

# Grand Inga Hydroelectric Project: An Overview

The Grand Inga is the world's largest proposed hydropower scheme. It is the centerpiece of a grand vision to develop a continent-wide power system. The Grand Inga mega-project is a priority project for a number of Africa development organizations, including the New Partnership for Africa's Development (NEPAD), the Southern Africa Development Community (SADC), East African Power Pool (EAPP) and ESKOM, Africa's largest power utility, among others.

The proposed dam is the fourth and largest of a series of dams that have been built or are proposed for the lower end of the Congo River in the Democratic Republic of the Congo (DRC). Grand Inga will generate 40,000 MW, and will be constructed in 6 phases of which the Inga III Dam is the first phase. The power generated would be double the capacity of the largest dam in the world, the [Three Gorges Dam](#) in China.

## Where is it?

The Inga dams are located in western Democratic Republic of the Congo, 50 km upstream of the mouth of the Congo River, and 225 km (140 miles) south west of Kinshasa on the Congo River. The Congo River is the world's second largest in terms of flow (42,000m<sup>3</sup>/s), after the Amazon, and the second longest river in Africa (4,700km), after the Nile River. It empties into the equatorial Atlantic Ocean creating what is famously known as the Congo Plume. The plume is a high productivity area arising from the rich nutrient flow from the river and is detected as far as 800km offshore. The plume accounts for 40%-80% of total carbon productivity and is one of the largest

carbon sinks in the world.

The river is unique in that it has large rapids and waterfalls very close to the mouth while most rivers have these features upstream. The dam site is on the largest waterfall in the world by volume, the Inga Falls. Inga Falls is a series of falls and rapids that drop in elevation via small rapids. The main falls are 4 km wide, dropping to about 21.37 metres near a bend and forming hundreds of channels and rivulets and many small islands. At the Grand Inga site the Congo River drops 96 meters in a run of 14.5 km.

The falls are currently incorporated into the [Inga I and Inga II](#) hydroelectric facilities. The volume of the river diverted for Inga I and II is approximately 30% of the average discharge. It is postulated that if the Grand Inga project is built, it will draw as much as two-thirds of the river water, if not more.

## Design

Based on a feasibility study conducted by AECOM- EdF from 2011 to 2013, Grand Inga would be constructed in 6 development phases with Inga III being the first of these phases. Inga III will be constructed in two steps, initially a low head and then a high head, extending the dam wall and making it higher. There will be no closure of the Congo River and no tunnels, just an open channel. An amount of about 6000m<sup>3</sup> m/s will be diverted for Inga III to a valley which runs parallel to the Congo riverbed. When completed, Inga III will produce 4,800MW of electricity.

Further stages will necessitate the flooding of the Bundi Valley, to form a 22000 hectares reservoir and drowning of the Inga III channel. The latest design approach allows the development of Grand Inga to have independent phases that can be operated by different operators.

## Cost

Grand Inga Dam has been estimated to cost US\$80 billion, including cost of the transmission lines needed to carry its power across Africa and potentially to Europe. Many consider the amount to be an underestimate.

## Financing

Potential contributors are the World Bank (it pledged its support in 2009), the African Development Bank (AfDB) and the European Investment Bank. The World Bank is supporting the technical aspect of Inga III (first of 6 phases of the Grand Inga scheme) and is equally playing an advisory role. The Bank's technical support is in the form of a \$50 million grant to cover EIA studies and all technical studies that need to be carried out, training of officers and to set up Inga 3 Dam Authority and; Development of a communication plan for the project. The AfDB has provided \$15 million dollars since 2010 to conduct a feasibility study of both the Grand Inga and Inga-III hydro projects. The study was undertaken by a Canadian /French Consortium. In June 2013 the AfDB together with the DRC government signed 2 grant agreements for a total of \$5.250 million in Marrakech. These grants fall within the framework of the Fragile State Facility (FSF) and are intended to provide technical assistance for the development of Inga. Grand Inga is being financed under a Public/Private partnership structure and is listed by the G20-Multilateral Development Banks as one of the top 10 “Exemplary Transformational Projects” that is large projects meant to have a significant impact on development. Due to the G20 push for large infrastructure investments the WB has updated its infrastructure investment strategy of which the Grand Inga is being considered. The strategy is to source finances from both private and public sources and fund the project through a Private Public Partnership model.

