

Implementing Zimbabwean Projects in the Zambezi Valley

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Abstract

Projects such as the Kazungula-Kasane Bridge, Victoria Falls North Bank Power Station, Hwange 7 and 8 Thermal Power Station Extension, Batoka Gorge Hydro-electric Scheme, Zambezi-Bulawayo Water Supply Scheme, Devil's Gorge Hydro-electric Scheme, Gokwe North Thermal Power Station, Kariba South Bank Power Station Extension and Mupata Gorge Hydro-electric Scheme have been on the Zimbabwean infrastructure development cards for a long time but are yet to see the light of day.

The objective of the Paper is to highlight some of the opportunities and challenges that each Project presents to policy/decision makers and potential developers utilising information in the public domain, interviews held with relevant potential developers and from the author's experiences and knowledge of the Projects. Some of the opportunities cited relate to the availability of the production raw materials, markets for the end products whilst the challenges include environmental concerns, politics, trust and confidence between development partners and technical issues.

Key words: Challenges, Infrastructure, Opportunities.

1. Introduction

The Zambezi Valley offers vast natural resources for sustainable exploitation ranging from coal reserves, water resources to wildlife. Whilst the Zambezi River and its tributaries may be considered more of an obstruction to land traffic (Tumbare 2010), the Zambezi River and its tributaries offer various opportunities for developmental projects such as hydropower generation, navigation, tourism and irrigation. In particular, transport, water supply, thermal and hydro power projects offered by the Zambezi Valley for development for the benefit of Zimbabwe and other neighbouring countries, will be discussed in this Paper. These Projects are:

- Katombora Weir
- Kazungula Bridge
- Victoria Falls South Bank Power Station
- Batoka Gorge Hydro-electric Scheme

- Zambezi - Bulawayo Water Supply Scheme
- Hwange 7 & 8 Extension
- Devil's Gorge Hydro-electric Scheme
- Gokwe North Thermal Power Station
- Kariba South Bank Power Station Extension
- Mupata Gorge Hydro-electric Scheme
- Kanyemba Bridge

2. Development Opportunities and Challenges

2.1 Bridges

Two major bridges across the Zambezi River, the Kazungula-Kasane and Kanyemba-Luangwa bridges, offer developmental opportunities and are key to the integration and development of the Southern African Development Community's (SADC) road corridor network. Figure 1 shows the bridges required across the Zambezi River and its tributaries including the two cited above.



Fig. 1: Proposed Bridges across the Zambezi River and its Tributaries
(Source: Tumbare, 2010)

KEY to Figure 1

The proposed bridges as numbered in the Figure 1 are:

- | | | |
|-------------------------|-------------------------|------------------------|
| 1. Zambezi to Litapi | 2. Mongu to Kalabo | 3. Senenga to Sitoti |
| 4. Shangombo to Rivungo | 5. Sinjembela to Luiana | 6. Kazungula to Kasane |
| 7. Kanyemba to Luangwa | 8. Luangwa to Zumbo | 9. Caia to Nicuadula |

Around the geographic point that the political boundaries of the four countries of Botswana, Namibia, Zambia and Zimbabwe theoretically meet, there are two international Border Posts: Zimbabwe (Kazungula) to Botswana (Kasane) and Botswana (Kasane) to Zambia (Kazungula). The current Zimbabwe to Botswana Border Post is over land but the Botswana to Zambia crosses the Zambezi River using two motorised pontoons. These carry at most 30 trucks per day as well as smaller motor vehicles and pedestrians (SADC, 2009). The ferry

crossing is usually tedious and causes long delays, thus the need for a bridge linking Botswana (Kasane) and Zambia (Kazungula).

The construction of the Kasane-Kazungula bridge across the Zambezi River will improve the traffic flow from western and southern parts of the SADC Region to the eastern and northern parts. It will also promote trading between Botswana, Namibia, Zambia and Zimbabwe. The bridge crossing numbered 6 in Figure 1 refers.

In 2001, the Japanese International Cooperation Agency (JICA) contracted Nippon Koei and Oriental Consultant to undertake a feasibility study of the Kazungula-Kasane Bridge. In 2008, further studies were commissioned by the African Development Bank for detailed designs of the Bridge and Tolling Facilities. At this stage, some negotiations were required as parts of the Bridge traversed the Zambezi River over Zimbabwean territory necessitating Zimbabwe to be treated as an equal development partner with Botswana and Zambia or the affected land being appropriated by Botswana. Zimbabwe opted for the former. During this period, both Zambia and Botswana openly disapproved of the Government of National Unity in Zimbabwe and took advantage of this Zimbabwean position to remove Zimbabwe completely from the Kasane-Kazungula Bridge Project by seeking and getting permission from Namibia, without Namibia claiming partnership in the Project, to realign the Bridge to pass over Namibian territory. Thus Zimbabwean Consultants and Contractors lost opportunities to tender for this work. Zimbabwe also lost the opportunity of future collaboration with Botswana and Zambia on this Bridge. The estimated construction cost of the Bridge is USD 82 million with an additional USD 30 million for Border Post control facilities.

