

The Challenges Faced by Private Project Developers in Securing Financing for Hydropower Projects in Zambia

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Abstract

The study investigated the challenges faced by private project developers in securing financing for hydropower projects in Zambia. It was a cross sectional exploratory study based on the pragmatic research philosophy. The multiple case study research strategy was utilized in the study. Mixed methods were selected as research choice and non-probabilistic was used as the sampling technique. Primary data was collected through semi-structured interviews and secondary data was obtained from library and internet. The population of the study comprised 13 hydropower projects that were being promoted by the Office for Promoting Private Power Investment.

Five of Thirteen (38.5%) hydropower projects were considered for the study having relevant data for the study. Purposive sampling was used to select the projects. Quantitative and qualitative data was collected and analysed.

The study found that the challenges in securing financing for hydropower projects in Zambia were related to the non-fulfillment of the key conditions required for nonrecourse financing of hydropower projects. Those conditions were

- 1. Development Mode of the project*
- 2. Sharing of project unlimited risks*
- 3. Government guarantees for project credit enhancement*
- 4. The Level of electricity tariffs*
- 5. The Power off-taker for the project and*
- 6. Provision of escrow arrangements by the off-taker.*

The study concluded that the efforts made by Government to support private investment in hydropower projects did not directly address the risks associated with project finance mobilisation. It was therefore recommended that Government addresses these requirements from the lenders and developers in line with the principles of project finance to enable the hydropower projects secure financing in Zambia.

Keywords: *Project Mode, Unlimited Risks, Government Guarantee, Electricity Tariffs, Off-Taker, Escrow, Project Financing.*

Introduction

Zambia has been making efforts to increase its electricity generation by developing the untapped hydropower potential around the country with the help of the private sector since the early 1990s. Although the Electricity Supply Industry (ESI) has been liberalised and various private investors invited to come and participate in the development of these idling hydro resources, not many hydropower plants have been commissioned by private developers 25 years after the liberalisation of this sector, except Ithezi Thezi Hyrdopower Project which is a joint venture between TATA Power and ZESCO, and Maamba Thermal Plant. This is despite the fact that there is currently a power deficit not only in Zambia but in the Southern African region as a whole. This raises the question as to why there has been no major success recorded in this area. The research attempted to investigate the challenges that were faced by private developers in securing financing for hydropower projects in Zambia.

Background to the study

Electricity is one of the major sources of energy in Zambia besides biomass and petroleum fuels. It is worth noting that Zambia has about 40% of the water resources in the Southern African region and thus 99% of the electricity produced in the country is hydro dependant. (ZDA, 2013)

The Electricity Supply Industry (ESI) in Zambia has a long history with the first power station built in Livingstone in 1906. The first major investment in the ESI took place in the 1950s when the Kariba dam was built at a cost of US\$480 million and consequently the Kariba North Power Station was also completed in 1976. The Kariba North Power Station, built at a cost of US\$420 million with an initial installed capacity of 600MW, was owned and operated by Central Africa Power Corporation which was jointly owned by the governments of Southern Rhodesia and Northern Rhodesia, presently Zimbabwe and Zambia. (USAID, 2008).

Until the late 1980s, most major power generation projects throughout Africa were financed using public funds and concessionary loans from developmental finance institutions like the World Bank. However, in the early 1990s, the financing of such projects started changing because of insufficient public funds. (Rabin, 2007).

Therefore, Zambia adopted plans to unbundle its power systems and introduce private participation and competition. Independent power projects that were privately financed and supported by non-recourse or limited recourse financing with long-term Power Purchase Agreements (PPA) with the state utility or other private off-takers became the priority. (Rabin, 2007)

On the other hand the installed capacity for the country was rapidly being outstripped by the electricity demand in the 1990s. The demand for electricity in Zambia was increasing at annual rates of about 3 - 4 % due to the favourable economic growth in the country. The rapid increase in electricity demand necessitated some form of government intervention.

In line with the new developments, government passed the National Energy Policy (NEP) in 1994, which was revised in 2008, with the intention of liberalizing the Energy Sector and to encourage private sector participation in the energy sector. One of the main objectives of the NEP in relation to the power sector was to develop the large hydropower electricity potential in Zambia which was estimated at over 6000MW (NEP, 2008).

According to Zambia Development Agency, Zambia needed to spend US\$1.6 billion per annum over the period 2006-2015 to develop that infrastructure to the level found in the rest of the developed world. That included the development of electrical power infrastructure in the country. That amount was equivalent to 20% of Zambia's GDP and it was about double the country's rate of investment. It was estimated that Zambia's infrastructure funding gap was at US\$500 million per year (6.5% of GDP) for the ten years from 2006 to 2015. (ZDA, 2014)

Government alone would not manage to close the financing gap for infrastructure and to develop the ESI in order to cope with the increasing electricity demand. Therefore, much effort in soliciting private sector participation in the development of the untapped hydropower potential in Zambia was needed.

The Government developed an appropriate framework which would make Zambia an internationally competitive investment destination to potential investors in the power sector.

In line with that, the Office for Promoting Private Power Investment (OPPPI) was established in 1998 and given the mandate of administering and coordinating the activities with private stakeholders in hydropower project development.(FPI, 1998) Through OPPPI, several private project developers expressed interest to invest in Zambia's ESI and were involved in developing about 13 hydropower projects.

Although Government had put in much effort in soliciting private sector participation in the development of the untapped hydropower potential in Zambia, no major privately owned project has been fully developed and commissioned since the liberalization of the ESI in 1995, except two Public Private Partnership (PPP) projects mentioned above. Some of the projects that had reached the finance mobilisation stage stalled due to some challenges relating to the conditions for securing financing for hydropower projects. There was need to identify the challenges that hindered the development of the hydropower projects in Zambia and find ways of addressing them.

Statement of the problem

According to the Office for Promoting Private Power Investment (*OPPPI Monthly Report of November 2013*), some private project developers were failing to secure financing for the implementation of hydropower projects in Zambia. The projects were failing to reach financial closure because no lender was willing to provide financing for their implementation. That was despite most hydropower projects progressing well in their initial implementation stages.

To the best knowledge of the researcher, no scientific study had been done to ascertain why some projects at the Office for Promoting Private Power Investment (OPPPI) were stalling once they reached the finance mobilisation stage. That prompted the researcher to investigate the challenges that were being faced by the private project developers in securing financing for developing hydropower projects in Zambia.

Purpose of the study

The research was an exploratory to gain insights and familiarity with the challenges being faced by private developers in securing financing for hydropower projects in Zambia. In the same vein, Cauvey et al (2003) said “In exploratory study, the main purpose is to formulate a problem for more precise investigation; also to discover facts, insights and priorities for further research etc”.

It is hoped that the findings of the study would help the stakeholders in the Electricity Supply Industry (ESI) to come up with appropriate interventions that could ensure successful finance mobilisation for hydropower projects being implemented with the help of private developers in Zambia.

The study focused on the hydropower projects that were being developed in Zambia with the help of the private sector through a government institution called the Office for Promoting Private Power Investment (OPPPI). The projects considered for the research were the ones that were under development since the liberalisation of the Electricity Supply Industry from 1994 up to year 2015.

Significance and justification of the study

The researcher was motivated to conduct the study seeing that Zambia is endowed with vast hydropower potential estimated at over 6000MW; but only 2000MW of the total potential was so far tapped for use in Zambia.

Many private developers had shown interest in developing the hydropower potential and engaged government through the Office for Promoting Private Power Investment (OPPPI) at various implementation levels. However, some projects were experiencing difficulties in securing financing despite the fact that there was an obvious power deficit in the country as evidenced through load shedding.

