

*PLAN FOR PARTNERSHIP PROJECT FOR  
ONGAWA HYDROPOWER PLANT IN SAME  
DISTRICT, TANZANIA*

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*“If you want to see things you’ve never seen before, you have to do things  
you’ve never done before”*

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## General Information

### Description of Same and the local situation

The inhabitants of Same district have limited access to water, sanitation, economic opportunities and energy. Approximately 6000 people live in the villages of Lugulu, Kanza and Vumba, whose villages are currently not connected to the national electricity grid. Even though Tanzania is making efforts in electrifying its rural areas, this is a slow and expensive process. For some countries, extending power grids to rural areas is sometimes hard to justify financially, as it is not cost-effective enough if consumption levels are low. However, it is not just about extending the power grid. Connection fees, which after the current subsidies provided by the Tanzanian government amount to 90 USD, are for many an unaffordable price (TANESCO, 2012). Mtii, another village in the Same district, became electrified in 2009, however, less than 10 % of all the households actually connected to the new grid when it reached them, the low number being explained by the high connection fee. Furthermore, the inhabitants of Lugulu, Kanza and Vumba are encountering more stumbleblocks to an improved livelihood, as their proximity to a natural protected area limits some of their productive activities and firewood collection. The Yongoma river, a part of the Pangani River Basin, which flows past the three villages is also under stress. The villagers, who divert channels from it to irrigate their fields, LM Investment, a private company whose machine is driven by the water flow of the river and the Ndungu rice irrigation scheme are the three main users of the river at the moment. Incidents have been reported where the company had to send guards in order to stop the re-channeling of the river. Overall, poor resource management and increased stress on the natural environment can be observed as more activity takes place on the riverside.

### Description of the Project

ONGAWA, a Spanish engineering NGO, is dedicated towards providing sustainable solutions to rural communities. The NGO has been active in Tanzania since 1998 and is on the verge of starting this project in Same. The plan is to build a micro hydropower plant (MHP) on the Pangani river, a sub-catchment of the Pangani River and so address several problems at once: First of all, poverty can be reduced and livelihoods will improve through access to energy. By providing the villagers with access to clean electricity, they will be able to power their households, improve current businesses or set up new ones. Children can do homework at night not under the dirty and unhealthy light of the kerosene lamp but under a lightbulb. Adults can perform their household

chores under the shine of clean light as well. However, as described above, the problem is deeper than just bringing the grid to the villages, as it is the connection fee that people cannot afford. As this is a foreseeable challenge for the villagers of Lugulu, Kanza and Vumba, this project is proposing a way of facilitating people's connection to the main grid, by tying it to environmental services provided by villagers and using parts of the revenue collected from selling the electricity to the main grid. How this is structured will be explained in the Partnership section. Natural resource management will improve, as less stress is put on forest, land and water resources. Promoting soil conservation practices in slope cultivations will be another aspect, as the village fields many times extend all the way down to the river. This will also be done by tying environmental conservation as well as improved agricultural practices to the partnership plan through the payment structure of environmental services. It hopes to organise this through a new, innovative partnership structure, hopefully scalable and replicable if successful, and so contribute to the overall development field.

This project is not just proposing a partnership structure, but it also proposes a different funding structure. Development projects, if not entirely based on donations, also draws on investments. The investors are usually already well-off "outsiders", who then benefit the most in terms of return on investments. Yet if one wants to consider *the process of funding* as part of the development work, then projects such as this one should enable, small, *local* investments as well. Although small, there is a growing middle class in the area of Arusha and Kilimanjaro who might be interested in seeing their money go towards improving their country and help create a better future for their countrymen. Therefore, one of the aims of this project is to draw on many different funding sources as well as investments not just from companies, but also from individuals, in Tanzania, as well as abroad. Preferably, a change in the field of funding development projects should materialise. By setting up a partnership model around this project, it will look at contributions not only through monetary value and will see the villagers as something more than just "customers" or "users" of the energy service. A new, innovative business plan can be developed where the overall share for the end beneficiaries, in this case the inhabitants of the villages of Lugulu, Kanza and Vumba can be maximised. Through the creation of a partnership, the villagers will play an active role in the development of their villages, their environment and their future. The share of the revenue between all the stakeholders and have enough money over for village development is what this project wants to look at.

The innovation of this project does not lie in the technology. Hydro energy is not a new invention. Although a new trend within development, setting up a partnership is not innovative either. However, where this project hopes to contribute with a new way of thinking is when it comes to looking at funding and that the view of the villagers from simply being customers, to contributors,

business people and eventually decision-makers of their own development. It is to showcase that a “simple” engineering project can do so much more.

The following paper aims to provide ONGAWA with several parts in order to assist them with their current project: First of all a risk analysis is delivered, where the main political, economic, social, technological, environmental and legal risks will be analysed and possible mitigation strategies will be proposed. After that follows a description of several crowdfunding platforms that could be tapped. On the side of investors an example of “Northern” private investment is described, as well as the possibility of encouraging local private investment through the example of LM Investment. Several impact funds have been identified as well as the newer idea of crowdfund investment /microinvestment, both locally as well as internationally. In order to prepare the partnership, a stakeholder analysis was performed. Thereupon follows a description of the purpose of the partnership, as well as who should be partners and an analysis of their needs, wants, resources, as well as motivations. How communication and meetings should be structured and how the management mode, roles and responsibilities should be divided. The relationship to important stakeholders yet non-members within the partnership is also discussed. Several options of what could be done with profits earned are outlined along with possible future ventures of the partnership. Lastly, a short description of how to join and leave the partnership is discussed. The next section of the paper is the description of the Excel Tool created for calculating the different investment conditions per investor. Finally, the potential pursuit of carbon credits is analysed where Gold Standard and Program of Activities are the main recommendations for this project.

## Risk Analysis

The following section will analyse certain outside risks that the micro hydro power plant and the subsequent partnership should be aware of in order to set up certain risk mitigation strategies. It should be noted that not all risks are discussed below, but only the ones assumed to be of high importance.