Another geographic situation arises similar to the location of the Kazungula Bridge. This is where the political boundaries of the three countries of Mozambique, Zambia and Zimbabwe theoretically meet at a point. The nearest towns to this point on either side of the Zambezi River are Kanyemba (Zimbabwe), Luangwa (Zambia) and Zumbo (Mozambique). Whilst the Kanyemba to Luangwa Bridge across the Zambezi River (the bridge crossing numbered 7 in Figure 1 refers)

does not form part of the SADC's north-south corridor road transport network, this Bridge, if constructed, will greatly improve local trade between Zimbabwe, Zambia and Mozambique bearing in mind that this area also has National Parks in the three countries which attract tourists. However, prior to the realisation of this Bridge Project, a lot of work is required to improve the road network and bridges in the Zambezi escarpment of Zimbabwe, Zambia and Mozambique leading to this Kanyemba-Luangwa Bridge to facilitate road traffic to then fruitfully and fully utilise this Bridge. It is hoped that the lessons learnt from the experiences of the Kazungula-Kasane Bridge will assist in facilitating adoption of better strategic approaches to such future joint international projects.

2.2 Integration of marine and land transport utilising Lake Kariba

There is great potential for the development of marine transport on Lake Kariba, operated in combination with land transport. Currently, if one needs to go to Victoria Falls from Kariba, one has to take the tortuous and dirt road through Karoyi to Hwange via Binga and yet if there was an efficient marine transport system on Lake Kariba, one would travel by ferry to Mlimbizi en-route to Hwange and Victoria Falls. This would be a more joyous and scenic journey for both the traveller and a relief to the motor vehicle. Flying would be another option, but would be more costly and least scenic if this was a family holiday excursion. Similarly, if one wants to travel from Kariba to Livingstone in Zambia, one has to hit the road through Kafue and yet the journey would easily be shortened if an efficient ferry service operated on Lake Kariba that would take the traveller to Sinazongwe. Figure 2 gives some details of this possible integration of marine and land transport.



Fig. 2: Integration of Lake Kariba Marine and Land Transport (Source: Tumbare, 2010)

The above proposal will need introduction of new Border Posts on the Lake Kariba lakeshore complemented with appropriate upgrading of the roads and bridges along Lake Kariba's lakeshore in both Zambia and Zimbabwe. This requires the two countries sharing Lake Kariba to have the same vision in improving the transport situation in the Zambezi Valley as a whole and in the enhanced economic development of the Zambezi Valley in particular, which has been neglected since the colonial era.

2.3 Thermal Power Projects

The Zambezi Valley provides two viable coal fields around Hwange and Sengwa (refer Figure 3 and Table 1 for details). The coal fields at Hwange are currently supplying high grade coal for mining, agricultural and other manufacturing purposes whilst also providing coal to power the Thermal Power Station at Hwange. The coal fields at Sengwa are large and proven and could be utilised in like manner as the Hwange coal fields but firing the proposed Gokwe North Thermal Power Station. Maposa (2011) notes that Zimbabwe has coal reserves that could last for the next 200 years at an abstraction rate of 5 000 tonnes/year.

2.3.1 Hwange Thermal Power Station

Hwange Thermal Power Station was first commissioned in 1972 with an installed total generating capacity of 480 MW (4 x 120 MW units). The Thermal Power Station was later extended by 440 MW (2 x 220 MW units) which was commissioned in 1987. This brought the total installed capacity to 920 MW making Hwange the largest power station in Zimbabwe. In the 1990's, plans to further extend Hwange Thermal Power Station by 600 MW (2 x 300 MW units), the so called "Hwange 7 & 8 Extension", were almost realised. AllAfrica.com (1998) reported that "Government is headed for a showdown with the embattled Zimbabwe Electricity Supply Authority (ZESA) Board over its insistence that there be a speedy resolution of the disposal of ZESA's Hwange Thermal Power Station to YTL Power Corporation of Malaysia, a deal the Board is reportedly adamant it will not endorse. Negotiations with YTL have been dragging on for three years as the two sides wrangle over shareholding arrangements and asset transfer". With the beginning of Zimbabwe's economic recession from year 2000, and the wrangles involving Hwange Thermal Power Station asset handover to YTL, Hwange 7 & 8 Extension has yet to see the light of day.