It is anticipated that the recommendations of the study could assist policy makers to make informed decisions on how best to facilitate and accelerate the development of hydropower projects that were being implemented in Zambia. That could subsequently lead to the harnessing of the full hydropower potential that was available for the benefit of the country and the region.

Research methodology

The research was an exploratory study based on the pragmatic research philosophy. (Saunders, Lewis & Thornhill, 2016) This philosophy was adopted because the study was expected to generate both qualitative and quantitative data since inductive and deductive approaches were applied. Inductive reasoning was used to explain the non-numeric data collected in the study. The study generated quantitative data from the project documents and interviews. Categorical data from the projects was collected and statistics were generated. The statistics generated were then presented in form of proportions and percentages. (Kothari, 2012)

The quantitative data obtained in the research included the following: Stage of development of the project; Estimated costs of the project; Development modes of the project; and Level of indicative tariff for the project.

Qualitative data was obtained from the project documents of each project under consideration. The information sought related to the conditions under which the financing was being solicited by the

developers. Those conditions included the following: Sharing of project unlimited risks; Issuance of Government guarantees for project debt repayment; Level of electricity tariff; Nature of Power off-taker (Buyer of power); and Provision of escrow arrangements by the off-taker.

Multiple case study strategy was utilised for this research in which documentary analysis and semi-structured interviews were used to collect data. (Robson 2002) This research strategy was adopted because the study had a small sampling frame and sample size. Yin (2003)

The study used mixed methods research choice for collecting and analysing the data. This was because both numeric and non-numeric data was generated in the study and required the use of both methods for data collection and analysis. (Saunders, Lewis & Thornhill, 2016)

The research was cross sectional due to its academic nature. Also because it was a snapshot of the challenges faced at the particular point in time. (Saunders, Lewis & Thornhill, 2016)

Purposive sampling was applied for data collection so as to select the relevant samples with the potential to provide the data required for the study. (Kothari, 2012)

A structured data collection form was used for the documentary secondary data while primary data, Telephone Interviews was used for collecting data through semi structured interviews. These methods were used because the respondents were scattered all over the country. From Lusaka and the respondents were in various places including Kitwe, Livingstone, Kalulushi, Itezhi-Tezhi, Sinazongwe and Chavuma among others.

Conceptual model, and operationalisation of research variables

The dependant research variable was the securing of financing for the hydropower projects while the independent research variables were the conditions that needed to be fulfilled in order for the lenders to finance the projects.

Based on the literature review, the following conditions were identified as key independent variables which needed to be appropriately addressed in each project for finance to be secured: Sharing of project unlimited risks; Issuance of Government guarantees for project debt repayment; Level of electricity tariff; Power off-taker (Buyer of power); and Provision of escrow arrangements by the off-taker.

Sources of data

Sources for primary data included respondents from various hydropower projects and other stakeholders who were interviewed included the following institutions: Sampled Hydropower projects (HPP); Office for Promoting Private Power Investment (OPPPI); Department of Energy (DOE); Zambia Development Agency (ZDA); Zambia Electricity Supply Corporation (ZESCO); Energy Regulation Board (ERB) and Rural Electrification Authority (REA)

Secondary data sources were from government project archives from Office for Promoting Private Power Investment (OPPPI that included: Project progress reports submitted by the project developers to OPPPI; Implementation Agreements (IA) between the project developers and GRZ; and Minutes of meetings among project stakeholders.

Sampling frame

The frame for the primary data included respondents from OPPPI, DOE, ERB, ZDA, ZESCO and the hydropower projects considered for the study. The sampling frame for the secondary data was limited to all the hydropower projects in Zambia that were being done through OPPPI. At the time of the study, the projects were at various stages of project implementation including Pre-Feasibility, Detailed Feasibility, Project Finance Mobilisation and Construction. A total of 13 hydropower projects were being handled by OPPPI for the time period referred in the study.

Sample size

For the primary data, a total of 11 respondents were interviewed using Telephone Interview. For the secondary data, five out of the total thirteen hydropower projects (5/13) being promoted by Office for Promoting Private Power Investment (OPPPI) were sampled and data from each of these projects was collected.

Reliability & validity

The researcher made sure that respondents for the primary data were people who were actually involved in hydropower project development in Zambia. Those included project developers, financial advisors, technocrats from government and experts from the national electricity utility company and from other independent power producers. Sources considered for secondary data were official government archives at the Office for Promoting Private Power Investment (PPPI).

Research results

Literature review

The literature review in the research focused on determining the challenges associated with the failure or success of private project developers in securing financing for hydropower projects in various countries including Zambia. The review focused on identifying the key conditions under which various hydropower projects secured financing for implementation and vice versa. These conditions were mostly related to project risk management. On that basis, the variables that determined whether or not a project would secure financing and attempted to relate them to the case of Zambia were identified.

Definition of important terms in the study

The following terms were used in the study and have, therefore, been defined in context of the research as follows:

1. **Bankable Feasibility Study.** Is a comprehensive study in which all geological, engineering, legal, operating, economic, social, environmental and other relevant factors were considered in sufficient detail that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the project;
2. **Power Purchase Agreement.** Is a contract entered into by a developer, off taker or customer for the sale and purchase of electricity that is generated from a project;
3. **Project risk:** Is the possibility of the project not going as anticipated;
4. **Project Developer:** A Company or Special Purpose Vehicle (SPV) that intends to develop, finance and operate the hydropower project. It may be a purely private company or may be a Public Private Partnership;
5. **Financial Closure.** Refers to the fulfilment of all conditions precedent to the first drawdown of funds under the loan agreements. At this point the project developer has access to the finance provided by the lenders and can draw the funds for implementing the project;
6. **Independent Power Producer (IPP).** An entity which is not a public utility, but which owns facilities to generate electrical power for sale to utilities and end users. Under the IPP mode of development, the electrical projects are usually executed on a Build, Own and Operate (BOO) basis where the private developer builds the plant and runs it in perpetuity during and after the project concession period;
7. **Public Private Partnerships (PPP).** A government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies. Most PPPs are executed as Build, Own, Operate and Transfer (BOOT) where the facility is transferred to government after an agreed concession period.

Theoretical framework

It was based on the project financing principle that a project can only be successfully implemented if the project risks are appropriately allocated among the project stakeholders. (Fight 2006) The key conditions which lenders insisted on being met before they could issue financing were generally related to how project risks were managed.

According to Fight (2006), allocating risks in a project finance structure enabled the sponsor to spread risks over all the project participants, including the lender. The diffusion of risk could reduce challenges and significantly improve the possibility of project success since each project participant accepts certain risks which one is able to handle.

In their publication, Spiegl and Schneider (2002) also stated that projects with substantial works like excavations and sub-surface works looked unattractive for private investors because of the risks involved. They argued that it was not sensible to let the developer assume a project's unlimited risks because the resulting risk surcharge would make the project unviable. It was more sensible to have risk compensation, and have the developer assume the risks only to a limited extent.

Investors are unable to assume unlimited risks due to financing constraints, as doing so might exceed the scope of their financing and can ultimately kill a project. According to Finnerty (2007), lenders generally do not lend funds to projects if their loans would be exposed to business or economic risks. A critical aspect of financial engineering for large projects involves identifying all significant project risks and then crafting contractual arrangements to allocate those risks among the parties who are willing to bear them at the lowest ultimate cost to the project.

Finnerty (2007) further states that in project financing, lenders want the sponsors or other credit-worthy parties involved in the project to provide assurances on the following issues: That the project would be completed even if costs exceeded those originally projected (or, not completed, its debt would be repaid in full); That the project, when completed, would generate cash sufficient to meet all of its debt financing service obligations; and That if for any reason, including force majeure, the project's operations were interrupted, suspended, or terminated, the project would continue to service (and fully repay on schedule) its debt obligations.