### Political Risks

Tanzania is unfortunately still a country where corruption is wide spread. Transparency International ranked Tanzania as 102/176 of all analysed countries (Transparency, 2012). This problem has, however, received a lot of public attention and the government has made strong commitments to fight corruption, including new laws, regulation and overseeing institutions (Swiss Agency for Development and Cooperation - SDC, 2012). Corruption is broadly understood as the abuse of entrusted power for private gains. This problem is further complicated if it is already engrained in societal practice and affecting all sectors. “Corruption (in Tanzania) has become so endemic that it corrupts everyone” (Makoye, 2013). Tanzania Electric Supply Company Limited (TANESCO), a parastatal organisation and the main electricity provider in the country, has an infamous reputation. In 2011, the Prevention and Combating of Corruption Bureau issued a report showing that the police and TANESCO are the worst ranked institutions when it comes to corruption (Tanzania Corruption Tracker System, 2010). When corruption becomes a way of life in a country, it is important to remember that this is not just the case for private companies, but also occurs within other organisations, institutions as well as local NGOs.

Addressing the problem of corruption can be challenging especially when “people seem to have accepted it as a part of the culture.” (Makoye, 2013) Yet an anti-corruption stance should be top priority in all talks with engaged members. Anti-bribery standards should be put in place and should become the norm surrounding all activity around the project and the partnership. The partnership should show support for local NGOs that aim to empower citizen and fight corruption. If bribery becomes an issue for the project and the partnership it should be dealt with immediately and as a group.

The lengthy response time of government in Africa consistently emerges as a key challenge. “Slowness” of the public sector is a problem in many countries, and Tanzania is no different in this regard (Stott, The Partnering with Governments Navigator , 2010). There exists the option of including the government in the partnership, or to decide not to do so. If it is decided that the

government will not be a member in the partnership, this should not be too much of an issue, especially if the MHP can benefit from LM Investment's water right already in the company's possession. Yet the different perceptions of time and bureaucracy can prove frustrating. Since ONGAWA has been active on the ground since 1995 they are well aware of these circumstances and so this should not prove too big of a hinder. If government is included through local representatives then the partnership should make sure of "institutional buy-in", so that the local representatives have enough power to make decisions regarding issues within the partnership and do not always have to refer back to HQ before every small decision making process. Another risk that may arise is that of time. Yet bureaucracy cannot be avoided, and so it should be seen as a sign of good governance; a long process making sure that checks and balances are performed thoroughly. Therefore patience and a cultural understanding of the local government as well as organisations such as TANESCO is of essence.

## Economic Risks

The project will phase certain challenges related to the current economic environment in Tanzania. Inflation has in the last years fluctuated from 4% in 2003 to 13.5% in 2012 annually. If analysed on a monthly basis however, inflation rates have been steadily declining from January 2013, and staying under the two-digit mark. Compared to other East-African country this is still high, as both Kenya and Uganda had an inflation rate below 5.5% last year (Magomba, 2012).

The inflation rate can have an impact on the cost facing the power plant and the partnership. As the feed in tariffs are set by a 15 year contract, these will not, although accounted for, change with real inflation. If the inflation stays at 8% or above it will eventually be eating all profits and make the power plant go in minus in year 15. This is caused because the costs are simply growing faster than the profits. In the Excel Tool (explained further in another chapter), the cost is calculated with an annual increase of 8%. This might be an optimistic forecast as the inflation has been above 10% the last 3 years. Hence year 15 might be a challenging year, depending on the saving goals set up by the partnership.

The inflation rate can have an impact on the feed in tariffs, which at the moment has had a yearly average increase of 15.77% since 2009. On the next page there is a table illustrating the development, also showing the differences and fluctuations of tariffs between the dry and wet seasons. This is a rather small data sample. As the small power plant (SPP) initiative started in 2009, there is, however, no data available for before 2009, challenging the possibility for a deeper analysis.

| 2009   |      | 2010   |       | 2011   |        | 2012   |        | 2013 |     |
|--------|------|--------|-------|--------|--------|--------|--------|------|-----|
| Dry    | Wet  | Dry    | Wet   | Dry    | Wet    | Dry    | Wet    | Dry  | Wet |
| 115.33 | 86.5 | 132.36 | 99.27 | 145.36 | 109.02 | 183.05 | 137.09 |      |     |

Inflation rates are unpredictable and unfortunately they cannot be influenced. A way for the partnership to reduce the risk the inflation represents is to create a savings account where a certain amount of the profits is placed in order to face e.g. extra cost. This has been accounted for and incorporated in the tool, explained further below.

Another economic risk is related to currency exchange rates. As the project is counting on some foreign investors, currency exchange rates will have an impact on their revenues. On the 3rd of June 2013 one American dollar (USD) was worth 1631.5 Tanzanian shillings. The relationship between the two currencies has experienced rapid changes and fluctuations over the last ten years. The Tanzanian shilling experienced a high in 2003, when only 1024.85 TZS was required to purchase 1 USD. In late 2011 however, after 2-3 years of steady decline, it reached of low where 1 USD cost 1813.99 TZS. The relationship has however been rather stable since late 2011 and up until todays date.

The uncertainty and fluctuations could represent a risk for the outcome of the return for the international investors. The feed in tariff and payment of the electricity services would be paid in TZS, by TANESCO. The payment to investors would therefor also be initially paid in this currency, which could represent a risk in the conversion. As USD is one of the most common trade currencies a close evaluation and monitoring



of the development would be crucial for investors. When the TSZ get less worth, there is smaller return for the investors wanting to be paid in USD. The local investors on the other hand will be



paid in the same currency as they invested in, and is therefore not affected by the currency fluctuations to the same degree.

The euro on the other hand, which is another important trade currency, is stronger than the USD and require 2155 shilling for 1 euro. The TZS saw a high in 2003, when only 1140.8 was required to purchase 1 euro. The weakest point in time over the last ten year period, was in 2011, when 2468 TZS was needed to buy 1 euro. Similarly to the USD the relationship between the two currencies has been rather stable since the end of 2011, beginning of 2012 and up until today. Close monitoring of the financial markets will be of interest to the investors, as it will have an effect on their return. Once invested it will not be possible or challenging to prevent the impacts of the currency fluctuations (XE, 2013). There is no clear suggestion as to what an international investor can do to protect his investment against this risk.