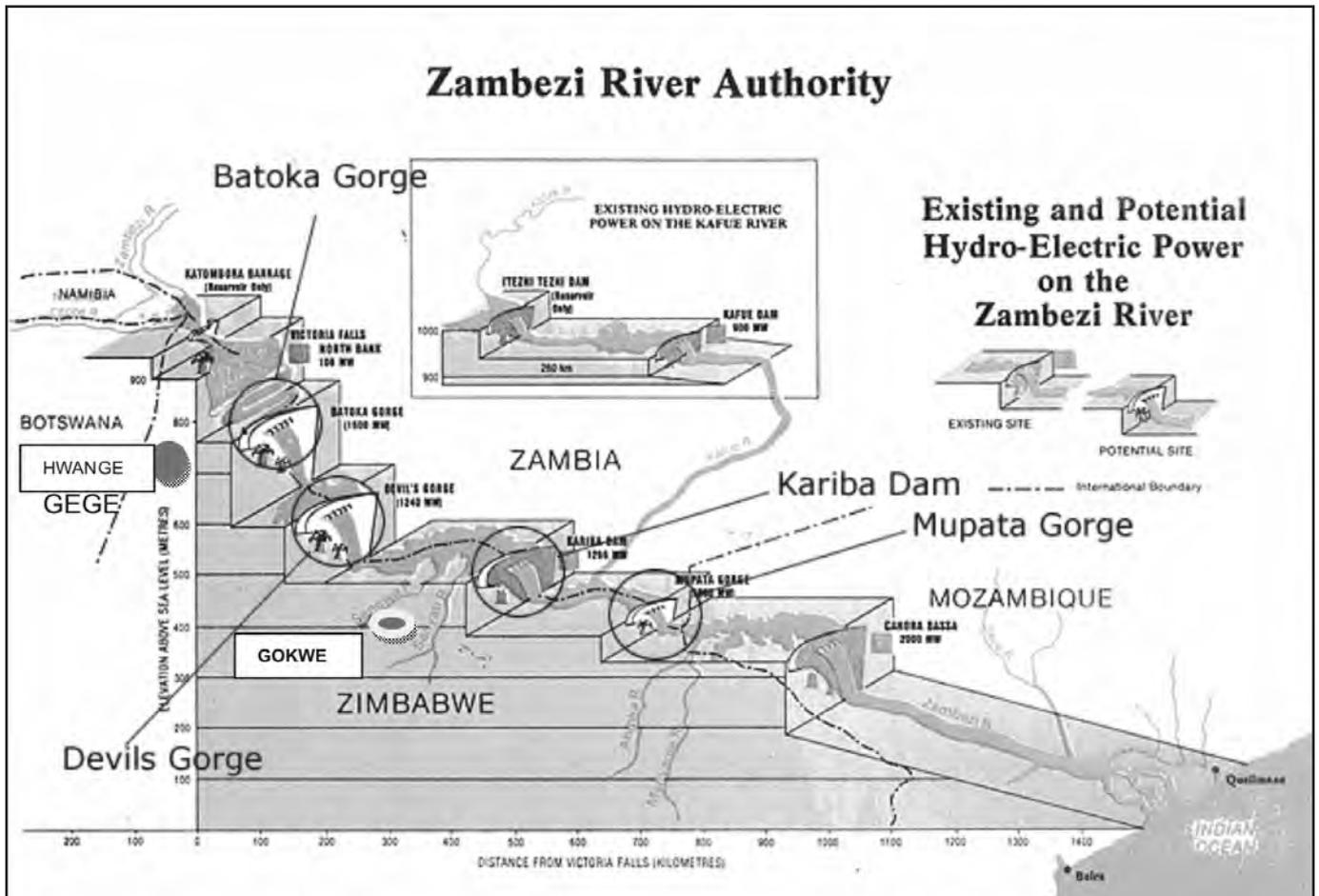


Fig. 3: Existing and Potential Hydro-electric and Thermal Power Schemes (Source: Tumbare, 2000)

2.3.2 Proposed Gokwe North Thermal Power Station

RioZim intends to mine the Sengwa coal fields and also provide coal for thermal power production at the proposed Gokwe North Thermal Power Station. The Sengwa Colliery has a coal resource of about 1 383 million tonnes of which 538 million tonnes are proven reserves. The Sengwa coal is the ideal feed for an on-site thermal power station, particularly as it has relatively low sulphur content (0.3%). The resource was extensively drilled in 1993 and 1994 and the Gokwe North Power Station Project was developed to feasibility study stage in 1997 (RioZim, 2011). The proposed Thermal Power Station would have a total installed capacity of 2 400 MW, which would make it the largest power station in Zimbabwe.

The Gokwe North Thermal Power Station Project was not implemented in the late 1990's due to the economic conditions that prevailed then. Recently, the controversial new Indigenisation Act recently passed by the Government of Zimbabwe seriously affected top mining counter RioZim resulting in its share price tumbling, Victor Gapare, President of the Chamber of Mines of Zimbabwe (COMZ), was quoted as saying by The Zimbabwean (2011). "Immediately after the Indigenisation Act was passed the RioZim share price was down," Gapare revealed. "Investors are still very worried about it and we need to come clean about it" (The Zimbabwean, 2011). There seems to be a misty investment climate for the Gokwe North Thermal Power Station to be realised.