Another important factor to consider in the study was that hydropower projects were very different from other sources of electricity generation in many respects. In his paper "*What are the Geological and Hydrological risks and issues affecting Hydropower financing*", Rabin (2007) emphasised the need to have an appropriate risk sharing mechanism in order to succeed in developing hydropower projects.

Rabin (2007) argued that the developments in hydropower risk allocation were tending to accept the fact that if financing and bidding were to remain competitively priced, a certain level of risk sharing would need to be achieved. He argued that the move to private funding in hydropower project had failed, and the passing of all construction risks to the contractor by the project company, as originally envisioned, had not been successful. Rabin (2007) pointed out that Contractors were reluctant to assume risks they could not manage alone, and were quickly realising that the construction phase of hydropower projects required close monitoring. Hydropower projects required the involvement of all project parties in managing the unlimited risks associated with them.

Therefore, the hydropower projects should come up with a good mechanism for giving lenders assurances in order for them to issue financing. The first call to address this challenge is a correct project risk sharing mechanism without which it becomes very difficult for the project to secure funding.

The question that begged to be answered was who among the project parties should assume the unlimited risks associated with hydropower projects. Fight (2006) pointed out that the party that was most capable of handling the unlimited risks of a project was the host government because it had a role of being service provider contrary to lenders whose objectives were business centred. Fight (2006) stated that the project could offer the government short term and long term benefits from the project: Short term, the government would use the project for political benefits and for attracting other developers to a country. Long term, the successful project should improve economic prosperity and, perhaps, political stability by providing the needed infrastructure.

It was therefore normal for the host country government to take up more responsibility in project implementation and assume the project risks that are unbearable to the developers and lenders in order to facilitate their development; especially for large high-profile projects like hydropower projects in which the challenges of project risk sharing are significant.

Even though it is acceptable for the host country government to assume some of the project risks, Finnerty (2007) argued that it should be done on the basis of the economic and social benefit it would bring to the country. He pointed out that a developing country has, almost by definition, limited credit capacity and therefore limited ability to provide credit support for project financing. Therefore, the expected economic rewards of the project must justify the financial risks which the host government would assume in form of guarantees. The guarantee effectively subsidizes the project's cost of funds.

It becomes very important for the host country to satisfy itself that the project would produce sufficient public benefit to justify the social cost that would be incurred in the subsidy.

Based on the foregoing, it could be argued that a correct project risk sharing mechanism among project parties is essential for the successful implementation of electricity generation projects in Zambia. As a general rule, Fight (2006) suggests that a particular project risk should be assumed by the party that is best able to manage and control that risk. By assuming this simple principle, most challenges in securing financing for hydropower projects could be addressed.

Previous studies

Several studies related to the development of electricity generation projects in Africa including Zambia were conducted over the years. Among them was a study released in November 2011 by the *Infrastructure Consortium of Africa (ICA)* entitled: *When Power Comes- An Analysis of IPPs in Africa*. The focus of the study was to assess the successes and the challenges of Independent Power Producers in Sub-Saharan Africa in the development of electricity generation projects. In the study, 23 mediums to large electricity generation projects being developed by IPPs were studied in 11 countries including Zambia, Uganda, Kenya, Senegal, South Africa, Togo, Tanzania, Nigeria, Ghana, Cameroon and Ivory Coast.

The study found that although the sampled projects had recorded successes in terms of progression, they were facing quite a number of challenges as regards implementation at basically two levels; at country level and at project level. Chief among them were the role of development finance institutions in developing power project and the need for credit enhancements. (ICA, 2011)

The study concluded that the main source of challenges that hindered the success of the electricity generation projects in the region was the gap that existed between the investors and the host country governments regarding the perception and the treatment of project risks. Project finance and project risks were seen as the major source of challenges for electricity generation projects, including hydropower projects. (ICA, 2011)

In the publication *Financing Private Hydropower Projects*, Head (2000; Disclosure date 2010) pointed out that all private infrastructure development carried certain common risks beyond the control of the project sponsor such as political risk, currency exposure and force majeure. These had the potential of killing a project.

However, he pointed out that hydropower projects were perceived as posing particular difficulties in a number of areas relating to project definition, project risk, project financing and regulations. Among the prominent challenges he identified were: High front-end capital costs; Difficulty in structuring procurement contracts; High construction risk; Hydrological risk; Heavily capital-intensive; Long debt payback periods; Pricing of the output power; and Regulatory issues.

Most of the obstacles identified were generally related to project risks. Head (2000) concluded that the support of the public sector was crucial to the financing of all hydropower projects, even if the projects were being implemented by private developers. He stated that the most obvious support was the provision of guarantees by the host government, particularly to cover payment obligations of the power utility. Head (2000) further pointed out that for project financing to be mobilised successfully, the project risks needed to be properly allocated among the project parties.

Considering the acceptable mechanism for risk sharing as presented by Head (2000), it was apparent that the host government was key in ensuring the success of hydropower projects, particularly in the areas related to handling project unlimited risks. This is because most of the unbearable risks are lamed on the host government because it is the only party able to absorb financial losses.

Rabin (2007) pointed out that hydropower financing was undergoing a crisis because of the changes from being financed and owned traditionally by the states to being financed, operated and owned by private developers. He stated that public funding for new hydropower projects had diminished substantially and there was need for an increase in private financing to compensate for the short-fall. That created a funding-gap, and was causing a sharp decline throughout the world in new-built hydropower projects.

Rabin (2007) further argued that the private sector was finding it extremely difficult to justify directing investment funds into new hydropower projects due to numerous issues that could compromise an otherwise functional project. Issues such as social and environmental opposition, unwanted project risks, large upfront costs, long lead times and lower returns on investments were crippling investment in hydropower projects.

Rabin (2007) concluded that private hydropower financiers were not prepared, and unable to assume the uncertain, and potentially unavoidable risks that would arise out of geology and hydrology in hydropower projects.

He recommended that mitigating these risks would have to fall into a series of risk-sharing arrangements, where the sponsors assume a portion of the risks up to a defined point, and after which, the host government accepts the remaining bulk of the risk. He argued that if governments desired to develop hydropower projects, they should create more attractive conditions in order to entice private investors, who would easily divert their money to other less risky projects.

A similar study was done by Kalitsi (2003) where he examined the problems of hydropower development in Africa and focused primarily on designing concrete strategies and policies for development under the New Partnership for African Development (NEPAD) initiative.

In his paper he recognised that hydropower projects in Africa over the last half-century have been undertaken with public financing supported by loans raised from multilateral and bilateral public sources. He stated that the World Bank had featured very prominently in those efforts by providing the bulk of the funds.

However, he similarly pointed out that at the time there was a severe shortage of public finance for power development both at the level of African governments and from the World Bank and other multilateral and bilateral aid agencies, which had initially supported hydropower projects.

That position led to increased interests in contributions of private sector finance to hydropower development mainly in form of loans raised from commercial banks and other private financing agencies or private equity investment entrepreneurs in power sector.

Kalitsi (2003) suggested that the risks normally associated with hydropower in the context of Africa posed challenges which deter private capital. These risks included technical, economic, commercial, environmental and social risks associated with hydropower project development as follows: Competition with other development projects, such as projects for health and education etc.; Political challenges; Regulatory challenges; Negative perception arising from population displacement and destruction of agricultural lands, insects, animals major changes in the destruction of the ecosystem; The change in the biodiversity; Hydrological uncertainties; High upfront capital investments which often require long gestation periods, and The risks of cost overruns and time slippage.