A more specific risk exists when it comes to TANESCO. The electricity produced by the MHP will be sold to the electricity provider and through them be infused into the main grid, therefore TANESCO will become a customer of the MHP. Yet, the general picture of TANESCO is a little disheartening, as their current economic situation is being discussed in the news (Mugarula, 2013). There are also examples of nepotism, illegal consumers, corruption, mismanagement, fines and debt far beyond their capacity. According to a report submitted by EWURA (Energy Water Utilities Regulatory Authority) states that the semi-governmental company will need \$637 million to stabilise its cash position and be able to supply reliable services (MWAMUNYANGE, 2012). The corruption allegations persist throughout all of the company, from ministers to top management. Officials from TANESCO had imported spare parts from the UK at a value of £50 000. This however, turned out to be a box of nails. Access Bank of Dar es Salaam consumed electricity worth almost \$8500, without paying for it. These examples are only a drop in the ocean of all the different allegations TANESCO is facing (Mwita, 2012).

Executives of the company said in August last year that they were planning on starting court actions against anyone who were not paying their bills on time, in order to improve their cash position. They are also fighting the theft of electricity as well as reducing lost electricity, due to technical issues (Mwamunyange, 2012). In May 2013 the Minister of Energy and Minerals, Prof. Sospeter Muhongo, said they are investing \$500 million to transform the company. \$300 million is a loan from the World Bank, while \$200 million is a loan from the African Development Bank (Saiboko, 2013). Time will tell whether this solution will help. More than money is needed to change the corporate culture of the company. It seems like corruption has become the norm and infiltrated every part of the organisation. The process of changing this will take time and will still represent a future risk for current and potential investors.

Even though the official picture painted looks rather dim, the truth is that there are other small power producers in Tanzania, such as Mwenga in Iringa, a 4MW hydro power plant, connected to the grid but also selling electricity to the community; in Mawingo, where the NGO ACRA has built a micro-grid and in Njombe, a cogeneration plant by TANWAT. (ONGAWA field study) and information and knowledge on how they are dealing with this risk should be shared. It is important that a kind of information sharing environment is created where all players can benefit from each other's knowledge and experiences. Regardless of this, the contract between TANESCO and the partnership should also be clear, available, read and understood by everyone. Incorporating some form of checks and balance in regards to decision making and handling of profits, may also assist in the prevention of unlawful activity. Even though there is a 'tab' on TANESCO's website for their financial statements, this turns up blank when attempted to open. An actual financial and credit analysis could therefore not be done as of now. The different news articles and statements became the base of the analysis and following recommendations.

For the partnership it will be important to have a focus on anti-corruption from the beginning. It should be one of the cornerstones and building blocks of the partnership. Clear guidelines should be drafted on how to deal with TANESCO and what to do in the case of potential corruption. The contract between TANESCO and the partnership should also be clear, available, read and understood by everyone.

As the risk of TANESCO arises, so does the risk of the partnership on not being able to pay its investors. If TANESCO does not pay, the partnership will not be able to pay and becomes a credit risk to its stakeholders. Therefore, by mitigating the risk of suffering under the credit risk of TANESCO one mitigate the risk of being considered a risk oneself. The steps and actions taken towards this will also illustrate the care and respect the partnership has for its stakeholders and investors.

As mentioned TANESCO does not have the best track records of paying their bills and therefore represents a risk, as the partnership would be selling electricity to them. As this would be the main source of revenue it is crucial for the partnership to find a way to mitigate this risk. However, it is also true that the SPP programme is funded by the World Bank, and this hopefully is a guarantee that they will stay behind TANESCO to fulfill its commitments (The World Bank, 2013).

Another economic risk but this time not from the Tanzanian side is that not be enough funds and donations can be tapped and so the project will not materialise due this fact. In order to make

sure this can be avoided this paper has identified several impact funds that ONGAWA should reach out to, as well as crowdfunding platforms, and has evaluated the idea of having individuals be able to invest into the micro hydro power plant, both individuals from Tanzania as well as from abroad. Tapping into private investment is an option. The different sources of capital will be discussed further below, however what is important to remember is that a wide variety of different sources of income will lower the risk of not finding enough initial capital.

## Social Risks

One of the biggest social risk is related to the challenging water management equilibrium that is already quite complicated in the area. The rice husk factory and LM Investment are two activities already present at the river and requiring the water for their functioning. With the micro hydropower plant joining them, there is a risk to misconceived perceptions of these activities using the villagers' river. Even though LM factory as well as the power plant do not physically take water from the river both require a steady water flow. Therefore it is imperative that big efforts are made to avoid misunderstandings and conflict

### Price Comparisons

Connection fee: 147 000 TZS

Kerosene expenses: 25000-30000 TZS / month

Charging mobile phone: 800 TZS / month

in this regard. As a Pangani River Basin Authority worker said "It is not just if you have the water right to do what you want to do, it is more important the perception of the people about the increased amount of water you are diverging." (ONGAWA Field Study notes) Both the micro hydro power plant as well as the partnership around it depend upon that people are made aware of its potential and future impacts. With regards to the MHP, awareness raising around the topic of energy and the potential of electricity has to become a central theme of the development work performed. The citizens of the villages of Lugulu, Kanza and Vumba have, until then, not been connected to the grid. Their reality until now is that they have to walk several kilometres to a nearby village to charge their mobile phones. However, the potential of having direct access to electricity is much greater than just being able to charge a mobile phone. Kerosene, an unclean and unhealthy source of light can be substituted so life activities do not have to cease just because it is dark outside.



Electricity can also contribute to improving existing businesses or spurring new ones. Simply

having light in a shop at night will attract more customers and new services will be made available to people (Wimmer, 2012). This phenomenon was already registered in nearby villages that became electrified. Mtii in 2009 saw the growth of a carpentry, a PC school (both promoted by the Church) as well as new electric milling machines (note that the old diesel engines were not substituted by new electric ones, however), barber shops have increased speed and prices they charge, photocopying services.

People will find ways to make productive use of the new source of energy, diversify their businesses and increase their sources of income. However, the case study done by ONGAWA in February 2013 shows that in general the villagers have limited knowledge of the potential uses of electricity.