Table 1: Proposed Zimbabwe Energy Projects in the Zambezi Valley

PROJECT	CAPACITY (MW)	ESTIMATED COSTS (X10 ⁶ US\$)	START DATE
KATOMBORA	REGULATORY STORAGE	300	SHELVED
VIC FALLS SOUTH	390	500	SHELVED
BATOKA GORGE	1600	4 000	2015
HWANGE 7 & 8	600	1 300	2014
DEVILS GORGE	1200	2 000	SHELVED
GOKWE NORTH	2400	3 600	UNDER DISCUSSION
KARIBA SOUTH	300	500	2016
MUPATA GORGE	1085	2 500	SHELVED
INCLUSIVE TOTAL	7 575	14 700	
EXCLUSIVE TOTAL	4 900	9 400	

2.4 Hydro-power Projects

Figure 3 gives a schematic of the existing and potential hydro-power projects in the Zambezi Valley that Zimbabwe could participate in their development and reap the resultant benefits. Table 1 gives the estimated Project costs for these hydro-power developments and their proposed start dates.

2.4.1 Katombora Regulating Weir

The Katombora Regulating Weir will be some 60 km upstream of the Victoria Falls. Its reservoir capacity would be of the order of 6 km³. The purpose of the Katombora Regulatory Weir, if constructed, would be to:

- regulate the Zambezi River water flows to the existing and planned hydro-power stations at Victoria Falls and Batoka Gorge
- to provide some water storage during low Zambezi River flows for various human uses including wildlife
- provide head and be the water abstraction position for transfer of the Zambezi waters to Botswana (Mpandamatenga/Okavango Projects), South Africa and Zimbabwe.

However, this Project has been shelved for the following primary reasons:

- high evaporation losses from the reservoir
- the Victoria Falls, one of the seven wonders of the World, will now be regulated by the Katombora Regulatory Weir. It would no longer be natural and will thus lose its stature and wonder
- Zimbabwe has shelved plans to build a hydro-power station on the south bank of the Victoria Falls for environmental reasons
- there are current objections from some of the Zambezi riparian states to the planned water abstractions from the Zambezi River at this location because of resultant low flows at Victoria Falls

The above reasons for shelving this Project are quite valid and strong and the realisation of this Project in the near future is very bleak.

2.4.2 Victoria Falls South Bank Hydro-power Project

Currently, there is a hydro-power station on the north bank of the Victoria Falls at Livingstone in Zambia. Its installed capacity is 108 MW. However, during low Zambezi River water flow periods, the Victoria Falls side that lies in Zambia dries up because of the water that is diverted away from the Victoria Falls on the Zambian side to the hydro-power station. An operational agreement has since been reached between Zesco Limited, the power utility that operates the hydro-

power station, with other stakeholders like hotel operators such that during these low Zambezi River water flow periods over the Victoria Falls, hydro-power generation is restricted during the day to allow water to still flow over the Victoria Falls for the benefit of the tourism industry with hydro-power generation occurring primarily during the night.

The above scenario affecting the Victoria Falls North Bank Power Station has informed the planning for the Victoria Falls South Bank Power Station hence the need for the Katombora Regulatory Weir. If the Victoria Falls South Bank Hydro-power Station were to be built, it would have an installed capacity of 390 MW and would operate as a run-of-the-river scheme exploiting the natural head provided by the Victoria Falls.

However, the Zimbabwe Electricity Supply Authority (ZESA) has shelved the implementation of this Project for primarily environmental reasons. Any further developments immediately around the Victoria Falls are now considered an environmental threat to the Victoria Falls and its status as one of the seven wonders of the World. The economic benefits to be realised if a south bank hydro-power station was to be built are considered far less than the tourism and the national/international heritage values and status that the Victoria Falls currently commands. In any case, without the Katombora Regulatory Weir, the Victoria Falls South Bank Power Station would suffer the same operational difficulties as currently experienced on the north bank.

2.4.3 Batoka Gorge Hydro-electric Scheme

The proposed Batoka Hydro-electric Scheme is located some 50km downstream of the Victoria Falls. It will be operated as a run-of-the-river scheme and will consist of a 181m high roller compacted concrete (RCC) arch dam with a storage capacity of only 1.7 km³, 0.9% of the storage capacity of Kariba Dam at full supply level. It is planned to have two underground power stations on each bank of the river of 800 MW capacity each. The Batoka Hydro-electric Scheme would involve;

- the construction of the 181m RCC arch dam
- the construction of the two underground power stations with total installed capacity of 1 600 MW
- transmission lines to join the national grids
- permanent access roads to the dam site in both Zambia and Zimbabwe
- airports on both sides of the river banks
- township developments on both river banks involving the construction of both high, medium and low density residential housing, hotels, banking facilities, hospitals, post offices, golf clubs etc., etc.
- border control facilities: immigration, customs and police services as the Batoka Dam wall will act as a road bridge crossing the Zambezi River.