India is one of the fast-developing countries in the world and they have made significant progress in the development of hydropower projects. However, that was not always the case. Spiegl and Schneider (2002,) undertook a case study on large hydropower development in India. They stated that India was for many years trying to develop large hydropower projects to no avail. That was as a result of unfavourable policies for investors and the inability to share risks appropriately among the government of India and the parties involved in the projects. The dual found that progress was only made when the government of India started participating in risk sharing.

Saxena and Kumar (2010) also give a similar account on India in their paper *Hydropower Development in India*. They reported that despite hydroelectric projects being recognized as the most economic and preferred source of electricity, the share of hydropower in India continued declining since 1963. The hydro share declined from 50% in 1963 to about 25% in 2010. In order to correct the hydro-thermal mix to meet the grid requirements and peak power shortages, the government of India announced a Policy on '*Hydro Power Development*' in 1998. This policy essentially increased government involvement in the development of electricity generation projects in India by providing different forms of guarantees. (Saxena & Kumar, 2010).

Thus, the government of India started offering some form of guarantees for private developers in order to encourage them to develop the electricity generation projects. As a result of these policy changes by the government of India, barriers to power project investment were reduced, the

functioning of the system improved, and it resulted in additional generation of power much in excess of that achieved in the earlier plans. (Saxena and Kumar, 2010). It can therefore be noted that government involvement in the implementation of power projects was key in addressing the challenges that were being faced in India.

A similar view on risk sharing between government and developers in the development of electricity generation projects was expressed by the Norwegian Tunnelling Society (NFF). It is worth mentioning that Norway is one of the global leaders in the area of hydropower development and Tunnelling and has recorded tremendous success in that area. In one of the articles by NFF (2012), it was reported that during the hydropower boom in the 1960's through the 1980's in Norway, a contract concept was developed and applied that focused on risk sharing between the host government and the project developers. That helped to resolve most of the challenges that were being faced in the development of hydropower projects and led to the hydropower development boom of the 1960's.

The literature review established that most of the challenges in developing hydropower projects faced by the countries considered were resolved through more participation and support by host country governments and appropriate risk sharing mechanisms among the project parties. The studies indicated that the private sector alone failed to implement the hydropower projects because the projects required concerted efforts from various stakeholders including the host country government.

Research gaps

The major gap identified in securing financing for hydropower projects was that host country governments did not play the pivotal role in project financing as stipulated in the theoretical framework and previous studies.

For Hydropower project finance to be successfully arranged the host government should find a way of anchoring the project financing agreements between the Lenders and the Project developers and it needs to devise systems for assuming unlimited risks associated with hydropower projects. The Zambian Government is no exception and should also take up this role if it is to successfully develop the hydropower projects. Previous studies also reveal that no comprehensive study has been done on the roles of the host country government in securing financing for hydropower projects.

The gap in terms of the previous studies is that none of the studies specifically tried to identify and address the challenges that were being faced by private developers in securing financing for hydropower projects in Zambia. The study by ICA (2011) gave a holistic view of the challenges and possible solutions in the development of electrical power projects in Sub Saharan Africa. Similarly, Kalitsi (2003) and Rabin (2007) gave a holistic view of the challenges being faced in Africa and the world respectively and gave recommendations on how best to implement hydropower projects. The case of Zambia was not specifically addressed.

Although their studies essentially included Zambia, Kalitsi (2003), Rabin (2007) and ICA (2011) did not take into consideration the fact that the electricity supply industries for each particular country are different and therefore would face some unique challenges.

Even though the countries considered in the previous studies had several differences in terms of policies, input resources for electricity generation (e.g. Hydro, Coal, Natural Gas, etc.), national access to electricity, grid connectivity, project development modes (e.g. PPP or IPP) and levels of tariffs, these factors were not adequately accounted for in the studies. Differences in the areas pointed out could significantly alter the investment climate in hydropower projects and that could influence the view of lenders regarding financing power projects in a particular country.

In support of that view, Rabin(2007) pointed out that in privatised systems, investors readily preferred the financing of thermal power plants (predominantly gas-fired) over hydropower plants due to their quick and relatively risk free construction periods, lower initial costs, less approval delay, and quicker returns on their investments and off the shelf solutions. Rabin (2007) acknowledged that just the type of input resource for a power plant could significantly alter the investment climates. Thus, it was important to identify the challenges on a country by country basis which was not done in the previous studies. It was for this reason that the researcher was motivated to undertake a study that would specifically consider the case of Zambia. The research specifically focused on identifying the challenges being faced by private project developers in securing financing for hydropower projects in

Zambia. For further study, it was recommended that a research be done to investigate the best development mode for hydropower projects in Zambia, particularly focussing on Public Private Partnerships.

Observations from literature review

Available literature indicated that for hydropower projects to be successfully implemented in some countries, certain conditions relating to project finance and project risks had to be fulfilled. Some of the conditions which the lenders required to be met for them to issue financing were related to project sharing risk between host governments and developers, the level of electricity tariffs, issuance of Government guarantees and the nature of the power off taker for the project. That was because government was in most cases the only party among all project stakeholders which was able to assume certain unlimited risks associated with hydropower project development. The literature review revealed that most of the conditions which the lenders demand to be met before they issue finances were generally related to the management of project risks associated with hydropower projects. It also indicated that most of the challenges in developing hydropower projects could be resolved through more support by host government and by an appropriate risk sharing mechanism among the project participants.

Fieldwork presentation

Quantitative data analysis

The quantitative data that was collected in the research from the archives for the hydropower projects included the following: Project capacity (in Megawatts); Development status (Pre-Feasibility, Detailed Feasibility or Project Finance Mobilisation); Estimated project cost (in US\$); and Development mode (IPP or PPP), and Level of tariff (whether higher or Lower than regulated tariff in the country)

Table 1.1. Hydropower projects being developed with private developers under OPPPI (As of March 2015)

SNo	Project Pseudo	Capacity (mgwts)	Status (as at May 2014)	Estimated Cost (US\$'millions)	Development mode	Projected Completion Date
1	HP-01	120	Project Finance mobilisation	240	Public Private Partnership	2015
2	HP-02	230	Detailed Feasibility	350	Independent Power Producer	2020
3	HP-03	60	Project Finance mobilisation	100	Independent Power Producer	2018
4	HP-04	171	Pre-Feasibility	660	Independent Power Producer	2023
5	HP-05	247	Project Finance mobilisation	690	Independent Power Producer	2018
6	HP-06	40	Project Finance mobilisation	190	Independent Power Producer	2017
7	HP-07	70	Pre-Feasibility	240	Independent Power Producer	2020
8	HP-08	280	Pre-Feasibility	1300	Independent Power Producer	2021
9	HP-09	130	Pre-Feasibility	850	Independent Power Producer	2021
10	HP-10	490	Pre-Feasibility	1400	Public Private Partnership	2023
11	HP-11	698	Pre-Feasibility	2150	Public Private Partnership	2023
12	HP-12	15	Detailed	60	Independent Power	2020

			Feasibility		Producer	
13	HP-13	750	Project Finance mobilisation	1940	Public Private Partnership	2020
	Total Megawatts	3,301	Total Financing Required	10,230		

Source: OPPPI Project Archives

As recorded in Table 1.1, a total of Thirteen (13) hydropower projects were being developed as IPPs and PPPs under the Office for Promoting Private Power Investment (OPPPI). The total estimated cost of the projects stood at US\$ 10,230 million – As of March 2015. Of the Thirteen (13) hydropower projects that were being developed with the help of the private sector, four (4) were being developed as Public Private Partnerships (PPP) at a total estimated cost of US\$ 5,730 million. That was about 30.8% of the number sampled projects. However, the 30.8% of the projects account for about 56.0% of the total estimated cost. Out of the Thirteen (13) hydropower projects being developed with the help of private developers, Nine (9) were being developed as Independent Power Producer (IPP) projects at a total estimated cost of US\$ 4,500 million. That was about 69.2% of the number of hydropower projects being developed. The percentage accounted for 44.0% of the total estimated project cost.

