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2 Americas
2.2 Central America

2.2.2 Costa Rica
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Key facts

| Population | 4,636,348
| Area       | 51,100 km²
| Climate    | Tropical and sub-tropical
| Topography | Mostly flat, with swampy coastal plains and low mountains in the South. Highest point: Cerro Chiripo, 3,810 m
| Rain pattern | Rainy season from May to November. Dry season from February to May. Hurricane season from June to November when coastal flooding, especially in the South, may occur.

Electricity sector overview
Costa Rica has almost a complete national rate of electrification: in 2010 it was 99.2 per cent. Approximately 93 per cent of the electricity is obtained from renewable sources, only seven per cent from thermal sources (figure 1).

The Costa Rican Institute of Electricity (Instituto Costarricense de Electricidad, ICE) has acted as a monopoly in the electricity generation sector of the country since its inception in 1949. Subsequently, other public-sector generators and some company-type rural electrification cooperatives were created, which have begun to develop small electricity generation projects.

![Electricity generation in Costa Rica](image)

**Source:** Grupo Instituto Costarricense de Electricidad

Small hydropower sector overview and potential
As of 2009, the combined capacity of the 18 publicly-owned and the 16 privately-owned small hydropower plants totalled to 91.1 MW, with individual installed capacities ranging from 60 kW to 10.5 MW (figure 2).

According to a study by the Public Services Regulatory Authority (Autoridad Reguladora de los Servicios Públicos, ARESEP), Costa Rica has a hydropower potential of 4,963 MW, which suggests the possibility of reaching quadruple hydropower generation in the country. Yet, the specific small hydro potential has not been identified.

![Small hydropower capacities in Costa Rica](image)

**Figure 2** Small hydropower capacities in Costa Rica
In Costa Rica, the small hydropower value chain is well developed. On top of that, Clean Development Mechanism projects implemented in the country also include small hydropower projects.

Renewable energy policy
In 1990, Act 7200 was enacted, allowing private-sector participation in electricity generation from renewable energy sources. This law had limited private participation (up to 15 per cent) in the national electric power system and after an amendment by Act 7508, the private-sector participation project limit was raised from 20 MW to up to 50 MW under the Build, Operate, and Transfer (BOT) modality, which must be executed through tenders by ICE. Importantly, under this law, all projects must use renewable energy.

The National Development Plan (Plan Nacional de Desarrollo, PND) 2011-2014 has established the goal to produce 95 per cent of Costa Rica's electricity from renewable energy sources within its priority goals. Hydropower is the main renewable source due to its resource abundance and the vision of the national leaders in the 1950s that recognized the environmental and competitive advantage of having a clean energy mix. The National Development Plan also promotes carbon neutrality, the use of clean energies and generally, the rational use of resources. The goal is to install 334 MW of clean energy with both public and private efforts.

Costa Rica challenges itself by aiming to be carbon-neutral by the bicentenary of its independence, thus the continuity of policies and actions favouring renewables in the country is essential.

Under the National Rural Electrification Programme with Renewable Resources, ICE has sought to reduce emissions of greenhouse gases, encouraging the use of decentralized renewable energy systems in areas that are isolated from the National Interconnected System. This would enable a nearly 100 per cent electrification rate, while achieving a reduction of more than 210,000 tons of CO₂.
Despite the Government's effort to have an electricity mix based on renewable energies, it is clear that the growing electricity demand and the climate variability scenarios bring several uncertainties. The private sector and rural communities will be essential partners in supporting clean power generation.

The Ministry of the Environment, Energy and Technology (MINAET) is the state entity of the country's energy planning by the Energy Sector Management Directorate (DSE) and one of the basic objectives is to diversify the energy mix through the use of renewable energies available at a commercial level.

In various documents such as the National Energy Plan (PNE) from 2008 to 2021, one of the strategic objectives is to promote the use of renewable and indigenous energy for electricity generation. Article 1 of Guideline 14 by MINAET, states that "the institutions of Electricity Sub sector should encourage the development of electricity generation systems on a small scale for personal consumption, using renewable energy sources like solar, wind, biomass and small-scale hydropower...".

Article 2 of Guideline 15 requires "ICE to submit to the Sub-Rector of Energy, within two months, a plan for implementing power generation projects of limited capacity ...". This objective is reinforced by the General Electricity Law, currently presented by the Executive to the Legislature by the record 17.812, where priority is given to energy planning of the national renewable energy sources and a retail market with renewable projects that are not exceeding 2 MW. Costa Rica offers net-metering and tax-based incentives for renewable energies such as tax relief, thus further encouraging the implementation and growth of the already strong renewable contribution to the energy mix. 

Legislation on small hydropower

The Constitution and Water Law are the legislative basis for everything related to private generation of electricity and water resource concessions.

Barriers to small hydropower development

Barriers to small hydropower in Costa Rica are common to barriers encountered by other renewable energy sources. Private developers of electricity generation projects must go through a number of administrative procedures in order to fulfill several documentation requirements of pre-feasibility and feasibility, in addition to obtaining resource use and building permits, and to conclude power purchase agreements, making ICE the only possible buyer. The institutional complexity involved in meeting the above-mentioned requirements creates great barriers to the private sector.

All hydropower projects, small or large scale, are considered to have potentially high environmental impact and therefore require a full environmental impact study, which is the most complex of the currently existing requirements.

Another problem relates to the establishment of rates for Feed-in Tariffs. At present the country lacks accurate methods to set the same, considering the various sources of energy. Costs, rules and tariffs were established in 2002, and stipulated specifically for hydropower plants. Therefore, any technology must adjust to this reality. Both private developers and the different government authorities seem to be aware of this situation, but have still not reached a consensus on how best to fix it.

References