In Mtii, still less than 10% of the households connected to the main grid because the connection fee was too high. This shows that it is imperative that the MHP partnership supports families that want to connect to the grid. It is not enough to just bring the grid to the villages. Therefore, the relationship the partnership will play together with facilitating their connection through environmental services. At the moment the natural resources in the Same-district are poorly managed, which one can see through erosion, droughts, water shortages etc. What the MHP and the partnership is attempting to do is to create cross-links between the partnership, the community and the environment, in order to improve the livelihoods of all parties involved. By working together and connecting the three one could create awareness, cohesion and a sense of importance in regards to the environment and the protection of it. An example of how this can be done is through an environmental service. The service would be executed by the locals, and would mainly be to take care of the natural resources. Their services would be “paid” by the partnership through the assistance of connecting them to the grid. It would be beneficial for all parties involved. The environment would be better taken care of, which again would benefit the hydro power plant through possible increased production capacity. The improved environment would also benefit the local communities by increased access to raw materials and resources. The community would also be connected to the grid, which could enable growth and the prospering of small businesses.

When it comes to the partnership itself it is also imperative to capacity build the individual partners. Simple issues such as attitudes towards the different members have to be foreseen and addressed before this impedes on good collaboration. “Although attitudes are changing, there is still an atmosphere of mistrust between the public and private sector (Stott, Weir, Lema, & Shaba, 2011).”The specific risks related to partnership failure will be further discussed under “The Partnership” section.

## Technological Risks

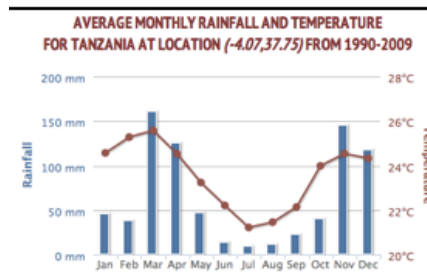
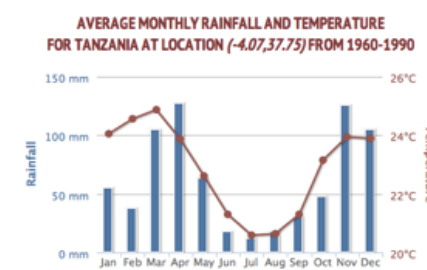
Several technological risks have to be evaluated before the start of this project, including construction risk, development and completion risk. All three are out of scope of this paper, yet ONGAWA should be aware of these and make sure they have the right expertise and knowledge of how to manage them should they arise. Technological risks also include operational risks which link to supply risks, as failure of the plant will stop production, therefore limit supply and thus revenue.

## Environmental Risks

The Yongoma River Basin is increasingly being used for agricultural uses as well as for powering the LM Investment factory mill. The region has two rain seasons, one having short unpredictable rainfall and the other more predictable and longer rainfalls. The first is usually from October-December, while the second is from March-May. The lower parts of the Same district are usually dry with a rainfall of 300-800 mm a year. The lower areas of the region usually has less rainfall than the higher. The graph below illustrates the rainfall measured in Same town meteorological station, from 1960-1996. There have been great fluctuations over the years, from less than 300 mm in 1993 to a high of 1100 mm in 1978 (Fronteras, 2006).



The graph to the right illustrates the average rainfall and temperature, based on the location seen in the map below the graphs. The data collections are different in the way they illustrate the climate in the Same area. The first paints a picture of the yearly development, while the second only



provides an average for the period 1990-2009. Despite of this, it does provide an idea of how the climate and specifically the rainfall has evolved over the last 50 years (The World Bank Group, 2013).

Draughts have been recorded, and there are occasions where there is not enough water in the river (Makoye, All Africa, 2013). Together with the fact that villagers are diverting channels from the Yongoma to water their fields, and LM Investment needs a constant water flow for their mill to function. The hydropower plant does not affect the functioning of LM's mill as the water will reach them after it has passed through the plant's turbine.

The weather and climate may perhaps represent one of the greatest risks for the project, because of its unpredictable nature. Force majeure risks are the kind of natural events one cannot predict but planning is key in order to mitigate the impact once they do hit. The most challenging will be the period from June to August, where there is a three month period that has had an average of less than 40 mm rainfall, over the last twenty years. This will have an effect on the production capacity and the profit gained from the hydro power plant. On the positive side, the average rainfall has increased from the 1960-1990 period to the 1990-2009 period. The average rainfall went from 743.48 mm to 777.11 mm. Although these numbers are not great in difference, it is moving in a positive direction.

Generally, if water are poorly managed, the project will face operational risks and therefore supply risk.

## Legal Risks

### PPP Act and Policy

The national PPP Act by the Government of the United Republic of Tanzania through its Ministry of Finance became effective in June 2010. Its aim is to “provide an overarching public private partnership policy framework” by having “the provision of institutional frameworks for the implementation of public private agreements between public and private sector entities; and the establishment of rules, guidelines and procedures governing public-private procurement, development and implementation of public private partnerships. The Act stipulates that partnerships can be developed between the private sector, individuals, public institutions or non-state actors and outlines specific roles and functions for each sector.” (Stott, Weir, Lema, & Shaba, 2011) As of now, partnerships do not have to pay taxes in Tanzania.

Therefore, the Act is not a risk at the moment, but actually ly an opportunity for this project. The only risk involved here is if the law is changed and eventually partnerships are required to pay tax.

| Risk          |                                 | Strategy  |
|---------------|---------------------------------|---|
| Political     | Corruption                      | Focus on transparency from beginning, anti-bribery standards, support local anti-corruption NGOs, issues should be dealt with immediately as a group. |
|               | “Slowness” of the public sector | Cultural awareness, standards in regards to follow ups  |
| Economic      | Inflation                       | Partnership savings account, renegotiation with EWURA about the feed in tariff  |
|               | Currency Exchange               | Reinvest profits or place the capital in banks in Tanzania  |
|               | Credit Risk                     | Clear contracts and procedures in case of defaults, especially in regards to TANESCO  |
|               | Lack of funding                 | Wide variety of funding sources   |
| Social        | Lack of awareness               | Awareness raising, capacity building, inclusion of people   |
| Environmental | Drought                         | Good natural resource management, partnership savings, renegotiate tariffs with EWURA   |
| Technical     | Operational                     | ?   |



## Stakeholders

Definition Stakeholders: “Stakeholders are those individuals, group of individuals or organisations that affect and/or could be affected by an organisation’s activities, products or services and associated performance” (Accountability, 2008)



Stakeholder identification: The owner of the engagement has the responsibility to identify stakeholders relevant to the purpose and scope of engagement. The owner has to set up a methodology of identifying stakeholders. Below a stakeholder map has been incorporated in order to clarify who is involved and what their prospective roles are.



