



The Solar Option Can Save Lake Chad

- Lake Chad was once the most important freshwater ecosystem in the Sahel, providing sustenance to 30 million people living in Africa's central Sahel.
- During the last 50 years, it has shrunk to less than 10% of its former size, precipitating a major humanitarian crisis.
- The Lake Chad Basin Commission, representing the countries surrounding the lake, has been studying the problem for years, seeking a viable approach to bringing water from the Ubangi River to replenish the Lake.
- On February 26-28, 2018, the Commission will convene African decision-makers in Abuja at the [International Conference on Lake Chad](#) to develop consensus on solutions to saving the Lake.
- Dramatic reductions in the cost of generating solar power, along with advanced grid-scale lithium-ion mega energy storage batteries, clearly make The Solar Option the best choice for the countries and people of the Lake Chad basin -- economically, environmentally and socially.
 - Approximately 10% of the cost of a hydroelectric dam.
 - No flooding and displacement of villages and people
 - No disruption of fisheries and agriculture.
 - No significant Ubangi River water loss.
 - Staged construction allows early start of water pumping, increasing Lake Chad about 3000 sq km in the first year.
 - Renewed Lake Chad ecosystem.
 - Increased agriculture, food security and economic opportunities.
 - Infrastructure development: roads and electrification.
 - A positive future to counteract civil unrest.
- The Solar Option will be presented to the International Conference in an invited paper on February 27, 2018, including Terms of Reference for a detailed feasibility study. The presentation's goals are:
 - To secure consensus on the Solar Option as the best choice for saving Lake Chad.
 - To secure commitment to obtain funds for a detailed feasibility study, per the Terms of Reference.

Invited Technical Paper

Ubangi – Lake Chad Water Transfer Using Solar Option

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Abstract

In 2011, CIMA International (Canada), under contract to the Lake Chad Basin Commission, completed a *Feasibility Study of the Water Transfer Project from the Ubangi to Lake Chad*. This study proposed a 360 MW hydroelectric dam on the Ubangi River at Palambo to provide 250 MW of power to pump water a distance of 128 km to the Lake Chad Basin. Not only was the proposed dam costly at \$2.7 billion (2011 US dollars), it would flood 200 km upstream, inundating many villages in both the Central African Republic (CAR) and the Democratic Republic of Congo (DRC). Moreover, during periods of low water at the Palambo dam site, the project would not generate enough power to pump the planned flow of 100 m³/s to Lake Chad.

However, recent reductions in the cost of solar power open a new opportunity for cost-effective, environmentally sustainable Inter-Basin Water Transfer (IBWT) to Lake Chad. This paper presents the Solar Option, as an alternative to a hydroelectric dam on the Ubangi River. One version of the Solar Option is summarized by the Sample Project Specifications, which show that the projected cost of solar energy may be less than 10% of the cost of the hydroelectric dam.

Key Words

- CIMA — CIMA+ Civil Engineering, Laval, Quebec; previous IBWT feasibility study
- Grid-scale battery — large energy storage used to extend hours of operation
- IBWT — Inter-basin Water Transfer (from the Ubangi River to Lake Chad)
- PV— Photovoltaic solar panels that generate electricity from sunlight
- Terms of Reference — Specification of engineering work to be done to plan a project
- Solar Option — The plan to use solar power as an alternative to a hydroelectric dam

Introduction

The CIMA Feasibility Study (1) specified a hydroelectric dam on the Ubangi River. The Solar Option is an alternative to this dam. The Sample Project Specifications of the full Technical Paper, to be presented at the International Conference on Lake Chad on February 27, 2018 summarize details of one model of solar power development to pump water for IBWT from the Ubangi River to restore Lake Chad. Other versions of the specifications are possible.

Appendix 1 provides a detailed Terms of Reference for a new engineering feasibility study of IBWT to Lake Chad, employing the Solar Option.

Figure 1 below is a Map of Chari River in the Lake Chad Basin, showing the IBWT route from the Ubangi River for pumped water into Lake Chad.