Qualitative data analysis

The qualitative data that was collected comprised the following: The various conditions under which the private developers were attempting to secure project financing from lenders, and the status of the finance mobilisation for each project indicating whether or not finance had been secured under those conditions. It should be noted that the qualitative data that was sought in the study could not be obtained from all the 13 projects.

That was because some projects had not yet reached the financing mobilisation stage hence did not have the data. Out of the thirteen (13) projects, only five (5) had reached the financing mobilisation stage. Therefore, qualitative data was only obtained from five projects since they were the ones with the data. Those were HP-01, HP-03, HP-05, HP-06 and HP-13. The data collected was summarised in Table 1.2

Table 1.2. Conditions affecting project financing mobilisation and the status for each project

S/no	Development Conditions affecting project debt mobilisation	Project Pseudo				
		HP-01	HP-03	HP-05	HP-06	HP-13
1	Government Guarantee for Project Debt Repayment	issued	not issued	not issued	not issued	issued
2	Escrow Arrangements with Project Off-taker	issued	not issued	not issued	not issued	issued
3	Assumption of Project Hydrological Risk by Government	partially issued	partially issued	partially issued	partially issued	partially issued
4	Assumption of Project Geological Risk by Government	partially issued	not issued	not issued	not issued	partially issued
5	Level of tariff (Higher or Lower than national Average)	higher	higher	higher	higher	higher
6	Off-taker of Power produced by the Project	state utility	not confirmed	not confirmed	private utility	state utility
Status of Project Debt		secured	not secured	not secured	not secured	secured

Source: OPPPI Project Archives

Although only 2 of the projects at financing mobilisation stage had secured finance, it is worth noting that the total estimated cost for the projects that had secured financing was more than double the estimated cost of the 3 of the projects that had not secured finance.

Primary data from semi-structured telephone interviews

Quantitative data analysis

After administering the interviews, the following Primary quantitative data was collected: The number of project developers that had completed the Bankable Feasibility study; The number of years that had passed since completion of the Bankable Feasibility study for each project; The level of the indicative tariff; and The development mode of the project. Once a Bankable Feasibility Study for a project was completed, it was used by the project developer as the basis for financing from lenders. However, some hydropower projects in the study completed Bankable Feasibility Studies as far back as 2003 but it had taken the project over 11years in negotiation for project financing as seen from Table 1.3. Ideally it should not take more than 3 years for the project developer to firm up an agreement with the lenders using a bankable feasibility study.

Table 1.3. Questions and answers from hydropower project respondents

Sno	Questions	Respondents Answers				
		HP-10	HP-03	HP-05	HP-06	HP-13
1	Has Project Developer completed the Bankable Feasibility study?	yes	yes	yes	yes	yes
2	In which year was the Feasibility study completed?	2003	2014	2010	2010	2011
3	How many years ago did the Developer complete Bankable Feasibility study	12	1	5	5	3
4	Is indicative Tariff higher than the Average Regulated Tariff?	yes	yes	yes	yes	yes
5	What is the development mode of the project?	PPP	IPP	IPP	IPP	PPP
6	Has the project secured finance?	yes	no	no	no	yes
7	When was the finance secured?	2015	n/a	n/a	n/a	2012

Source: Fieldwork datasheets

Qualitative data analysis

The primary qualitative data collected through the telephone interviews included the following: The power off-taker for each project (Whether private or public); Type of Government support requested by the lenders in order for them to issue financing to the hydropower project; The Response of government to specifically meet the requirements of each lender for them to issue finance to the hydropower project; Responses by government to help hydropower projects to secure financing. Whether government was doing enough to assist private hydropower project developers to secure financing from lenders. The responses tabulated below. The Response of government to specifically meet the requirements of each lender for them to issue financing to the hydropower project.

Table 1.4. Government response to the requirements by lenders

S.no.	Government Support Required by the Lenders	Government Response to Requirements				
		HP-01	HP-03	HP-05	HP-06	HP-13
1	ZESCO to be Power Off taker	yes	No	No	No	yes
2	Government to Guarantee PPA with Off-taker	yes	No	No	No	yes
3	Escrow Arrangements	yes	No	No	No	yes
4	GRZ to Assume Geological Risk	yes	No	No	No	yes
5	GRZ to Assume Hydrological Risk	yes	yes	yes	yes	yes
6	Borrow in US dollar and quote tariff in dollars (Firm currency)	yes	yes	yes	yes	yes
7	Guaranteed use of national grid by IPPs	yes	yes	yes	yes	yes
8	Enforce Cost Reflective Tariffs	No	No	No	No	No
9	Standardised PPAs for electricity projects	No	No	No	No	No

Source: Fieldwork datasheets

Key: No means Not Granted and yes means Granted

Table 1.5. Efforts by government to promote development of hydropower projects through the private sector

S.no	Deliberate efforts made by government to help develop hydropower projects through the private sector in Zambia. This is according to respondents from OPPPI, DOE, REA, ZDA, ZESCO and ERB
1	Passing of the National Energy Policy of 1994 (revised in 2008) meant to liberalize the energy sector. This policy was enforced to encourage private participation in electricity supply industry and energy sector in general.
2	Government entering Implementation Agreements/Concession Agreements with private project developer which indicates commitment to the project on the part of government.
3	Passing of the ZDA Act No.11 of 2006 to include development of electrical infrastructure as a priority sector in Zambia.
4	Signing of the Investment Protection and Promotion Agreement (IPPA) between the project developers and Government aimed at protecting private investment from nationalization and expropriation.
5	Allocation of fiscal and other incentives to private developers in the electricity sector. Some incentives administered through the ZDA include tax holidays, tax exemptions and duty-free importation on capital equipment.
6	Governments aim to increase electricity generation capacity by at least 1,000 MW and build appropriate transmission lines by 2016 according to the Sixth National Development Plan through private and public sector.
7	Governments aim to Expand and Improve infrastructure for electricity generation, transmission and distribution in Zambia through the public and private sector.
8	Government working to Establish of an open and non-discriminatory transmission access regime in the electricity industry applicable to all stakeholders in Zambia
9	Implementation of a Cost-Reflective Electricity Tariff Regime. The programme is ongoing and step increments are currently being done
10	Adopt the Electricity Grid Code to govern use of the national grid by all stakeholders, private and public.
11	Government currently working on Feed in Tariff Policy in Zambia to encourage development of alternative power sources including small hydros in Zambia.
12	Government giving hydropower third priority underutilization of water resources in The Water Act Cap 198 of the laws of Zambia.
13	Revocation of Statutory Instrument SI 33 of 2012 and SI 55 of 2013 by Government to make borrowing for projects easier

Source: CATI datasheets

Discussion and interpretation of findings

Only two (2) out of a total of five (5) projects at the financing mobilisation stage had successfully secured financing for constructing the hydropower plants. That accounted for 40% of the sampled projects and the conditions under which the financing was secured were consistent with those identified in the literature review as necessary for securing financing from lenders as mentioned above.

Meanwhile three (3) out of a total of five projects at the financing mobilisation stage had not secured financing for constructing the hydropower plants accounting for 60% of the projects.

Development mode of the project (whether IPP or PPP)

The development mode of the project had a bearing of whether or not a project secured financing. Of the five (5) projects at the financing mobilisation stage, project HP-01 and HP-13 were being developed as Public Private Partnership (PPP) and project HP-03, HP-05 and HP-06 were being

developed as Independent Power Producers (IPP). It was found that the PPP projects HP-01 and HP-13 had secured financing unlike the IPP projects HP-03, HP-05 and HP-06.

