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**Ecuador's most spectacular waterfall threatened by
Chinese-funded hydroelectric project**



A massive new Chinese-funded hydroelectric project now threatens Ecuador's San Rafael Falls, one of the truly great waterfalls of the world.

In early June, the Export-Import Bank of China, after a long and rocky negotiation period, succeeded in signing a \$1.68 billion loan to Ecuador for the construction of the 1,500 MW Coca-Codo Sinclair Hydroelectric Project. Last week, the Chinese contractor Sinohydro officially started work on the project that is scheduled to be completed in the year 2016.

However, specialists are warning that due to inadequate planning and an inflated design, the project will be an ecological disaster and won't deliver its promised energy production.

The water diversion dam for the project is designated to be built just 19 km upstream of San Rafael Falls on the Coca River and will effectively divert the water needed for energy production through a large cross-country tunnel

spanning the distance across a prominent bend in the river, thereby circumventing the falls altogether and leaving San Rafael Falls high and dry.

At a towering 480 ft, San Rafael Falls is Ecuador's largest and most spectacular waterfall. It is located in the mega-diverse transition zone between the Andes Mountains and the Amazon and is a principal attraction of the UNESCO Sumaco Biosphere Reserve. The falls have become one of the more prominent images and icons for promoting ecotourism in Ecuador, a country that made headlines in 2008 for being the first nation to grant constitutional rights to nature itself.

“So basically you have the first country in the world that legally respects nature, and they are about to destroy their greatest waterfall,” said Dr. Matt Finer of the DC-based Save America's Forests. “While we applaud and support Ecuador's revolutionary initiative to leave oil reserves under the Amazon, this hydroelectric project is just a step back to business as usual.”

Ecuador made international headlines recently by signing a trust fund agreement with the United Nations as part of a bold plan to receive compensation for not extracting nearly a billion barrels of oil lying beneath Yasuni National Park, one of the most biodiverse rainforests on Earth.

According to Matthew Terry of the Napo River Foundation, based in Tena, Ecuador, the principal problem is that the project is completely over-dimensioned in relation to the amount of available flow in the river, and lacks a comprehensive environmental impact study, as well as a number of technical studies, final designs, and a definitive budget.

The state-owned Hydro Coca Codo Sinclair company boasts that the project will generate 1,500 MW of electricity using 222 cubic meters of water per second from the Coca River. But Terry maintains that the river typically maintains a flow of only 80-100 cubic meters per second, and the project does not have a reservoir with any significant regulating capacity due to the issues of sedimentation and seismic risk.

“There is no doubt in my mind that when they build the diversion structure with the capacity to take over 200 cubic meters per second from the river channel, and the river only has about half of that, they will take the entire river and leave the San Rafael Falls with virtually no water,” said Terry.

And one doesn't have to look far for an example. Ecuador's second largest waterfall, Agoyan Falls, has been almost completely de-watered by a similar hydroelectric project scheme.

“We maintain that the first priority for developing the Coca-Codo Sinclair project is to determine the amount of available water at the dam site,” said Terry. “And this analysis must take into account all instream environmental flow considerations, as well as future demands for water in the basin.”

The Coca-Codo Sinclair Hydroelectric Project began development in the mid-1980s, but was eventually scrapped after the Reventador volcano erupted and devastated the entire region in 1987, and the project was considered to be high risk. In 2007, President Correa resurrected the project as one of the centerpieces of his administration's energy plan, and cites recurrent energy shortages in the capital Quito as evidence that this project must move forward.

It is touted to be the largest energy project in Ecuador and the largest overseas hydropower project undertaken by a Chinese company (Sinohydro). Only two Chinese firms responded to the international bidding, and only Sinohydro met the bidding requirements.

According to Finer and Terry, the two new feasibility studies that recommend developing the 1,500 MW project were based on historic hydrologic data of questionable validity, neglected to include hydrologic data over the last 20 years, and failed to take into account the effects of multiple trans-continental water diversions from the Coca watershed, all of which justify their concern that the project does not take into account the current available flow regime in the Coca River drainage and Upper Napo basin.

The original feasibility studies, financed by the IDB and finished in 1992, recommended the project to be built in two phases – first, a 432 MW project using a flow of 63.5 cubic meters of water per second from the Coca River, and later, in order to take advantage of exceptional high flows for power generation, a second stage could be installed with capacity of 427 MW, for a total production of 859 MW using a total flow of 127 cubic meters of water per second.

In 2007, after President Correa resurrected the project, the Italian firm Electroconsult was contracted to provide a new feasibility study that justified nearly doubling the installed capacity of the project to 1,500 MW. However, according to Terry, the study utilized historic hydrologic data of very questionable validity and quality, and no effort was made to verify the persistence of flows in the project area.

In January 2010, the Mexican state electricity company completed an analysis of the Electroconsult study, and recommended an installed capacity of 1,200 MW for the project. However, this analysis only evaluated the methodology used in the Electroconsult study, and did not verify or evaluate the hydrologic data for the project,

“Coca-Codo Sinclair will only be able to produce its installed capacity of 1,500 MW when the Coca River is in high flood stage,” stated Terry. “In fact, if promises are kept to maintain an adequate aesthetic flow for San Rafael Falls, the project will only be able to produce between 200 MW to 400 MW of electricity the vast majority of the time.”

The Coca-Codo Sinclair Hydroelectric Project also threatens one of the last intact roadless areas in the Tropical Andes. The great bend or “codo” in the Coca River, is not only home to San Rafael Falls, but also forms a natural barrier with its steep canyon walls that protects a vast rainforest wilderness area. Due to its importance for the conservation of tropical biodiversity, UNESCO designated the area as a Biosphere Reserve, and even the oil companies spared this area during prospection and development of pipeline corridors in the Ecuadorian Amazon.

A new access road has already been constructed into a previously untouched part of the UNESCO Sumaco Biosphere Reserve to the proposed powerhouse location. Meanwhile, a second major road into the reserve is now being planned for additional project components. The studies for the proposed 500-kV transmission line corridor have yet to be completed, and it is expected that it will require another separate road corridor as well, in addition to shorter access roads for the construction of the tunnel and work camps.

“It is now well understood by scientists that new road construction is the biggest trigger of tropical deforestation, so building multiple new roads into the core protected areas of the Sumaco Biosphere Reserve without adequate planning and studies is incredibly irresponsible,” said Finer.

With the project officially underway with Sinohydro, Terry claims that the poorly-planned project is high cost, high risk, and a serious distraction from the country’s renewable energy development priorities, and that Coca-Codo will ultimately saddle Ecuador with huge debts and unforeseen commitments to China when it is not able to produce the amount of energy being touted by its promoters to pay back the 15-year loan that carries a steep 6.9 percent interest rate.

He suggests implementing an aggressive energy efficiency plan for the country as an immediate measure to reduce or offset the demand for electricity during critical periods and long-term growth. Terry also indicates that there are no shortage of superior alternatives for renewable power generation available to President Correa and Ecuador. For example, the Sopladora and Cardenillo Hydroelectric Projects would tie into existing power transmission infrastructure, are closer to the biggest population centers in the country, would cause much less environmental impact, and would generate over 600 MW. In addition, the Chachimbiro, Tufiño and Chalupas geothermal projects would add over 400 MW. These geothermal projects are the best options for secure and renewable energy available to Ecuador, according to Terry, and should be national priorities.