It is prudent at this stage to highlight that the Batoka Hydro-electric Scheme, now estimated to cost USD 4 billion inclusive of all the above cited developments, would be the largest single investment for Zambia and Zimbabwe and will create jobs for both local contractors, consultants and manufacturers. The Batoka Hydro-electric Scheme for instance will consume all the cement currently produced in Zambia and Zimbabwe which would need supplementation from elsewhere within the SADC Region. As a Project estimated to last about 7 years, it would be viable to build a cement factory solely to supply Batoka. Thereafter, the cement factory could supply the SADC Region for longer-term profits. Two Environmental Impact Assessments (EIAs) have been conducted for the Batoka Project, one completed in 1993 and the other completed in 1998. The 1998 EIA was a sequel of the 1993 EIA, primarily undertaken to study in more detail and suggest mitigatory measures for those issues identified in the 1993 EIA as needing attention and suggesting ways of enhancing those issues that the Batoka Project impacted positively. With the current planned height of the Batoka Gorge Dam, the tail water levels at full supply level will only reach the "Silent Pool" where the existing Livingstone Power Station in Zambia discharges from its hydro-power turbines, and will not, as often claimed by the misinformed, flood the Victoria Falls. It would be folly and irresponsible for any developer, not mentioning the two Governments of Zambia and Zimbabwe, to allow construction of a dam that would flood the Victoria Falls, one of the seven wonders of the World. Five of the Zambezi River rapid sections between the Victoria Falls and Batoka Dam will permanently be lost to white water rafting, a negligible cost compared to the dilemma of the millions of persons in Zambia, Zimbabwe and the SADC Region as a whole who find themselves living without a reliable clean source of electric power and having to burn CO₂ gas emitting fossil fuels for their daily energy needs.

Now, having said the above, why has the Batoka Hydro-electric Scheme not taken-off since the finalisation of the Feasibility/Pre-Final design studies of 1993? The reasons go back to the Federation years of Rhodesia and Nyasaland (1953 to 1963), the background and decisions surrounding the construction of the Kariba Hydro-electric Scheme over the Kafue Hydro-electric Scheme in the 1950's, the Zambian expectations post-Zimbabwean Independence and the subsequent sharing of the Federal and Kariba Hydro-electric Scheme

assets between Zambia and Zimbabwe in the 1980's.

The Federation of Rhodesia and Nyasaland was born in 1953 at the instigation of the settler whites in the then Southern Rhodesia, now Zimbabwe. The Federation of Rhodesia and Nyasaland involved the union of Northern Rhodesia (Zambia), Southern Rhodesia (Zimbabwe) and Nyasaland (Malawi). The main arguments proffered in favour of the Federation were that:

- the economies of the three countries in the Federation would be stronger and more diverse
- there would be freedom of movement and an abundance of African labour within the Federation
- the dominance of the Union of South Africa would be diluted

However, the citizens of Northern Rhodesia did not agree with the above reasons:

- the Africans in the Federation in general believed that the creation of the Federation was a ploy to delay their self-rule and emancipation as individual states
- the citizens of Northern Rhodesia felt that their resources; mineral (copper), human and otherwise, were being used to develop Southern Rhodesia at their expense. This was reinforced in that the Federal Capital was Salisbury, in Southern Rhodesia, the University College of Rhodesia and Nyasaland was built in Salisbury, the railway system network was better developed in Southern Rhodesia with a Head Office in Bulawayo, the Central African Airways was based in Salisbury, state-of-the-art hospitals were being built in Southern Rhodesia like Harare and Mpilo Hospitals, etc., etc.
- the Africans in the Federation also strongly believed that the Federal laws and governance system favoured the white settlers than the majority indigenous blacks
- After the decision was "unilaterally" made by Southern Rhodesia to build the Kariba Hydro-electric Scheme ahead of the cheaper Kafue Gorge Hydro-electric Scheme which was located wholly in Northern Rhodesia, the Northern Rhodesians could only believe that this was one of the prime reasons for the creation of the Federation. The Minister of Power of the Federation consolidated this belief by his statement: "Kariba is the greatest single achievement of the Federation so far; without Federation it could not have been undertaken" (Federal Power Board, 1960).