The point to note was that the PPP projects had a higher cost allocation of US\$2180 million as compared to the IPP projects which had US\$1040 million. That was despite the fact that the IPP projects were more in number than the PPP projects. It was arguably less risky to invest in the smaller IPP projects than in the larger PPP projects. However, lenders were more willing to lend to PPP projects rather than to IPP projects despite the higher costs.

The following could be some of the reasons why lenders preferred to fund PPP instead of IPP projects: (1) PPP projects had an inherent risk sharing mechanism between the public and the private sector because Government was involved as a shareholder; (2) It was easier for the lenders and developers to obtain Government guarantees and other support like escrow arrangements for a PPP project rather than an IPP project; (3) A PPP project had more chances of entering into a Power Purchase Agreement with the electricity state utility because it was also owned by the Government.

For the foregoing, it could be argued that PPP hydropower projects were more likely to secure financing than IPP hydropower projects in Zambia. Therefore, developing a hydropower project as an IPP could be a challenge to securing financing.

Issuance of government guarantees for project debt repayment

All the Five (5) project developers at the financing mobilisation stage requested Government to provide guarantees for project debt repayment in order for them to secure financing from lenders.

As indicated in Tables above, only two (2) projects, HP-01 and HP-13, were issued with guarantees for project debt repayment by Government. Hence, only these projects successfully secured project financing.

Fight (2006) argued that Government Guarantees were necessary to facilitate the securing of financing for capital intensive projects such as hydropower projects. That practice was accepted as standard practice in the field of project finance. Without some form of guarantees, it became very difficult to access project finance for capital intensive private projects. Therefore, lack of Government guarantees was a challenge to securing financing for hydropower projects in Zambia.

That view was backed by the case study by Saxena and Kumar (2010) where they established that hydropower development through the private sector in India only saw success after the Government of India started giving Guarantees to the private developers. However, the question that begged to be answered was whether Zambia had such kind of finances and whether it was willing to spend it on developing hydropower projects at the expense of other developmental projects.

Sharing of project unlimited risks like geological and hydrological risks

100% of the projects at the financing mobilisation stage requested Government to assume part or all of the unlimited risks associated with the projects. The government only assumed Geological risks and other risks for two projects, namely HP-01 and HP-13. Because of that, only these two projects secured financing. Fight (2006) argued that Government was the party among all other project stakeholders that was best suited to assume unlimited risks in projects because of its ability to absorb financial losses. Developers and Lenders could only handle risks to a certain extent, depending on the scope of financing that was available for their project. Hydro projects in Zambia were no exceptions and therefore government's inability to assume those unlimited risks was a challenge to securing financing for the projects. (Rabin, 2007).

However, it should also be noted that Government had limited funding to enable it backstop the stated unlimited risks. It was therefore a matter of weighing the importance of the projects versus other Government obligations in the country. It was difficult for Government to assume the unlimited risks associated with potentially all the thirteen hydropower projects being developed since that called for availing huge sums of money for the projects.

Level of electricity tariff, whether higher or lower than regulated tariff

All the projects at the financing mobilisation stage had indicative tariffs that were higher than the regulated tariff of Zambia that were not cost reflective. Project finance demanded that the project

should be done at economic levels to enable it repay the debts through the cash flows it generated. Therefore, the lenders expected the project to be economically viable for them to provide the funding. (Fight, 2006)

Lack of cost reflective tariffs in Zambia made it difficult for the private developers to source a direct market for the power produced and to run the project at favourable economic levels. Thus, the state utility remained the most preferred off taker for the private developers since tariffs from new hydropower projects were higher than the regulated tariffs in the country. Electricity customers naturally prefer to buy the cheaper power from the state utility and thus, forcing new hydropower developers to want to sell their power to the state utility as well.

It could thus be argued that the tariff levels were another challenge in securing financing for hydropower projects in Zambia.

Power off-taker for the project i.e. state utility or private buyer

All Five (5) projects that were sampled wanted the state utility to be the off taker of the electricity to be produced from their projects. Project HP-01 and HP-13 had the state utility (ZESCO Ltd) as the off-taker of the power. On the contrary, Project HP-03 and HP-05 had not yet confirmed the off-taker while project HP-06 had a private off-taker.

Government has taken a position that the developers should independently procure an off taker for their power, who should not necessarily be the state utility. That was because it was not possible for the state utility to off take all power from all the thirteen hydropower projects.

The project developers preferred selling their electricity to the state utility rather than other private off takers like large manufacturing industries and mining companies because: (1) The state utility was owned by Government and therefore it would be easier for private developers to obtain support for the project in form of guarantees and escrows; (2) State utilities could enter into longer term PPAs with the developers unlike shorter term PPAs with other businesses; (3) The national tariffs were below cost reflectivity, that made it difficult for the developer to sell power directly to other private off takers as theirs were generally higher than the approved national tariff; and (4) The state utility owned the transmission facilities in Zambia and therefore the developers felt more secure to sell their power to the state utility rather than competing with it for use of the grid.

Provision of escrow arrangements by the off-taker

All the sampled projects demanded for the off-taker to make escrow arrangements in order to secure payments on the PPA. The off taker for project HP-01 and HP-13, namely the state utility, established escrow arrangements for PPA payments. Projects HP-03, HP-05 and HP-06 had no escrow arrangements and could not secure project financing.

An agreed amount of funds could be held in the escrow account by a third party until the payment obligations to the developer or lenders were met. That means the off taker needed always to have funds available in that account to act as security in case of failure to meet its payment obligations to the developer under the PPA. It was very difficult for a private off taker to establish an escrow account to secure PPA payments for the lenders because it required a lot of finances. It was much easier for the off taker –ZESCO Ltd because of government backing.

The arrangement also tended to limit the cash flows of the off-takers as it forced them to lock huge amounts of money in an account instead of re-investing it. The opportunity cost for establishing an escrow account was very high. Therefore, even though it was acceptable practice in non-recourse financing of projects to establish escrow arrangements to secure finance repayments, it was not encouraged because of the losses due to opportunity cost. Thus, lack of escrows was also a challenge to secure financing for hydropower projects in Zambia.

Efforts made by government to promote private investment in hydropower projects in Zambia

The Government of the Republic of Zambia had made huge strides in trying to develop the Electricity Supply Industry (ESI) since the dawn of the 90s. After realising that it could not manage to implement such developments by itself, laws and policies were passed and amended to ensure that the

electricity sector was liberalised so that private developers could participate in those developments. Table 1.5 showed the list of some of those efforts made in the past 20 years by government based on data from the respondents interviewed from some government institutions.

The notable achievements that had been recorded since the liberalisation of the ESI were that several private investors had shown interest to invest in Zambia's electricity sector as evidenced by the records at OPPPI. Over 19 private project developers had come to invest in the hydropower sector in Zambia.

Despite making progress in the initial stages of development like pre-feasibility stage, planning stage and detailed feasibility study stage, projects tended to stall once they reached the crucial stage of finance mobilisation for the reasons raised by the lenders regarding guarantees, escrows and risk sharing.

While the Zambian government created conducive environment for developing projects, they did not necessarily protect the investment from unforeseen occurrences like adverse geological risks during construction or prolonged draughts once the hydropower project was operational.

The Figure below illustrated the financing gaps in terms of a typical project financing model based on the findings related to the conditions under which IPPs were being developed.

