Hydropower Along the Nile

Foreword:
The following visuals highlight and help to better understand the hydropower expansion along the Nile River. The main factors explaining such development in the sector are:
1. Riparian countries lack access to grid electricity although demand is increasing with rising economies and population;
2. High hydropower potential with few existing infrastructure;
3. The Nile Basin Initiative (NBI) contributes to hydropower expansion by providing a forum for joint planning and cooperative development;
4. Availability of new funding sources from emerging powers (e.g., China, Turkey or Arab States).

Fragmentation of Nile basin area between 11 riparian states

Hydropower Capacity

The total hydropower capacity is symbolized by a "checkerboard" whether it's functional, planned, inside, or outside the Nile basin. The countries are sorted by functional hydropower within and without the basin. For example, Egypt has already developed close to its full hydroelectric capacity (86%), all of which is within the Nile basin. China has a great hydropower potential within the basin, but only 6% is functional. Outside the basin, the Democratic Republic of the Congo is a major actor in Africa dam development with the proposed Grand Inga dam project that has a potential capacity of about 4,800 MW (if completed, the dam would be the largest in the world).

Hydropower Importance

Hydropower Share

Hydropower plays an increasing role in most of Nile basin economies. It contributes much more than 90% of electricity in Burundi, Uganda, DRC, and Ethiopia. This option is preferred for its long-term economic life and the low production cost of electricity making it affordable to the poor urban and rural areas. The average Levelized Cost of Electricity (LCOE) for large hydropower infrastructure in Africa is below $0.05/kWh, while below the LCOE of gas, coal or geothermal. The use of hydropower also brings environmental benefits, like less deforestation and soil erosion from biomass burning, less greenhouse gas emission from fossil fuel, better flood control and river-flow regulation.

Hydropower Potential

The same countries can however benefit from a high hydropower potential, awaiting infrastructure development. Therefore an increased demand is forecasted as shown in the figure below.

Hydropower Investment

Since 1999, the People’s Republic of China has launched loans to encourage national companies as well as banks to engage in dam-building ventures. This is particularly the case for the state-owned Guangdong Corporation, which is now the largest hydropower company in the world, or the Export-Import Bank (China EXIM Bank) that has become one of the major funders of large dams. According to the NGO "International Rivers", in 2018, 92% of the country invested in big dams in Africa, representing 88% of all Chinese overseas dam investments. China’s first investments in the Nile River basin was in 2003 at the Merson Dam in Sudan. In this case, other financing institutions had previously rejected to get involved due to non-compliance with social and environmental standards. This map shows the distribution and proportion of the main Chinese investments along the Nile basin as of January 2015, with the Chinese name for the project written in parentheses.

Geographic Sources:


The Nile basin countries generally lack a harmonized electrical grid, an interconnected network to deliver electricity to consumers, especially in rural areas, as shown in the graphic below for the year 2010.

Percentage of Population with Grid Electricity (2010)

Electrical Grid

The Nile basin countries generally face a fragmented electrical grid, an interconnected network to deliver electricity to consumers, especially in rural areas, as shown in the graphic below for the year 2010.