## Investors

Under the investor category a few groups can be identified: Private investment (monetary and non-monetary), impact investment and micro investments.

### Local private investments

It is desired that the next step of the development of this project finds local businesses interested in investing in the power plant. Currently only LM Investment has been identified as a partner, yet at this stage it is not clear whether there will be a financial contribution from their part or whether they will just be a partner within the partnership, as the hydropower plant will be using their water right. In the Tool scenarios were forecasted with an investment of \$5000 coming from local private investments. At this point it does not seem probable for LM to be investing in the hydropower plant, therefore the case of LM Investment will be discussed further below.

In order to discover further private investment opportunities with the possibilities to contribute financially, ONGAWA could, for example reach out to UNIDO in Tanzania. In the direct vicinity there seem to be no other private enterprises except for LM Investment, yet it seems plausible that there are more within the district or in the wider region. It would be a great success if the project would manage to spur local private investments, as this would close the circle, by ensuring that Tanzanians help Tanzanians and the money and interest earned remains in Tanzania.


In the tool the local private company has been kept anonymous, as there has not been possible to obtain contact with any. They have however been included with an investment amount of \$5000 in the realistic scenario. This number is based on recommendations from ONGAWA as well as reading through their field studies.

### Impact Funds

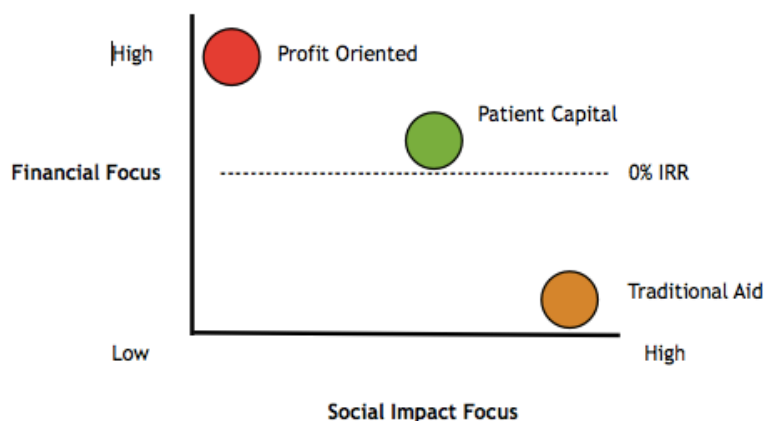
Impact investment is investment made with the intention of having a positive social and environmental impact, at the same time as getting a financial return. The financial return is usually below or up to the market norm. The investors operate in an area between traditional philanthropy and pure profit orientation, and so are contributing to a more sustainable and equal opportunity oriented development. The impact investment industry is based on several different fund sources, such as private equity funds, clients of leading private banks and pensions funds as well as private foundations and NGOs (Global Impact Investing Network (GIIN), 2013). Below several

impact funds are discussed. Acumen is described in more detail in order to showcase the working of an impact fund, yet all four are equally valuable to this project.

**Acumen:** is a non-profit organisation founded by Jacqueline Novogratz, and currently present in

 several locations in North and South-America, Asia and Africa. Their model is based on receiving charitable donations, which they again invest in early-stage companies providing services within areas such as education, clean energy, health services and safe drinking water, all within low income communities (Acumen, 2013). The entrepreneurs

are not passive recipients of donations or charity, but individual customers with a passion for change. This investment or loan is again done in a way that Acumen calls “Patient Capital”, referring to the fact that they are not looking for fast cash revenue. With this model in mind their founder explains that the essence lies in having long term vision and understanding the high risks involved, in order to let the entrepreneurs prosper and grow.



There are 8 initial investment requirements that Acumen set, which have to be met by the applying project, in order to be considered right. Looking at ONGAWA and their fit with Acumen it is apparent that the initial round of investment qualification is on track.

1. **Geography** - ONGAWA and the hydropower-plant are located in East-Africa, one of Acumen’s main areas of operation.
2. **Sector** - ONGAWA is operating within the energy sector, one of Acumen’s investment sectors.
3. **Investment size** - ONGAWA has a budget of \$960 000 which is within Acumen’s ideal investment size of \$0.25-3 million.
4. **Stage** - Acumen wishes to invest in companies that are in the early-mid stage of scaling
5. **Potential for Significant Social Impact** - they wish to invest in products or services that address a need, which are economically better, creates social change and is not at the moment accessible on the market. ONGAWA is, with the hydropower-plant addressing several issues in the area, such as access to electricity, deforestation and poverty.
6. **Potential for Financial Stability** - Acumen requires a clear business and financial model, which illustrates the financial sustainability potential, within five to seven years. This should include the

coverage of operating expenses with the generated revenue from the project. For ONGAWA this is illustrated in the financial part of this document as well as being backed up by “the Tool”.

**7. Potential to Achieve Scale** - Acumen wishes to reach more and more beneficiaries and users over the lifespan of the investment. In the case of ONGAWA and the hydropower plant the payback period for the different investors would end at different stages as they would have different demands and requirements. However, as the different investors have been paid back, a greater share of the profit would go towards the villagers and further development in the local area.

**8. Strong Management Team** - Acumen requires that the organisation or individual applying has a strong, knowledgeable and skilled management team that has the drive and passion to follow the project through and make it a reality. The team also has to be driven by the thought of serving the low income community. This should not be an issue for ONGAWA, as they have experience within the field as well as the will and force to execute the project (Acumen, 2013).