## **Why is Grand Inga being proposed?**

Africa faces a huge energy gap that has contributed to slow economic development and poverty. On the other hand Africa has a huge potential for all forms of energy, hydropower, solar, wind and fossil fuel energy. The proponents of the Grand Inga project (mainly African governments and development organizations) consider hydropower to be clean renewable energy.

They have put forward arguments that the Grand Inga hydropower scheme will provide cheaper and readily available energy and allow Africa's industrial and manufacturing industry to take off. In addition the project is promoted as being good for promoting peace in the region and for the environment. However, a number of concerns that include environmental and social impacts of this project have not yet been addressed and all energy options are still to be explored.

## **What is the current status of the project?**

South Africa and the DRC signed a Memorandum of Understanding (MOU) in November 2011 for the development of Grand Inga. In May 2013, the two governments signed a co-operation Treaty to jointly develop the Inga III Dam. South Africa will purchase 2,500 MW of the total 4,300 MW generate, making it the principal buyer for Inga III electricity. Following the signing of the treaty, the DRC relaunched the process for the selection of a developer and established the first stage objective of the Inga dam- to lay the foundation stone in October 2015. A number of consortia including Sinohydro, the Three Gorges Corporation from China, Actividades de Construcion y Servicios (ACS), Eurofinsa and AEE from Spain and Daewoo- Posco from Korea are currently bidding for selection as developers of the Grand Inga. The terms of reference for the Inga III social and environmental impact assessment (SEIA)

studies were posted in early July 2013 for public comments. These studies should be concluded within a year and construction is planned to commence in 2016.

## **What are the likely negative impacts of the dam?**

The Grand Inga is a massive project that will require huge sums of money for its realization and astute management for tendering process and implementation. Based on history there are high risks of corrupt deals, and ever escalation of costs. By its unique ecological systems huge ecological impacts that include nutrient and sediment trapping, loss of the mid Atlantic plume are anticipated. Diverting flow of the Congo river to create a reservoir will flood the Bundi Valley, affecting local agricultural lands and natural environments; and may cause huge methane emissions that will contribute to global warming. The effect of reduced flow in the Congo River may cause loss of biodiversity and a shift in the dominant species. The flooded area may also create an environment which is conducive for the breeding of water-borne vectors such as the "malanquin' mosquito.

Transmission lines always result in huge corridors of forests being cleared. The DRC has the worlds' second largest rainforest and loss of the forest to create paths for electricity transmission lines will have significant environmental and social impacts, not to mention the security and maintenance risks posed by such a long transmission system.

Very little of the electricity generated by Grand Inga will provide for city or village level power to Congolese people. There are mentions that the power will uplift the DRC but so far there is no strategy on the table to show how the poor communities will access the electricity.

## **Project studies**

So far three feasibility studies have been done, with the latest having been carried out in 2009. A separate feasibility study for Inga III dam was finalized in mid 2013 and at this writing is still to be released to the public.

Our concerns are that 94% of the people in DRC have no electricity and yet the continent's biggest infrastructure investment is all for the extractive industries and faraway urban centers. We are further troubled by the impacts the dam will have on sediment transportation and biogeochemical processes in the Atlantic, possible carbon emissions from the reservoir (no matter how little) and largely the socioeconomic impacts. The socioeconomic impacts include impacts on the people living on the area that will be inundated and the whole cost-benefit for the poor people of the DRC especially in terms of debt burden and access to modern electricity. The DRC needs to subject the Grand Inga proposal to the standards of the World Commission on Dams standards.