Typical simplified project financing structure for IPP projects in Zambia illustrating the gaps which hinder financial closure

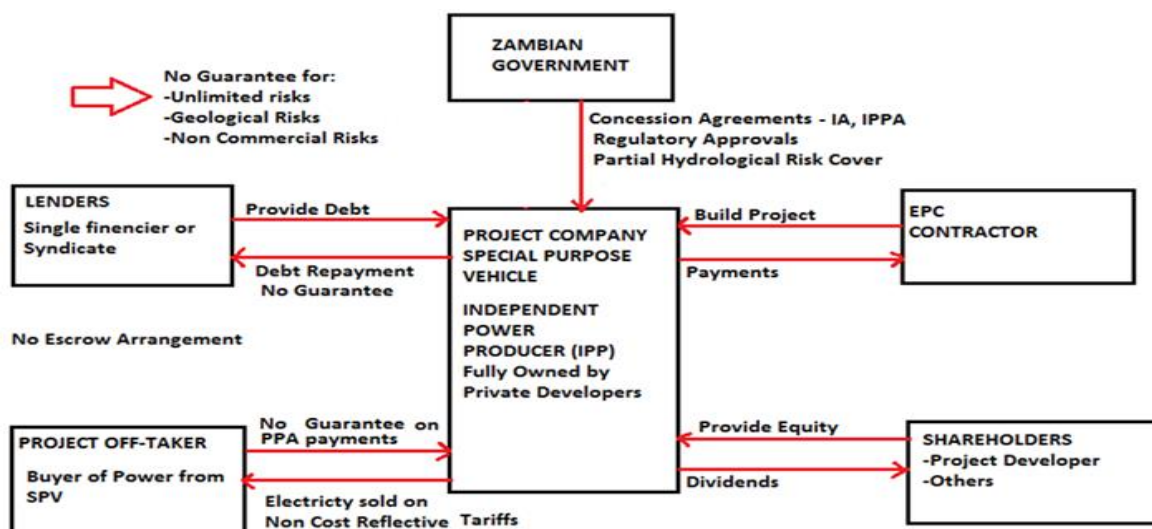


Figure 1

Sources: Tables 1 to 5

Conclusions of findings

Firstly, the developers that were issued Government Guarantees successfully secured financing for implementing the projects unlike those that were not given the guarantees. Therefore, lack of Government Guarantees was a challenge for private project developers in securing financing for hydropower projects development in Zambia.

Secondly, the projects for which Government assumed part or all of Geological and Hydrological risks managed to secure financing for project implementation unlike the projects where government did not assume both of these unlimited risks. Thus, inappropriate sharing of the unlimited risks, namely geological and hydrological risk, between government and the developer was a challenge in securing financing for hydropower projects implementation in Zambia.

Thirdly, the projects for which the off-taker had established escrow arrangements had successfully secured financing for project implementation contrary to the ones whose off-taker had not established escrow arrangements. A lack of escrow arrangements between the project off-taker and the developer was a challenge in securing financing for hydropower projects implementation in Zambia.

Fourthly, the projects whose off-taker was the state utility had managed to secure financing for implementing the projects unlike those whose off-taker was either private or not confirmed. The inability to sell power directly to private off-takers economically was a challenge in securing finance for hydropower projects implementation in Zambia.

Lastly, only PPP projects had secured financing for projects implementation and none of the IPP projects had successfully secured financing. Therefore the mode of development for hydropower projects also influences whether or not financing would be secured for implementation of the projects.

Implications

If nothing was done to address the challenges faced by private developers in securing financing for hydropower projects in Zambia, several implications would result. First and foremost, Zambia would be unable to develop its hydropower potential for its benefit as seem for the past 21 years. The country would fail to secure the necessary funding for developing the projects through the private sector. It should be noted that lenders wished to invest in countries that possessed the least risks and were most profitable. Therefore, Lenders took that into consideration and Zambia had to compete for funding with other countries requiring similar development.

The other implication of failing to secure financing for the hydropower projects would be that the power deficit that has been experienced in Zambia and the region would not be resolved. That means that load shedding would actually increase because infrastructure development was still coming up in Zambia and electricity was required.

The third implication would be the challenges of economic growth due to lack of investment in the energy sector. It was important to note that some industries in Zambia were unable to be established because of lack of affordable electricity in the country. Therefore some industries could only be unlocked if investment was first done in the energy sector. The cost of not developing the hydropower projects was much higher than the cost of guaranteeing those projects because of the potential of economic growth.

Unemployment was another implication due to failure to secure financing for implementing the hydropower projects. Developing these projects requires a lot of manpower and thus such projects could be a stable source of employment for the many citizens. Therefore, securing financing for these projects would reduce the rates of unemployment.

Recommendations

To resolve these impediments, the following recommendations were made

1. Hydropower projects in Zambia should be developed as Public Private Partnerships in which Government owns 20-30% equity shareholding in order for the projects to have inherent government support which was required for securing project financing.
2. Government should issue guarantees, namely credit enhancement guarantees and political risk guarantees, to protect foreign direct investments against political and non-commercial risks for hydropower projects in Zambia. That could be done by engaging the Multilateral Investment Guarantee Agency (MIGA) or other similar organisations like SADC and COMESA to provide funding.
3. Government should assume the hydrological risks for both private and public hydropower project developers to cover the operational life of the plant. That could be done by Government and the private developer agreeing on minimum average hydrological flows that would trigger financial relief from government for the hydropower projects to help meet their financing obligations;
4. Government should assume geological risks for both private and public hydropower project developers particularly during the construction period of the project.
5. Electricity tariffs in Zambia should be raised to cost reflective levels to enable free trading at economic prices of electrical power among various parties. That should be done gradually to avoid tariff shock in the economy.
6. A study should be done to establish the best mode of development for hydropower projects in Zambia with focus on PPP models.

Based on the findings and recommendations of the study, the project financing model shown in Figure below was proposed to enable address the challenges and enable the hydropower projects secure financing in Zambia:

Proposed basic project financing model for hydropower projects being developed by private developers in Zambia.

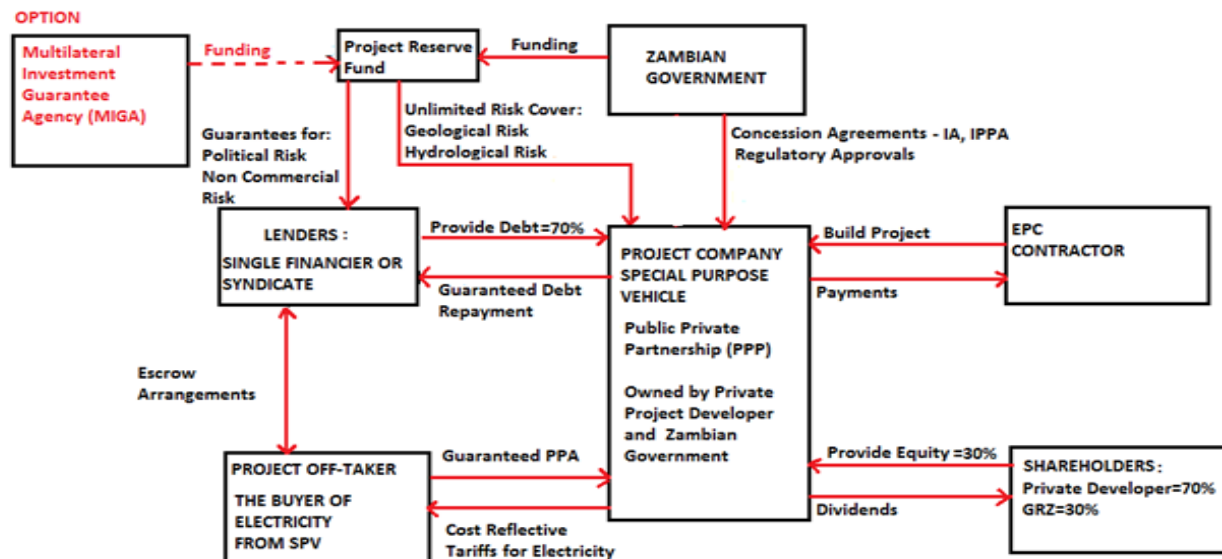


Figure 2

Sources: Tables 1 to 5

References

[1]. African Development Bank (2011) *Independent Review Mechanism on The Implementation of Findings Of Non-Compliance And Related Actions to Be Undertaken By The AFDB Management on For The Bujagali Hydropower And Interconnection Projects of June, 2011*; Bujagali; AFDB.

