

Green energy for the Copperbelt

Ensuring sustainable and beneficial hydropower projects

By Amelia Briel, Environmental Section Manager, Knight Piésold

The expansion of mining in the Zambia-DRC Copperbelt has led to a severe shortage of electricity. With high annual rainfalls and large rivers, it makes sense that countries on the Copperbelt are turning to hydropower to address the additional demand.

Hydropower does not consume water but rather the water is used to turn turbines to generate electricity and then released back into the river. Private developers have identified the opportunity and are addressing the power deficit through hydropower projects in the region.

While hydropower is considered green energy, the impacts of these developments, power lines and access roads can have an immense environmental and social impact. It is for this reason that an environmental and social impact assessment (ESIA) that utilises a multi-disciplinary approach is crucial in hydropower project development.

An ESIA sets out to determine whether the benefits outweigh the impact and if this is not the case, then a project should not proceed. Also, by identifying the impact on communities and the environment, the developer can plan a project in a manner that avoids or minimises impacts as far as possible or mitigates these impacts. In addition, not only must the environmental and social impacts be assessed, but also closely scrutinised by international investors before they decide to fund a project.

An area of a river that has a falling gradient is selected for a hydropower development. Water is impounded by building a dam or a weir. This water is diverted via an intake structure to the hydropower station to generate power and is then released downstream. The effect is that the natural flow pattern of the river is affected or altered. To mitigate the effect on the aquatic environment, an Environmental Water Requirement (EWR) study is done to inform the downstream water requirements.

Knight Piésold (KP) is currently involved in ESIA's for two major hydropower developments: the Lufubu project in Zambia and the Sombwe project in the Democratic Republic of Congo (DRC). Both projects are in remote Greenfields areas where there is currently no power supply.

Addressing critical power and social needs

The Lufubu hydropower project is located in northern Zambia on the Lufubu River. The project will entail the development of a cascade of three impoundments and power plants with an initial installed capacity of 163 MW. An ESIA was previously completed and approved by the regulator; however, KP has been appointed by the Lufubu Power Company to address international funding requirements and also to determine the EWR for the project. The EWR will determine the volume of water and flow regime required to sustain the ecosystem and downstream water users.



↑ The ESIA's seek to ensure that the hydropower projects benefit communities affected by the new installations

The Lufubu ESIA is challenging due to the remoteness of the site. The direct project area is uninhabited, but there are various communities residing downstream between the cascades and Lake Tanganyika. In this case there could be an impact on these communities' livelihoods because of the altered flow of the river. KP will use its local expertise in Zambia to conduct consultation with affected communities and update the resettlement requirements.

On account of the socio-economic circumstances in the region, the project may result in an influx of people seeking economic opportunities. This social influx has knock-on effects on the environment.

The Sombwe hydropower project is on the Lufira River in the Mitwaba territory of Haut-Katanga in DRC. Its developer, Kipay Investments, is a DRC-based company aiming to address the immense power deficit in the DRC.

The project involves the construction of a 90 m high roller compacted concrete arch gravity dam, intake structure, headrace tunnel and a powerhouse approximately 3 km downstream of the dam. Sombwe will generate 150 MW of power that will be supplied to the substation at the town of Fungurume via a 220 kV powerline.

As with Lufubu, the Sombwe site is located in a remote area in the DRC with very limited access, especially in the wet season. KP aims to ensure that the aquatic and terrestrial biodiversity components are adequately addressed. Also, Kipay investments aims to use the project to facilitate upliftment of the

local community and therefore KP will prioritise social studies and consultation.

Currently, due to COVID-19 restrictions, site visits cannot be undertaken but KP is working towards getting other parts of the ESIA's completed and will mobilise to site as soon as international travel restrictions are lifted.

Sustainability before profit

As both are Greenfields projects, there is a need to first understand the



↑ Chika Falls, Lufubu River

baseline environment; that is, what the environment and social sensitivities are. For example, an access road has a massive impact area because it opens up the area to deforestation and biodiversity degradation and it also has a significant social impact by altering livelihoods and traditional ways of life.

On the other hand, these ESIA's also take into account that there are social benefits on both a regional and national level as there is a serious power deficit in these countries. For example, these new developments will also supply communities with power and help stimulate the economy through job creation. The social assessment takes into account the community's needs and identifies which development initiatives will benefit them most.

The ESIA's for both projects will ensure that the environmental and social safeguards are implemented. The focus will be on developing robust environmental and social management plans (ESMPs) to guide the construction and implementation phases of these projects to ensure sustainable, green energy.

Essentially, an ESMP is a rule book to guide the construction and operational phases. Examples of the guidance in the ESMP is the preservation of grave sites and trees. In the operation phase, the ESMP could guide a company about the volume of water that must be released to satisfy the ecological and social requirements downstream of the development.

At a time when there is an urgency to get economies going amid the COVID-19 pandemic, companies and governments may be swayed to pay less attention to the details of ESIA's. However, this is the wrong approach. Even in an economic crisis, it would be short-sighted not to look at the sustainability of a project as you cannot have short-term gains with long-term environmental and social impacts. **MRA**

About the author

Amelia Briel holds an M.Sc. in Zoology (Aquatic Toxicology) and is a registered professional natural scientist. She has 16 years' experience in environmental management within the mining and water infrastructure field. She specialises in large-scale infrastructure and mining projects.

