

## *Case Study of Itaipu Dam*

### ***SUMMARY***

Over the previous decades, the Itaipu Dam has served a key role by producing reliable power for the states of Brazil and Paraguay. Lessons have been learned amid the development and operational phases of the project that can control the stability of new hydro-electric power stations in Latin America, regarding balancing national energy needs with environmental protection.

The streams that are sufficiently huge to have the dams and produce MWs or even GWs of power are frequently trans-border river, which crosses borders of some states.

The Itaipu Dam maintains its power generation because of the climatic conditions of the area. The predictable rainfall of 2,500 millimeters for every month guarantees stable water repository levels, in this manner empowering all year's power generation need from the dam is fulfilled.

The starting power generation limit of the plant is 14 GW, with 20 generating units supplying 700 MW each with a hydraulic structure ranges between 118 meters (387 ft). In 2016, the plant employed 3038 workers.

The Itaipu Dam project is an explanatory model of how the emerging states can collaborate to tackle nature's capacity for maintainable improvement in the coming decades.

### ***LEARNING OUTCOMES***

On April 26, 1973, Brazil and Paraguay signed the Itaipu Treaty, the legal tools for the hydroelectric misuse of the Paraná River by the two nations. On May 17, 1974, the Itaipu binational element was made to manage the plant's development. The construction started in January of the next year. Brazil's and Latin America's first electric car was launched in late 1974. It got the name Itaipu out of appreciation for the project.

The Itaipu Dam is a bi-national hydro-electric power generation station situated on the Paraná River in South America, which is worked mutually by the states of Brazil and Paraguay. This project extends from Foz do Iguaçu, in Brazil, and Ciudad del Este in Paraguay, in the south to Guairá and Salto del Guairá in the north.

It is significant to note that the decision to build this dam was made when the two governments were under the military regime

The eco-friendly benefit of Itaipu Dam is the supply of power through the flow of water controlling it without the requirement of consuming coal or oil, as required in petroleum product power stations.

The dam is the biggest hydro-electric power generation station, at 98 trillion watt-hours created per annum. The Itaipu Binational Hydroelectric Power Plant, situated on the Parana River among Brazil and Paraguay supplies over 25% of Brazil's electrical power and 80% of Paraguay's.

Despite the way that Itaipu Dam is just the second-biggest station in age limit terms at 14,000 megawatts, after the Three Gorges Dam in China, which has a 22,000-megawatt limit, producing a lesser 85 trillion watt-hours per annum.

The imperative angle in which Paraguayans have gained an edge is more geopolitical sense. Two 600 kV electrical lines from the Itaipu dam keeps running more than 500 miles and supplies electrical energy to the urban communities, for example, Rio de Janeiro, Sao Paulo and the territories around them. These are the most industrialized and urbanized communities of Brazil. In this manner, sharing the control to some degree over the power supply of the greatest urban areas in Brazil certainly gives an edge or haggling capacity to Paraguayans against Brazil on everything. In the event that they need, Paraguay can genuinely challenge the stability of Brazil's power supply, most probably by refusing to pitch a lot of power to Brazil

The world's largest waterfalls, the Guairá Falls, was drowned by the newly constructed Itaipu. The Brazilian government eliminated the Guairá Falls National Park and dynamited the submerged site where the falls had been, encouraging more secure route, in this manner wiping out the possibility of restoring the falls in future. A couple of months before the reservoir was filled, 80 individuals lost their lives when a crowded bridge collapsed due to ignoring the falls, as reported by the tourists.

The Guaíra Falls was a strong barrier that confined freshwater species in the upper Paraná with its numerous endemics from species found beneath it, and the two are perceived as various ecoregions. After the falls vanished, numerous species in the past limited to one of these territories have owned the potential to access the other, causing issues normally connected with presented species. For instance, more than 30 fish species that formerly were restricted to the area underneath the falls have possessed the ability to penetrate the region above.

The downstream and upstream countries that are influenced in such a way or specifically turns into the main cause of trial and blocks the growth of the scheme. Consequently, it isn't the specified complexity or technical and social barriers that make these experiments hard to be funded or fulfilled, however, it is the political problems behind these barriers usually create the major problem.

A fish pass was also built as a major aspect of the environmental moderation tends to empower oceanic life to go from the downstream Paraná River to the upper supply region behind the dam. This project was unsuccessful, and a modernized fish pass was built in 2002 to address this issue. The changed fish pass comprises of 6km of a firm channel and 4km of a particular channel over a rise of 100m to empower angle entry up the Paraná River. This transformed type of fish pass is now essential for new hydroelectric dams that are expected to meet Brazil's energy requirements for its 200 million individuals.

The impact on wildlife habitat encouraged the creation of eight animal resources to which the different species were migrated by zoological specialists. In 2003, a Biodiversity Corridor was built in parallel with a reforestation program. It linked the original animal reserve zones to the greater Iguazu National Park, hence ensuring a survival rate of 70% for baby animals in the zone.

Both Paraguay and Brazil have increased much in the advancement and operation of the Itaipu dam. This advantage did not come without expense, as the dislocating lot of individuals and the destruction of key natural landmark are decisions not to be taken lightly. This source of hydroelectric energy has decreased dependence on coal and oil in the two nations and has furthermore brought about a stronger connection between the two nations through their joint organization. Despite the fact that there were some remarkable expenses acquired, the Itaipu dam rose as a natural, economic and political achievement; the capacity to create such a lot of

hydroelectric energy has spared every nation monetarily and has moreover been a little advance in reducing the world's oil reliance

Water is a shared resource. Therefore, it is of vital importance to run well politically the big hydropower plant projects and work together with the neighboring countries to balance the interest and meet the mutual needs. Thus, all big hydropower projects on international rivers have to be treated with accuracy and to planned well ahead.

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