Once Southern Rhodesia had "unilaterally" decided that Kariba should go ahead of Kafue, work commenced and all the infrastructure to construct the Kariba Dam was based in Kariba on Southern Rhodesian soil. The main contractor was Italian with the civil sub-contractors all being Southern Rhodesian companies, except for the cement which was hauled from Chilanga near Lusaka. The Federation of Rhodesia and Nyasaland was finally dissolved in 1963, after Kariba Dam had started producing hydropower from the power station on the Southern Rhodesian side. The construction of the power station on the Northern Rhodesian side had been postponed, only to be constructed by then independent Zambia in the 1970's.

Soon after the dissolution of the Federation in 1963, Northern Rhodesia gained its independence from Britain in 1964 to become Zambia. In 1965, Southern Rhodesia, led by Ian Douglas Smith, unilaterally declared independence to become Rhodesia. Zambia observed the international sanctions imposed on Rhodesia and assisted and harboured the Zimbabwean Freedom Fighters and their leaders to fight the Smith regime. Both Zambian and Zimbabwean human lives were lost in the war for Zimbabwean Independence and the Zambian nation sacrificed both human, financial and other resources to assist the Zimbabwean liberation war. Zimbabwe finally got Independence in 1980 and naturally the

Zambian citizens expected Zimbabwe to show gratitude for the assistance rendered by Zambia during the liberation war in various forms including equitable binational relationships. Albeit, Zimbabwe did not display this to the expectation of the Zambians (Times of Zambia, 1994):

- the distribution of the Federal assets between Zambia and Zimbabwe was seen by the Zambians as to favour Zimbabwe as the University, hospitals, air force planes, airports, railway network system, which were the major assets developed during the Federation, were retained by Zimbabwe
- during the distribution of the assets of the Central African Power Corporation (CAPCO) which was managing the Kariba dam and power stations on behalf of Zambia and Zimbabwe, Zimbabwe claimed that the North Bank Power Station was also a CAPCO asset which should be shared equally. Zambia claimed that this Power Station was solely built from loans sourced and serviced by Zambia during the Zimbabwean liberation war and was thus wholly a Zambian asset not subject to sharing. This dispute raged on from 1987 until 2005 when Zimbabwe accepted that the Kariba North Bank Power Station was a wholly owned Zambian asset.
- After Zimbabwe accepted that the Kariba North

Bank Power Station was a wholly owned Zambian asset, the distribution of the CAPCO assets was then concluded and the net result was that Zimbabwe owed Zambia USD 73 million. The issue of when the interest should start accruing on this amount has since been another issue for resolution.

- During the exploratory drilling works for the Batoka dam site in the late 1980's, which formed part of the Feasibility Studies for Batoka, all the exploratory drilling companies contracted to carry out the work were Zimbabwean with the camp site and access roads established on the Zimbabwean side. This further reinforced the Zambian position that the Federal Kariba practices were now being employed again at Batoka by independent Zimbabwe.

Thus the Federation planted the seeds of inequity and discontent between Northern and Southern Rhodesia which are still growing to this Zambia-Zimbabwe era. Bilateral relationships between Zambia and Zimbabwe in the post Zimbabwe Independence era have not helped the Batoka Project either with the then Zambian Energy Minister, Hon. Edith Z. Nawakwi, stating: "Zambia will exercise caution before entering into any joint ventures with Zimbabwe given the turbulent history of existing ventures" (Daily Gazette, 1993).

Thus the Batoka Hydro-electric Scheme, even though it is by far the most viable new energy source for not only Zambia and Zimbabwe, but the SADC Region as a whole, is embroiled in the mistrust and inequity perceptions and beliefs that date back to the Federation days. It is up to Zimbabwe to come to terms with this and change its strategies if it has to realise the implementation of such shared projects.

2.4.4 Devils Gorge Hydro-electric Scheme

The proposed Devils Gorge Hydro-electric Scheme is located between the Batoka Dam site and the headwaters of Lake Kariba. It will be a 180m high RCC arch dam with an installed capacity of 1200 MW, 600 MW on each bank.

Besides the more technical challenges that face the construction of the Devils Gorge Dam due to the headwaters of Lake Kariba and thus the need to keep Lake Kariba at low storage levels during its construction at the expense of hydro-power generation at Kariba, Devils Gorge has also higher specific generation costs compared to Batoka. Further, Devils Gorge, as a joint Project between Zambia and Zimbabwe, would suffer from the same Kariba legacy issues as Batoka, unless these issues between Zambia and Zimbabwe are timeously resolved.

2.4.5 Kariba South Bank Power Station Extension

Kariba South Bank Power Station can be extended by the installation of 2 units of 150 MW each giving a total of 300 MW. Kariba North Bank Power Station has already commenced the extension of its Power Station by the addition of 2 units of 150 MW each.

