

Sustaining Hydropower Energy for Economic Growth and Development in West Africa Hydropower Development And Management

J. Asamoah ^{1*}

Abstract

One challenge that faces hydropower is the environmental and social impacts that are usually associated with the development and management of hydropower. On account of this, there is currently a preference for moderately sized hydropower development projects. Further, the cost of developing huge hydropower projects is very high with long gestation periods. Electricity generation capacities are less than 1,000 MW, against huge demand for domestic, service, and industrial applications for most of the countries in the region. The study reveals that electricity generation in SSA is associated with acute shortages and high levels of unreliability. Electricity generation capacities are less than 1,000 MW, against huge demand for domestic, service, and industrial applications for most of the countries in the region.

Keywords

Climate change–Renewable Energy–dam–Hydropower.

*Chief Consultant/Managing Director, EnerWise Africa

¹Corresponding author J. Asamoah

Contents

- 1 Introduction
 - 2 Hydropower
 - 3 Management
 - 4 Small-Scale Hydropower Development
 - 5 Electricity Generation in Sub-Saharan Africa
 - 6 Conclusion
- References

1. Introduction

Africa is seeing huge demand for power, due to rapid economic growth, population growth and urbanization. Considering the significant hydro resources on the continent, hydropower is a vital source for the expanding power industry. Most sub-Saharan countries are highly endowed with relatively big rivers, waterfalls and streams that can be dammed to provide hydropower. One challenge that faces hydropower is the environmental and social impacts that are usually associated with the development and management of hydropower. On account of this, there is currently a preference for moderately sized hydropower development projects. Further, the cost of developing huge hydropower projects is very high with long gestation periods. The running cost of hydropower projects is low, in comparison with thermal plants, which guzzle large quantities of fossil fuels – coal, oil and gas.

2. Hydropower

- 1 Hydropower is the renewable energy contained in flowing water, and is also the oldest form of generating power through the use of pump storage or run-off water. During the generation of hydropower, the potential energy of the water is transformed into mechanical energy when water strikes the rotary blade of a turbine. The rotating turbine drives a generator, which produces electricity. The development of the dam is associated with moving whole communities from their normal place of abode to relatively safe places; where they are not expected to be affected by the dam, particularly during flooding and the installation of transformers and transmission cables. This exercise in social engineering is preceded by painstaking negotiations, and the payment of compensation to the affected communities. In some cases, shrines and sacred places, including cemeteries are moved to far places, beyond the catchment areas of the dams. The bigger the dam, the greater the effort put in to relocate the affected communities. These relocations are factored into the Environmental and Social Impact Studies that precede the development of the dams.

3. Management

Management deals with the organization and coordination of the activities of a business to attain defined objectives. Along with machines, materials, and money, management is usually included as a factor of production. According

to the management expert, Peter Drucker, the basic task of management includes both

- i Marketing, and
- ii Innovation

Management consists of interlocking functions of creating corporate policy and organizing, planning, controlling, and directing organization's resources in order to achieve the objectives of a policy (WebFinance 2016). A manager gets other to do a piece of work, but does not necessarily do it himself.

4. Small-Scale Hydropower Development

A small-scale hydropower (SHP) is a cost-effective and reliable energy technology for the provision of clean electricity generation, and is environmentally benign. Small hydro is in most cases "run-of-river"; in other words any dam or barrage is quite small, usually just a weir, and little or no water is stored. SHP is very useful in remote off-grid communities with typical applications in areas such as rural residential community lighting, TV, radio and telephony, rural small industry (agriculture and other uses) as well as grid based power generation. SHP can serve two main purposes: social and commercial.

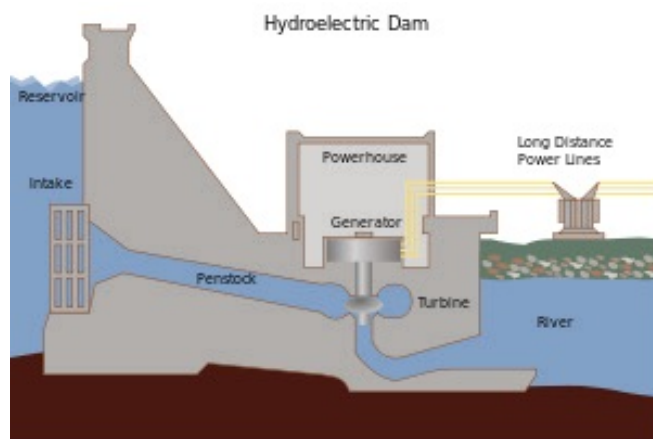


Figure 1. Schematics of a Hydropower Dam. Source: Wikiversity

5. Electricity Generation in Sub-Saharan Africa

Electricity generation in SSA is associated with acute shortages and high levels of unreliability. Electricity generation capacities are less than 1,000 MW, against huge demand for domestic, service, and industrial applications for most of the countries in the region. The total installed electricity generation capacity for all the 48 countries of

sub-Saharan Africa (SSA) countries, excluding the Republic of South Africa, is about 30 gigawatts (GW), which is stated to be almost equal to that of Argentina (Kaunda et al 2012). However, South Africa has an installed capacity of over 40 GW.

6. Conclusion

In Ghana, the big hydropower (HP) opportunities have been exhausted. However, there are about 6 small hydropower opportunities to be explored. One management issue to grapple with in large hydropower is flooding and displacement of people. Considerable damage is being done to the water bodies in Ghana, which may hinder HP development in future.

References

- [1] KAUNDA, C., KIMAMBO, CUTHBERT & NIELSEN, T., 2012, Potential of Small-Scale Hydropower for Electricity Generation in Sub-Saharan Africa. <http://www.hindawi.com/journals/isrn/2012/132606/>
- [2] WEBFINANCE, 2016, MANAGEMENT. <http://www.businessdictionary.com/definition/management.html>