[2]. Central Statistics Office (2012), *The Living Conditions Monitoring Survey Report 2006 & 2010*, Lusaka: Living Conditions Monitoring Branch, CSO.

[3]. Chapman, C. and Ward, S. (2003) *Project Risk Management: Processes, Techniques and Insights 2nd edition*, Chichester: John Wiley & Sons Ltd.

[4]. *Electricity Act Chapter 433 of the Laws of Zambia* (1995) Lusaka, GRZ.

[5]. *Energy Regulation Act Chapter 436 of the Laws of Zambia* (1995), Lusaka, GRZ.

[6]. Fight, A. (2006) *Introduction to Project Finance*, Oxford: Butterworth-Heinemann.

[7]. Finnerty, J. D. (2007) *Project Financing; Asset-Based Financial Engineering [pdf]*, New York: John Wiley & Sons Inc. https://www.academia.edu/23726748/Project_Financing_Asset_Finnerty.

[8]. Head C. (2000) *Financing of Private Hydropower Projects*, Washington DC; No.WPD420; The International Bank for Reconstruction and Development/The World Bank.

[9]. Japan International Cooperation Agency Value Planning International, Inc. (March 2011) *Case Studies in Capacity Development in Power Sector with South-South Cooperation Components Final Report*, The New Cornerstone for Capacity-Building Programs held in March, 2011 in Washington, U.S.A.

[10]. http://www.jica.go.jp/usa/english/office/others/pdf/publication_110527.pdf.

[11]. Kahn, R. and Cannell, C. (1957) *The Dynamics of Interviewing*. New York and Chichester: Wiley.

[12]. Kalitsi E.A.K (2003) *Problems and Prospects For Hydropower Development In Africa*; The Workshop for African Energy Experts on Operationalizing the NGPAD Energy Initiative 2 – 4 June 2003 Novotel, Dakar, Senegal; viewed 28 February 2014; <http://sustainabledevelopment.un.org/content/documents/nepadkalitsi.pdf>.

[13]. Kothari, C. R. (2012) *Research Methodology: Methods and Techniques 3rd edition*, New Delhi: New Age International Publishers.

[14]. Kumar, R. (2011) *Research Methodology: A step by Step Guide for Beginners*, London: SAGE Publication.

- [15]. Lester, A. (2007) *Project Planning and Control 5th edition*, London: Elsevier.
- [16]. Marczyk, G., DeMatteo, D., Festinger, D. (2005) *Essentials of Research Design and Methodology*, New Jersey: John Wiley & Sons Inc.
- [17]. MEWD/OPPP/103/5/1; Closed Volume, Date- 30 May 2011 to 17 June 2013.
- [18]. MEWD/OPPP/103/5/17; Closed Volume, Date- 30 November 2005 to 16 December 2008.
- [19]. MEWD/OPPP/103/5/3; Closed Volume, Date- 1 August 2003 to 7 August 2013.
- [20]. MEWD/OPPP/103/5/30; Closed Volume, Date- 13 June 2011 to 19 September 2013.
- [21]. Ministry of Energy and Water Development (2008) *Rural Electrification Master Plan*, Lusaka: JICA & MEWD.
- [22]. Ministry of Energy and Water Development (1998) *Framework and Package of Incentives for Private Sector Participation in Hydropower Generation and Transmission*, Lusaka: MEWD.
- [23]. Ministry of Energy and Water Development (2008) *National Energy Policy*, Lusaka: MEWD.
- [24]. Ministry of Energy and Water Development (2010) *The Study for Power System Development Master Plan in Zambia Final Report*: Lusaka, JICA & MEWD.
- [25]. Ministry of Finance and National Planning (2011) *Sixth National Development Plan (SNDP) 2011-2015*, Lusaka, MFNP.
- [26]. MMEWD/OPPP/101/10/15; Date- 12 September 2011 to 2 May 2014.
- [27]. MMEWD/OPPP/101/10/2; Date- 29 August 2006 to 5 May 2014.
- [28]. MMEWD/OPPP/101/10/3; Date- 09 October 2013 to 19 March 2014.
- [29]. MMEWD/OPPP/101/10/5; Date- 19 September 2013 to 31 March 2014.
- [30]. MMEWD/OPPP/101/10/6; Date- 30 December 2008 to 15 April 2014.
- [31]. MMEWD/OPPP/101/10/8; Date- 7 August 2013 to 30 April 2014.
- [32]. Nag, P. K., (2008), *Power Plant Engineering, 3rd edition*, New Delhi: Tata McGraw-Hill.
- [33]. Norwegian Tunnelling Society (2012) *Contracts in Norwegian tunnelling*; Publication No. 21, Oslo, NFF.
- [34]. Meki Wallace (2014) *An Investigation on Hindrances Faced by Private Project Developers in Securing Debt for Hydropower Projects*, Unpublished Dissertation, Lusaka, CUZ.
- [35]. Rabin, M. (2007) *What Are the Geological and Hydrological Risks and Issues Affecting Hydropower Financing?* University of Dundee, viewed 19 November 2013; http://www.dundee.ac.uk/cepmlp/gateway/files.php%3Ffile%3DCAR-11_12_476864027.pdf.
- [36]. Saunders, M., Lewis, P., Thornhill, A. (2016) *Research Methods for Business Students 7th edition*, Harlow: Pearson Education Ltd.
- [37]. Sexana, P. and Kumar, A. (2010) *Hydropower Development in India*, Ighem-2010, Oct. 21-23, 2010, AHEC, IIT Roorkee, India; viewed 2 January 2014; <http://ighem.org/Paper2010/TSA01.pdf>.
- [38]. Singh, Y. K. (2006) *Fundamentals of Research Methodology and Statistics*, New Delhi: New Age International Publishers.
- [39]. Spiegl, M and Schneider, E. (2002,) *Dealing with Geological Risk in BOT-Contracts: Proposal for a supplementary module to BOT-contracts under International Competitive Bidding (ICB)*, United Engineering Foundation – UEF 15.-19. Sept. Graz, Austria.
- [40]. The Infrastructure Consortium for Africa (2011) *WHEN POWER COMES- An analysis of IPPs in Africa*, Tunis; African Development bank; viewed 28 February 2014; <http://www.icafrica.org>.
- [41]. U.S. Agency for International Development (2008) *ELECTRICITY SUPPLY INDUSTRY IN ZAMBIA*; General Information for Potential Investors, Washington DC, USAID.
- [42]. Verzuh, E. (2003) *The Portable MBA in Project Management*, New Jersey: John Wiley & Sons Inc.
- [43]. Yin, R.K. (2003) *Case Study Research: Design and Method* 3rd edition. London: Sage.
- [44]. Zambia Development Agency (January 2014) *Public-Private-Partnerships in Infrastructure Development in Zambia*; ZDA, Lusaka.
- [45]. Zambia Development Agency (2013) *Zambia Energy Sector Profile*; Lusaka, ZDA.
- [46]. ZESCO (2014) *Power Rehabilitation Program*; viewed on 22 April 2014; <http://www.zesco.co.zm/CAAndBD/Projects/ZescoGenerationCapacityUpto2015.html>.