What can potentially represent a challenge for ONGAWA in regards to landing the investment from Acumen is point seven about scaling up, depending on how many individuals Acumen wishes to affect. The upstream and downstream communities are represented by approximately 6000 people, who would benefit from the electricity in one way or another and/or being an investor in the power-plant, receiving profit shares. Whether this is a sufficient number of beneficiaries for Acumen is uncertain at this point in time. The project is, however, possible to replicate in other areas in Tanzania as well as Africa in general, but would inevitably have to be adapted to local needs and conditions.

**LGTVP:** was established in 2007 as a part of the LGT Group, a bank founded in Lichtenstein in 1920. The CEO of the LGT Group Prince Maximilian Nikolaus Maria of Liechtenstein wanted to



continue the princely family’s long tradition of philanthropic engagement. LGTVP operates on behalf of the princely family, as well as other clients. They focus on projects with a long term sustainable perspective. Like Acumen they value ideas that can be replicated and scaled up, in order to reach out to more people. The

shape of their philanthropic activity may be in the form of donations or investment, between \$200 000 and \$10 million.

LGTVP’s investment process starts with screening of potential projects. After an information gathering process, the project is considered in regards to five criteria: quality and experience of management, effectiveness of the solution, growth potential, efficiency of implementation and potential to create impact (LGT Venture Philanthropy , 2013). Once that has been done, there is a more extensive and critical analysis of amongst other things; the business model, finance and

experience, before the details surrounding the terms and condition of the investment/donation. As the project continues LGTVP want reports on progress, challenges and KPIs (Key Performance Indicators). They have a realistic view of change and development, and realise that it does take time. Their commitments are therefor usually over 5-7 years.



**GVEP International:** also called Global Village Energy Partnership, is an international non-profit organisation, working with low income communities, attempting to reduce poverty and increase access to energy. Their way to do so is to assist small local energy businesses grow and develop. They were established in 2002 and have since then established themselves in Africa as well as the Caribbean (GVEP International, 2013). Not only do they assist with technical support, they also provide access to capital. Although they are attempting to reduce the amount of grants, they do not see it as a problem with partial grants. For ONGAWA and the MHP a potential grant would purely be a contribution to the whole invested amount. GVEP has previously supported a micro hydro power plant in Rwanda and is therefore familiar with this approach to development.

The initial contact can be initiated on GVEP's webpage: where ones concept, business idea, impacts and financials has to filled in (GVEP International, 2013). The projects have to be in Sub-Saharan-Africa to be considered. They do not mention anything about minimum or maximum monetary requirements from the projects side, in regards to debt, equity or grants. Therefor by looking at previous projects, the possibility of being substantially supported is not impossible. The reason for one's proposal has to be backed up, by plans, models, impact assessment and financials, but this has to a great extent already been done from ONGAWA's side.

GVEP seems to be a very interesting partner, as they have recently also started a new project, together with AlphaMundi Group, a Swiss impact investment fund manager. It aims to make investments of €500 000 to 8 million in renewable energy companies and projects in East Africa. The proposition submitted has to be able to demonstrate significant and measurable social and environmental impacts, along with financial viability. The application form can be found under (GVEP International, 2013). They also have an office in Tanzania, in Mwnza.



**OPES Fund:** invest in social enterprises that tackle problems at the base of the pyramid and will yield both social and financial returns. Their vision is a world where everyone has access to health, water, sanitation and energy and the opportunity to fulfil their own potential. They invest in enterprises in several Eastern African countries, including Tanzania and within different sectors, including renewable energy, through equity and soft loans with flexible ranging from 50k - 400k Euro (Opesfund, 2013)..

Within the Excel Tool, Acumen has been used as a reference for the impact funds. They have a policy of investing between \$250 000 and \$3 million. Once again a conservative estimate has been used, and their investment amount is therefore set to \$250 000. Due to their philosophy of patient capital and long term project vision, the payback period is set to 12 years, while they will receive profit shares over 15 years. With this they will get an IRR of 3%.

### Crowd-investment / Micro-investment

A new and interesting path that should be explored for financing projects like the following is to involve individuals through encouraging them to invest and earn a return on their investment. Renewable energy is a good investment opportunity and more and more people are keen on seeing their money help out and make a profit on a worthwhile cause. In order to do so, organisations have to be identified that could first of all localise potential investors as well as represent the investors' needs in the partnership.

### Local organisation

**SACCO:** Another hopeful idea is to explore a sort of partnership with a local microfinance institution, such as the local SACCO branch, to talk about how they could help in channelling local micro investments from Tanzanians who wish to invest in the hydro power plant. This would be a new pursuit for the SACCO branch as well, as technically they are a lending institutions, however, they seem to be in a good middle position to take on this position. The Tanzanian middle-class, albeit small, does exist. It has been estimated to be around 12.1% of the total population (The East African). Regionally, a middle class is starting to rise in and around Arusha (so in close proximity to Same) based on banking, tourism and retail industries. It is hard at the moment to say much more about the Tanzanian middle class as a more in-depth local knowledge would be needed and there does not seem to be much research around this topic. This would be truly innovative when it comes to the funding mechanism and principle of renewable energy projects and redistribution of revenues. This project believes in this idea, and future talks should be held with SACCO to see what role they could play within this scheme. However, a word of caution should be expressed at this point regarding some of the aspects discovered while researching the Tanzanian middle class. First of all, the Employment and Earnings Survey of 2010-2011 issued by the National Bureau of Statistics in Tanzania reports that “the proportion of total income of middle class employees earning between TZS 150 000 and TZS 500 000 has decreased to 39.6% in 2011 from 48.0% in 2010.” (National Bureau of Statistics, Ministry of Finance , 2012). Even though this is just a number and it accounts for all of Tanzania it still shows that the purchase capacity of the middle class is decreasing, even though nationally perhaps the country is growing. Furthermore, as described by The African weekly a little less than a year ago “Both past

and existing political and economic policies in Tanzania undermine the existence and growth of the middle class.” (Ngahemera, 2012) “The overall mind set of Tanzania’s middle class is one of massive anxiety and fear” (Ibid) and it goes on describing how the intellectual middle class (University professors with PhDs) invest in bars and pubs which make for quick returns, rather than in agriculture, education or other more local, sustainable sources, into areas that “they teach and preach”. The article further goes into the sad truth that the socialist structures of the Ujamaa which used to rule the country are no longer present. Naturally, no project idea should stand or fall on an article published almost a year ago, and the people on the ground will have a better vision of how to best reach out to possible local micro investors, because this is still a path this project wants to pursue. It is, however, at this point in time, difficult to foresee how to reach out to possible local investors if not through the SACCO structure, how many would be interested and able to invest and what their monetary contribution could amount to.

