

# Electricity Sector Reform Means More Dams for Costa Rica

by Elizabeth Anderson

**T**he number of dams is on the rise in the Central American country of Costa Rica. In a little over a decade, more than 30 small to medium sized hydropower dams have been built on the nation's rivers and more dams are currently being planned. What do these new dams have in common? All are owned and operated by private companies.

The longitudinal orientation of Costa Rica's rugged mountain chains, coupled with large amounts of rainfall (approximately 5000 mm annually in some areas), has resulted in a large number of high gradient streams with sufficient discharge for hydroelectricity generation. Costa Rica is currently very dependent on hydropower, which accounts for roughly 85% of the nation's electricity.

Before 1990, the Costa Rican Institute of Electricity (ICE), a government-run institution, was responsible for generating all of the country's electricity. Restructuring of Costa Rica's electricity sector began with legislation passed in 1990 that partially privatized electricity generation. The motivation behind this legislation was to decrease pressures on ICE by allowing private companies to build and operate new electricity supply plants. Thus, the country could better distribute costs and responsibilities of electricity generation across several sources and meet increasing demands for electricity.

Electricity privatization is an international trend that has been sweeping developing countries over the past two decades, in many cases as a response to increasing demands for electricity, as in Costa Rica. Privatization refers to the transfer or sale of government assets and responsibilities to private companies, and can take many forms. While some countries have restricted involvement of private companies to electricity generation, transmission, and/or distribution, other countries have gone so far as to sell state-run dams and other types of generation facilities, completely absolving the government of any responsibilities related to the electricity sector. Costa Rica's steps toward electricity sector restructuring have been more gradual than those of many other developing countries, as its legislation places many limits on private participation.

Costa Rican legislation permits private companies to generate electricity, but the state-owned ICE retains authority over transmission and distribution and continues to build and operate government generation facilities. Private companies must establish

contracts with the government to sell all electricity generated to ICE and are required to complete an environmental impact assessment report in order to receive these contracts. Costa Rican law limits the maximum installed generation capacity of these plants to 20 megawatts. In addition, the law limits foreign capital in private generation companies to 65% of total investments. Furthermore, the total amount of electricity generated by private companies is restricted to 15% of total domestic electricity production.

Despite these restrictions, the results of private participation in electricity generation in Costa Rica can be seen on watersheds throughout the country. Between 1990 and 2001, 50% of the country's 34 major watersheds have been targeted by private hydropower development, with projects planned or under construction. Although in many other developing countries privatization has led to an increase in thermoelectric generation plants, Costa Rica's abundant freshwater resources and rugged topography has led to more dams.

There are both costs and benefits to private participation in electricity generation and the resulting hydropower development in Costa Rica. Although the combined electricity produced by all private generation facilities (including more than 30 dams) accounts for just 15% of total domestic electricity, private power plays a crucial role in supplying the country's electricity during peak demand periods that occur twice daily. As for environmental mitigation, multiple private hydropower plants have entered into programs of environmental services payments for forest protection with a local non-governmental organization, and others have started reforestation projects in their surrounding watersheds.

But these benefits do not come for free: the rapid increase in the number of dams that electricity sector restructuring has caused could lead to serious irreversible impacts to many watersheds and the biota that inhabit them. Most private hydropower plants in Costa Rica operate as diversion dams, causing sections of the river to have significantly reduced flows. Depending on the size and operations of the dam, these "de-watered" reaches may be several kilometers long and the resulting decreases in aquatic habitat may present serious challenges to aquatic biota. Additionally, most private hydropower plants operate on peaking power regimes that disrupt the hydrology of the river downstream

of the dam and could affect biological cues of aquatic fauna whose life histories have evolved with the natural flow regime of the river. Peak releases of large quantities of water could also be dangerous to people using the river downstream.

Furthermore, electricity sector reform has resulted in the construction and operation of multiple private dams on individual watersheds, as Costa Rican law does not limit the number of dams per watershed. One watershed on the country's northern Caribbean slope presently has six private dams in operation (in addition to two dams owned by ICE) and many more private dams currently being planned. The installed capacity of these private dams ranges from 1 to 17 megawatts. A recent state of the nation report for Costa Rica stated that the cumulative impacts of multiple dams on single watersheds was one aspect of private hydropower development that has not yet been adequately addressed and needs evaluation. Rapid hydropower development on watersheds draining the northern Caribbean slope has also caused concern among local residents and environmentalists who are currently working to develop management plans to minimize unsustainable development of their watersheds.

Getting 85% of its power from its rivers is a risky approach for Costa Rica, making its economy vulnerable to climate change and drought. It could do more to reduce its dependency on hydropower by tapping into its significant renewable energy resources. Although Costa Rica is already Latin America's leading source of windpower, most of its wind potential remains untapped. According to *New Energy* magazine (June 2000), in 1999 wind power accounted for just 2% of the country's electricity consumption. The World Bank has even identified Costa Rica's "reliance on hydroelectric and thermal power despite high potential for wind power generation" as an environmental problem, and has funded some small windpower projects. According to the American Wind Energy Association, wind farms in Guanacaste, Costa Rica, have one the best performance records in the hemisphere, and are cheaper than fossil fuels. Costa Rica also has strong potential for solar and geothermal energy. ■

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*The author is with the Institute of Ecology, University of Georgia. Her dissertation work is focused on the cumulative impacts of dams on Costa Rica's watersheds.*