It should be highlighted here that the extensions at Kariba for non-peak power generation only make economic sense with the construction of Batoka Gorge Hydro-electric Scheme and the subsequent conjunctive operation of Batoka, Kariba and Kafue Gorge Power Stations. Extensions at Kariba, without Batoka, are only viable for generating peaking power and generating power during periods of high Kariba lake levels combined with high inflows into Lake Kariba. Further, the Kariba South Bank is located in poor rock conditions necessitating expensive tunnelling methods for the Power House Extensions as opposed to blasting unlike the North Bank Power Station which is constructed in solid granite requiring no concrete lining.

The estimated overall useful life of Kariba Dam is 130 years (Tumbare, 1998). Kariba has been in operation now for 52 years. This leaves only 78 years of useful life. Sooner than later, major dam wall strengthening works or the replacement of the Kariba Dam wall downstream of the existing location will need to be planned for and executed as Lake Kariba can no longer vanish as this would be a major environmental and economic catastrophe. It is thus important to bear this in mind in the consideration of the existing Kariba Power Station Extensions as these Power Stations can be made redundant by the need to stabilise or replace the Kariba Dam wall downstream of the existing dam wall.

2.4.6 Mupata Gorge Hydro-electric Scheme

The proposed Mupata Gorge Hydro-electric Scheme is located between the Kariba Dam and Cahora Bassa Dam in Mozambique. Two possible developments have been studied: a high dam wall scheme with an installed capacity of 1 200 MW and a low dam wall scheme with an installed capacity of 640 MW. Both options would be RCC arch dams.

Mupata Gorge Hydro-electric Scheme has been shelved because of the following reasons:

- the high evaporation losses that the Scheme would incur
- the reservoir would inundate large portions of the Mana Pools and Luangwa South National Parks
- the specific generating costs are high

2.4 The Zambezi - Bulawayo Water Supply Scheme

The Zambezi - Bulawayo Water Supply Scheme envisages the abstraction of approximately 0.25 percent of the mean annual Zambezi River flows (translating to about 1.2m³/s) to Zimbabwe's second largest city of Bulawayo. Proposals to abstract this water from the Zambezi River date as far back as 1912. The severe drought of 1991/92 prompted the formation of the Matabeleland Zambezi Water Project (MZWP) by the residents of Bulawayo who raised sufficient funds to finance a Feasibility Study. However, the Zimbabwe Government established a parallel venture through the Matabeleland Zambezi Water Trust (MZWT). The Ministry of Local Government was given responsibility of running the MZWT and the Project as all City Councils, including Bulawayo, fall under this Ministry. Nothing materialised from both the MZWT and the MZWP initiatives in the realisation of transferring water from the Zambezi to Bulawayo until the Project was recast by the Ministry of Water Development by proposing a series of dams from the proposed abstraction point on the Zambezi River at the confluence of the Zambezi and Gwayi Rivers to Bulawayo (Mutede, 1988). The proposal is anchored on the Gwayi-Shangani Dam which is now under construction.

Instead of pumping water directly from the Zambezi to Bulawayo, a feat that would require and consume a lot of electric energy, water would be pumped from the Gwayi-Shangani Dam and then be transferred to Bulawayo through a network of other smaller dams, pipeline and canals when there is sufficient water in the Gwayi-Shangani Dam. In the event of a hydrological failure of this system, this is when water would be pumped from the Zambezi River into the Gwayi-Shangani Dam to fill it up. Figure 4 refers.