### International organisations

Two two micro-investment funds have been discovered, both UK based. Another favourable option seems to be the ECOOO not-for-profit in Madrid. After an initial meeting they shared the excitement of this project and showed willingness to keep pursuing future collaboration in regards to micro investments from Spain.

Within the Excel Tool, the amount of local investors is set to be \$20 000 (in the realistic example scenario). This is based on the assumption that there will be 200 interested in investing and that their investment capacity will be \$100. These numbers are dynamic and can be altered in accordance with changes within the investors. The local micro investors’ investment amount has been calculated based on assumptions and on an average. It does not reflect the different investment amount between the investors. In the realistic scenario they will be paid back within 2 years, which is a requirement recommended by ONGAWA. They will however receive profit shares over 4 years and end up with an IRR of 35%.



**ECOOO:** is a possible partner when it comes to organising the micro investments from international individuals. It is a not-for-profit business focused on promoting sovereign energy production through renewable energy.

One of their services includes the possibility for individuals to invest in a solar plant project in Spain and earn a profit on their investment, and so help in the transition to a clean energy future. An interesting meeting was held with them in July just before this paper was submitted. They were able to clarify how their business model worked, but most importantly, they seemed very interested in partnering with ONGAWA regarding the project in Same and be the channeling body for micro investments from Spain. Closer-to-reality numbers regarding possible investors as well

as how much each individual would be willing to invest were supplied by ECOOO which is a great advancement when it comes to using the tool and prediciting several scenarios. The numbers discussed between ONGAWA and ECOOO can be seen in the chapter regarding the Excel Tool, however, at this point, the most important break through is that they seem keen on entering into this project. More meeting should be scheduled in the future to further work on the business plan and proceed in this matter.

Through meetings with ECOOO in Madrid, following numbers were suggested. Investment amount \$70000(pessimistic), with a payback period of 12 years and profit share receiving over 15 years, leaving them with an IRR of 3% after taxation.



**Microgenius:** is a community shares platform, where projects get a national platform to showcase their renewable energy projects and sell shares. It is quite recent entrepreneurial idea, set up in 2001, and so far only has three renewable energy projects, all in the UK. Their aim is to offer quick, easy and secure way of finding and selling community shares. As it is a UK initiative, only people with a UK bank account can buy the shares. At the time of research their initiative was still very new and no contact could be established and so at the point of writing this it was still unclear whether they would be willing to open up to a project located in Tanzania, however, it seems worthwhile pursue this path and enquire further with them (Microgenius, 2013).

**TrillionFund:** empowers individuals to invest directly in clean energy infrastructure. They understand that individuals, when grouped together are more influential and that a community, when pooling together their money can access larger financial opportunities that otherwise would have been impossible. They only facilitate investment in renewable energy, because they want to help fund a sustainable future, where renewable energy is cheap, carbon levels are low and bills hopefully cheaper. Although UK based, it would be interesting to enter into conversation with them and hopefully they would potentially be supportive to the idea of sharing this initiative with their network (Trillionfund, 2013).

**THE COMMUNITY  
IS A NEW FORCE  
IN FINANCE**

In order to run the Excel Tool, an estimate had to be set for micro investments. Except for the recent meeting with ECOOO, there has not been any direct contact with any of these investors, and so a relatively low number was set. None of the impact funds or other investors have published any previous investment amounts or requirements. Therefore, the amount is set to \$75 000 in the Tool, a very conservative number.

## Donors

### Businesses

Businesses could contribute to the equation in a more traditional philanthropic way, through donations and or as a part of their CSR program. They could also contribute with knowledge transfer and capacity building. Money is not the only asset they can bring to the table, which might be a benefit for all parties involved. If done correctly, businesses could build long lasting partnerships with the other investors and learn from each other. In many cases, businesses bring the hard cash and are therefore seen as the party with the greatest decision making power, which can ruin the essence of partnerships. A partnership should be what the word entails; two or more individuals or groups working together as equals towards a common goal. By providing knowledge and skills it can be easier to maintain a power balance. The businesses further outlined below could be potential future partners. A long term partnership could be entered between the private company and ONGAWA, a process not new to this NGO, which is actually one of the reference NGOs in Spain when it comes to these kind of partnerships. Therefore, this project will only identify one new “Northern” businesses to showcase an example.

Depending on what the businesses would want to contribute with, it could potentially be challenging to assign it a monetary value. This again would complicate the process of incorporating it in to “The Tool”. An estimation would have to be made, yet this poses no greater difficulties as the tool is dynamic, and so different scenarios can easily be analysed.



*Statkraft*: is the biggest producer of renewable energy in Europe, and within this sector one of their specialties is hydropower. They are active within sponsorship and are particularly interested in the areas of sport, culture, environment and humanitarian development. They value competence, responsibility, innovation and are interested in partnerships locally, regionally as well as globally, as long as they create value and are in line with their core values. They focus on the fact that the partnership has to benefit all parties, which is a great base for ONGAWA and the other potential investors. Another aspect, which Statkraft highlights, is the wish to participate in projects that can engage their employees (Statkraft, 2013). This means they could potentially contribute with skills and knowledge transfer. As mentioned earlier, knowledge transfer could bring challenges in regards to quantifying the monetary value of their contribution.



*Agua Imara*: is a renewable energy company which was established by Statkraft Norfund Power Invest AS (SN Power) in 2009. SN Power is 60% owned by Statkraft and 40% owned by Norfund, a leading development financial institution in Norway. While SN Power has its main areas of operation in Asia and Latin America, Agua Imara has a goal of becoming a leading hydropower company in emerging markets in Africa and Central America. In the process of expanding and building a name in the regions, participation in a positive community project could be a step towards achieving the presence they are striving for.