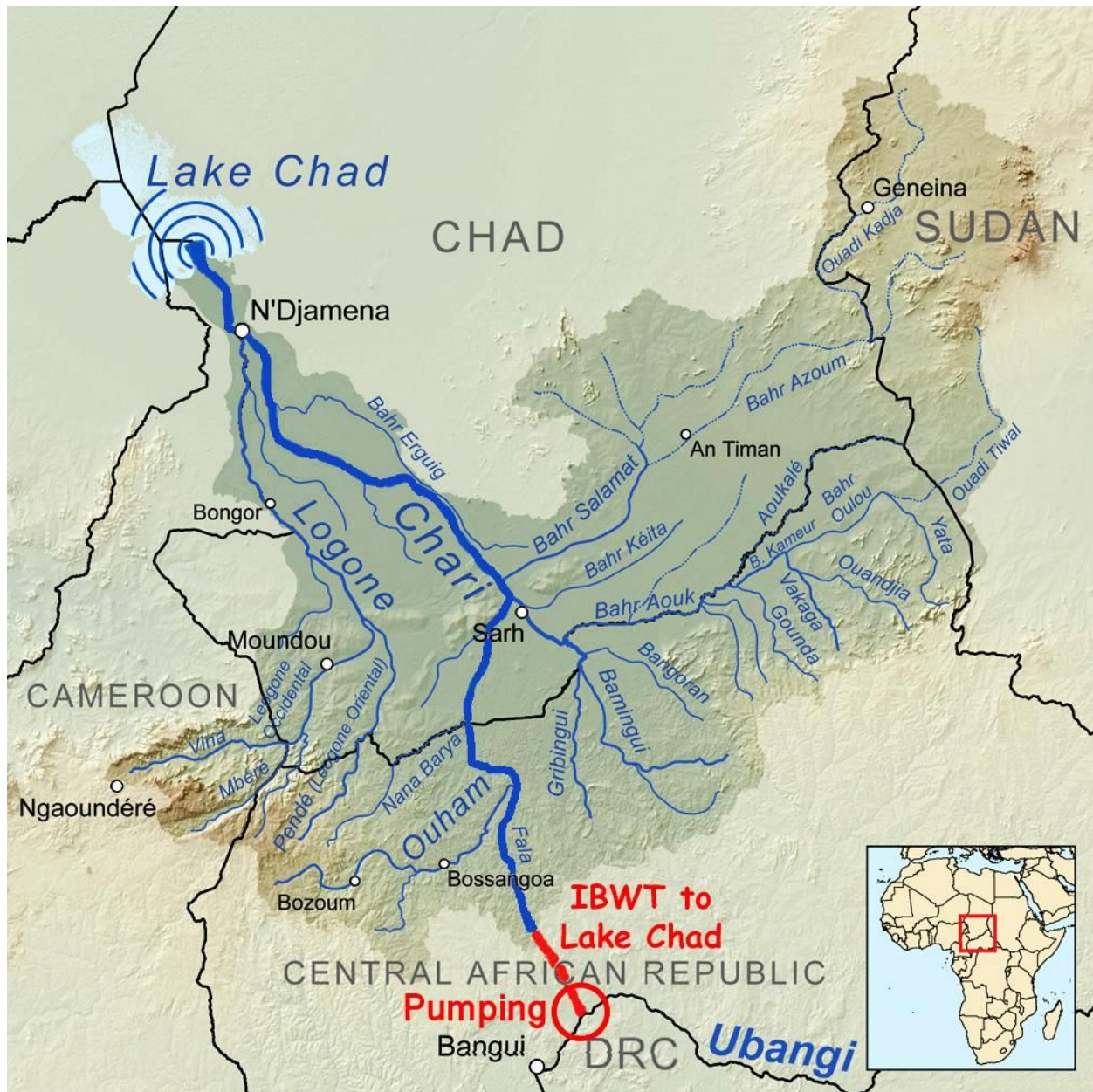


Figure 1: Map of Chari River in the Lake Chad Basin, showing the IBWT route for pumped water.

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