, especially coffee and cardamom.



▲ **Figure 2. Long-term average of daily/yearly sun.** (Source Solar GIS/ESMAP/World Bank)



▲ **Figure 3. SIBO Solar Power Plant in Guatemala.** (Source: MEM, Guatemala)

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Belize National Sustainable Energy Strategy 2012-2033 proposes to reduce the country's dependence on imported fuels. It promotes the deployment of solar technology for electricity generation in rural and urban areas and has the goal of shifting 50% of rural households using firewood to biogas, plant oil, and solar cookers. Notwithstanding, the country currently lacks a regulatory framework for this issue. Belize has the least development of solar energy but has installed a 435 kWp PV system connected to the grid at the University of Belize.

Costa Rica has a regulatory framework for electricity self-consumption (MINAE, 2015, Reglamento generación distribuida para autoconsumo con fuentes renovables modelo de contratación medición neta sencilla) that regulates the interconnection and operation of distributed generators with renewable energy and compensates for the electricity surplus sent to the grid. However, the capacity that each customer installs meets the amount of energy consumed because the electricity surplus is not compensated. Most of these projects are PV installations. At the same time, the country also has a rural electrification program for communities not connected to the grid, where solar technology is the primary energy source.

There are installed 95 MWp of PV capacity: 12 MWp at large scale and 73 MWp for distributed generation connected to the country electric net. Juanilama Solar Park is the largest solar plant in the country, and its installed capacity is 6 MWp.

In the country, 41.3% of households use electric domestic hot water systems, so there is great potential for solar thermal energy. Moreover, there are available technical standards for solar thermal equipment, such as solar collectors and their components and solar sanitary water heating systems. Indeed, the regulatory framework is being prepared to allow the massification of solar thermal, especially in the residential and tourist sectors (MINAE, SEPSE and others, 2017, Hoja de Ruta Tecnológica Solar para Calentamiento y Enfriamiento).

Dominican Republic has great potential to generate solar energy; the average global solar irradiation varies between 5.25 and 6.00 kWh/m²/day. The Law of Incentives to Renewable Energies and Special Regimes (Comisión Nacional de Energía, 2012, Ley número 57-07 Sobre Incentivo al Desarrollo de Fuentes Renovables de Energía y sus Regímenes Especiales y el Reglamento-Decreto 202-08) creates the framework to facilitate the expansion of solar technologies. The regulation grants up to 40% of the cost of the initial investment in equipment as a single income tax credit for family homes, commercial or industrial locations that change or expand systems for self-consumption. The country has 166 MWp of installed solar capacity connected to the grid and 7.2 MWp in off-grid systems.

El Salvador has been promoting the entry of renewable energies through long-term power purchase agreements that

allow securing long-term energy prices, guaranteeing supply and economic income for independent private generators. As a result, solar energy's share in the country's generation mix is growing, with an installed power of 403 MWp, representing 18% of the country's installed capacity.

The use of solar thermal systems in El Salvador is practically limited to hotel and hospital users, and its application is minimal in the residential sector. Moreover, there are no regulations that support and promote the development of the sector.

Honduras has made significant progress in terms of electricity generation with solar systems. It is the country in the region with the highest installed capacity in solar generation, 510 MWp. Honduras has implemented an attractive tax incentive policy for the solar sector that is beginning to show excellent results.



▲ **Figure 4. Solar thermal system at a dairy plant in Honduras.**
(Source: SOPELIA)

In Honduras, like many other countries, there is not a strong solar thermal energy market. At the residential level, solar thermal energy use is infrequent and primarily used in the commercial and industrial sectors.

Nicaragua, in 2013, started to boost solar energy production with the installation of two power plants: one of 1.3 MWp and the other of 3.1 MWp. In the same year, Nicaragua started to bring electricity based on solar systems in rural areas, achieving a total capacity of 63 MWp.

Furthermore, Nicaragua has installed 338 solar thermal heaters, the second-largest solar thermal system in the world, and the only one in Latin America. This emblematic project is located at the Dr. Alejandro Davila Bolaños Military School Hospital in Managua. The project was executed with the support of the United Nations Agency for Industrial Development (UNIDO) and the National Cleaner Production Centre of Nicaragua. The installation covers

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▲ **Figure 5. Solar thermal installation on a Nicaraguan hospital.** (Source: Hospital Militar Escuela Dr. Alejandro Dávila Bolaños)

30% of the air conditioning demand and 100% of the hot water demand for various operational functions of the hospital, such as patient and doctor personal hygiene, food cleaning and preparation, and laundry.

Panama, as part of their 2015 regulation to promote solar energy, the National Energy Secretariat put out a tender to contract solar energy on a large scale. As a result, Panama has the largest PV generation project in Central America, with an installed capacity of 150 MWp. The total installed capacity in the country is 194.6 MWp plus 43.4 MWp for self-consumption.

Panama will be a pioneer in the implementation of a modern solar energy system called “Maverick.” It is a revolutionary modular, prefabricated, prewired solar solution that folds up to send to a site and install. It is one of the easiest and fastest ways to add solar resources, using fewer tracts of land. Panama will be one of the first countries where this technology will be implemented in a 2 MWp fast track project as a part of AES (a Panama utility) electricity generation projects.

In the same line, the country is implementing the *Termosolar Panama Project*. It is executed through an inter-institutional alliance between the UN Environment Regional Office for Latin America and the Caribbean and the National Energy Secretariat (SNE), with financial support from the Global Environment Facility (GEF), and several partners from the public and private sectors. The objective is to install one million square meters of solar thermal technology applications for water heating throughout the country by 2050. With this, the country will reduce 6.4 million tons of CO₂ and will save more than US\$ 3 million annually in fossil fuels. The project

started in 2018 with the implementation of demonstration pilot projects with solar water heating systems. Energy audits were carried out in pre-selected households, businesses, and hospitals to identify savings opportunities and the market potential that exists in the country. One hundred of these pilot projects have been implemented in health and social assistance buildings, hotels, private companies, and residences.

SICREEE’s Vision for the Future

At SICREEE, we believe that clean energy development is essential to reduce the devastating effects of climate change. Renewable energies have received significant support at an international level with the Paris Agreement and the Sustainable Development Goals (SDGs) adopted in 2015 by all United Nations Member States and in the SICA region with the Sustainable Energy Strategy 2030. The transition towards energy systems based on renewable technologies will thus have very positive effects on the economy, society, and the sustainable development of the countries of the SICA region.

As the region has a great potential for solar energy, this is one of the main themes of technical support of SICREEE. “Solar energy is the only renewable energy resource that allows electricity service to be democratized, for users to become prosumers, stating out a challenge for building up new and innovative regulations and business models. The opportunity is there, and the support of the SICREEE would facilitate the outlining of new ideas and holistic projects to increase solar deployment at large and small scales, for both urban and rural areas, in the SICA countries. The great advantage is that solar technology, especially PV, is the most competitive to phase out harmful fossil fuels and guarantee affordable electricity prices. Lessons learned in solar energy from the GN-SEC network could be adopted by the region through the leadership of the SICREEE”, indicates Andrea Eras Almeida, International Consultant at UNIDO.

The Center seeks to support SICA member states to address existing barriers to sustainable energy and efficient technology markets more effectively. At the same time, SICREEE will complement and strengthen activities that are already being carried out at national and regional levels in the areas of policies, capacity development, knowledge management, as well as investments and business promotion in renewable energy and energy efficiency.

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