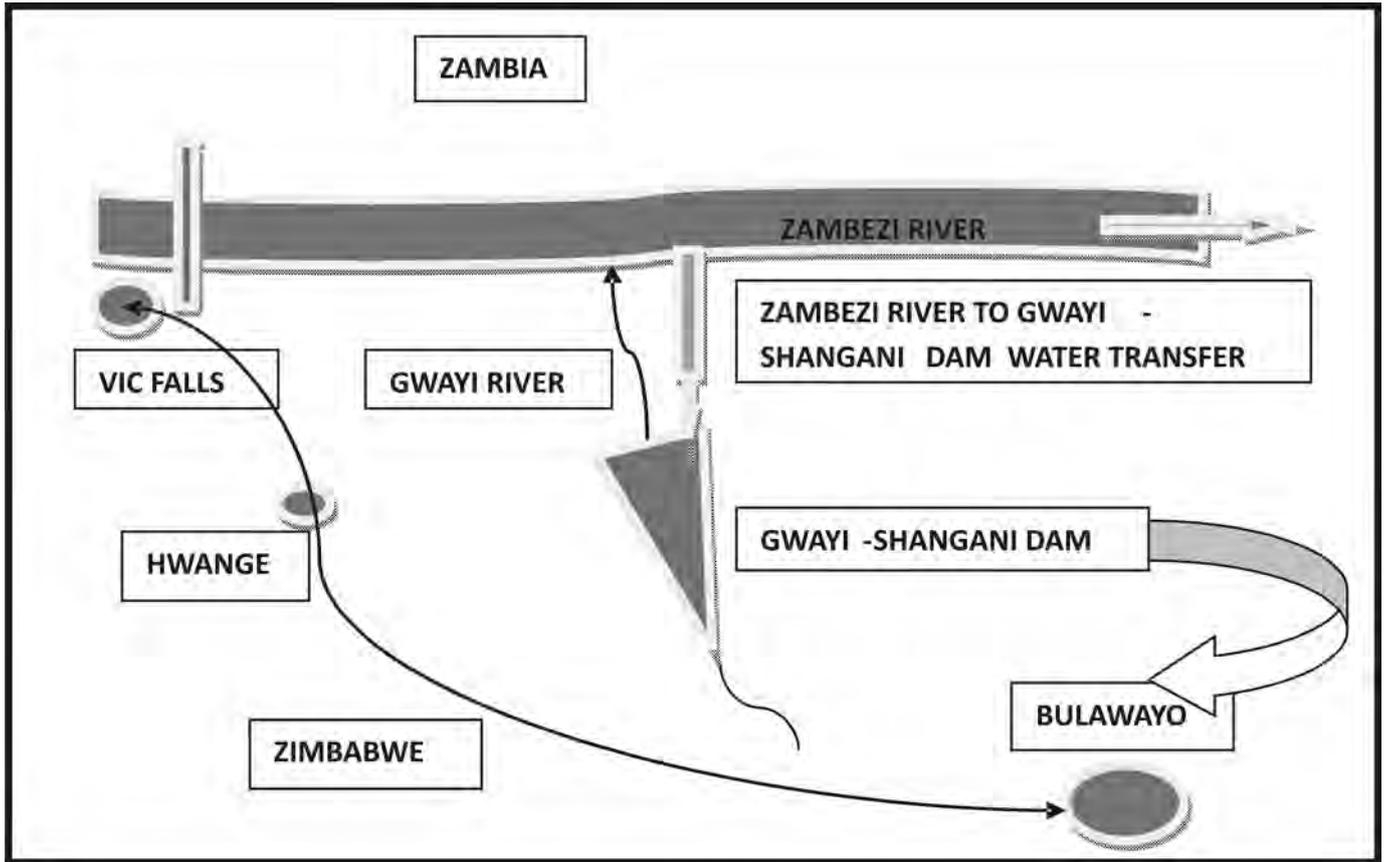


Fig. 4: Schematic Layout of the Zambezi- Bulawayo Water Transfer Scheme (not to scale)

Whilst the construction of the Gwayi-Shangani Dam has since taken off, anchoring the Zambezi-Bulawayo Water Supply Scheme, problems may arise when Zimbabwe formally requests the other seven Zambezi riparian states to abstract the 1.2m³/s from the Zambezi River. This is because the Zambezi Watercourse Commission (ZAMCOM) Agreement is now in force (effective July 2011) which requires this formality. Zimbabwe has already raised objections to Botswana abstracting water from the Zambezi for its Projects and unless trade-offs are discussed and mutually agreed on, Zimbabwe will find another bottleneck in the realisation of the dream to pump water from the Zambezi for Bulawayo. Had Zimbabwe gone ahead with this Project some years back, it would only have had to discuss this abstraction with Zambia through the Zambezi River Authority Acts of 1987.

3. Conclusion

This Paper has discussed eleven Projects in the Zambezi

Valley that Zimbabwe could embark on for its socio-economic development. The challenges associated in the realisation of each Project have been stated and discussed and are summarised in Table 2.

Unless Zimbabwe changes and adopts strategies which deliberately reverse the perceptions and beliefs held by its northerly neighbour Zambia, which were planted by the Federation of Rhodesia and Nyasaland and which continue to be perpetuated by disputes regards the sharing of the Federal assets, the bi-national projects between these countries such as the Batoka will never see the light of day. Zimbabwe should use such bi-national projects as an opportunity to demonstrate goodwill so as to eventually inculcate trust and confidence with neighbouring developmental partners. Zimbabwe will also need to put policies in place that will attract and retain investments for the benefit of the investors and the Zimbabwean citizens.

Table 2: Summary of Zambezi Valley Projects and the main Challenges for their realisation

PROJECT	TECHNICAL	CAPITAL	ENVIRONMENTAL	TARIFFS	LEGACIES	POLITICS	STRATEGY
KATOMBORA			X			X	
VIC FALLS SOUTH			X	X			X
BATOKA				X	X	X	X
HWANGE 7 & 8		X		X			X
DEVILS GORGE	X			X	X	X	X
GOKWE NORTH		X		X			X
KARIBA SOUTH	X	X		X			X
MUPATA			X	X	X	X	X
KAZUNGULA BRIDGE						X	X
KANYEMBA BRIDGE		X				X	X
BULAWAYO-ZAMBEZI	X	X		X		X	X

KEY to Table 2

X» Major Primary Challenge

X» Secondary Challenge

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