For the partnership, Agua Imara could contribute with knowledge and skills within the field of hydro-power, as well as having experience within development, through Norfund. Agua Imara has experience when it comes to the sale of carbon credits through CDM. As this is a possibility explored for the hydro power plant in Same, a possible partnership could take advantage of their expertise in this arena (Agua Imara, 2013).

## Crowdfunding

Crowdfunding is a way of financing big and small projects, which has become increasingly popular over the last ten years. The first crowdfunding activities can be traced back to the 1700 in Ireland. It was however not until internet came along that the funding model generated big capital. Within only three years the capital tripled. From 2009 to 2011 the revenue went from \$530 million to \$1.5 billion (Fundable, 2013).

It is a collective effort, usually done online, to collect money for, either individuals or organisations, who have a dream and a vision. Different crowdfunding pages have different focuses, requirements and terms of use, but their common denominator is their urge to make dreams become reality. Most of the pages are built in a way where a person or organisation sets up the project online, telling their story and setting a monetary goal needed for the project to become reality. Some of the pages require an “award” to the individuals donating the money, which is related to the project. Marketing is usually done by the project creator in order to create buzz around the cause, however, there are some crowdfunding websites that assist with this. Donators can, with some restrictions, donate as little or as much as they want, over a period of time, set by the creator. As these pages are purely donations, the required return equals zero. In this case this is an interesting opportunity, as this means more would go to the villagers and the local communities.

Crowdfunding is about appealing to the masses. It engages their passions and forms a community of people connected to one common cause. One should be open, clear and creative in one’s communication. To engage a big community a good and creative story (project description) is

crucial. A video can be great tool to capture someone's attention, as it becomes more real and personal. Once the story is communicated it is essential to continue the communication with the community. Some pages are better at facilitating this, through for example smartphone applications, website widgets and social media. Furthermore, most projects funded through crowdfunding get donors excited because they receive a certain "thank you gift", depending on the size of their donations. Usually, when the project appealing for funding is based on producing a product, the first few hundred donors will receive a copy of the product, depending on the size of their donations. As this project is not about asking for funding to start producing a product, but about helping provide a service, this is perhaps a little harder to sell, but definitely not impossible. Therefore an idea emerged, where donors will receive a photo of a plaque with their name and /or message of their choosing on it which will be hung in the micro hydro power plant, showcasing what can be achieved when individuals with a great passion get together. This could



be a possibility for the big donations, whereas smaller donations could be encouraged with a gift from local artists producing crafts.

*Indiegogo:* is a global crowdfunding platform that also provides great exposure for projects. the platform is open to any kind of project and joining and publishing projects is free of charge. They have two different pricing and fee models; one flexible and one fixed funding. Since ONGAWA is not registered in the United States this project can only look at crowd-funding from the flexible method. For both flexible and fixed terms a goal of how much money has to be funded has to be set. Once the goal has been reached Indiegogo receives a 4% commission, for either of the funding options. With the flexible method, if the goal is not reached, Indiegogo will charge 9%, letting the organisation or individual keep whatever money is raised. For the fixed, 0% is charged if goal is not reached and the funders will be refunded. With the flexible option they also charges 3% credit card processing fee as well as a \$25 wire-fee for non US campaigns. Currency exchange fees are also added. The negative aspect with Indiegogo is their different additional charges. On the other hand it is easy to start, and does not require to be an NGO registered in the United States, like many other pages (Indiegogo, 2013)

*Razoo:* A global platform and easy to use. They have a flat rate of 4.9% commission, which is one of the lowest among crowdfunding platforms. This means more money goes to the projects. Razoo is great in terms of social media and connecting with the community. Unfortunately, to be able to use Razoo for funding one has to be a 501(c)(3) non-profits. A 501(c)(3) is an American tax exempt non-profit organisation (Cornell University Law School, 2013). As ONGAWA is a Spanish NGO, they will not be eligible to propose their project as an official NGO.

*Kickstarter:* Kickstarter is currently one of the biggest crowdfunding platforms. Even though it is doing a great job, it will not be possible to use it in this project as it is only available for US and UK creators.

Razoo and Kickstarter have been mentioned because, even though they cannot be used for the current project, they are the most well known crowdfunding platforms currently existing and therefore it was felt that there should be a clarification as to why they cannot be approached in this case.



*KissKissBankBank:* is a French crowd funding page, which is available internationally to anyone over 18 years of age, with projects meeting certain criteria. The projects must have a specific purpose, which in ONGAWA's case would be the hydropower-plant. When creating the project, a monetary goal has to be set by the creator as well as a timeframe, which can be a maximum of 90 days. It does not cost anything to launch a project on KissKissBankBank. The donations will continue for the time frame set, even if the goal set is being surpassed. They do however charge 5% commission fee and 3% banking fee, if the goal set by the project creator is reached. If the goal is not reached, the money is reimbursed to the donator.

As it is a French page, the project can be written in French and or English. It is, however, more likely to reach more donations if it is written in both. The KissKissBankBank team will have to approve projects before they are being published and ready to be supported. This may take some time, but is also increasing the credibility of the page and the projects they promote. Once uploaded to their page, the projects can be connected with Facebook and Twitter, in order to make live, massive social media marketing fast and efficient (KissKissBankBank, 2013).



*Goteo:* is a Spanish crowdfunding platform managed by the non profit organisation Fundación Fuentes Abiertas (Open Source Foundation). This network opens possibilities in regards to making the project visible to a wider community, they give advise on how to improve communication with the community and they provide access to certain social media tools. When creating the project online, prior to publishing, one is required to fill in description of the project, its aims, time frame, expected returns as well as minimum and optimum sum of money required. This differentiates Goteo from some of the other crowdfunding platforms, as most only set one goal. Once the application is registered it will be reviewed by the Goteo team, and compared with other projects that have applied. The charges for using Goteo are 8% commission of total capital collected and between

0.8 and 1.4% transaction fee from the bank. If using PayPal, they will charge 3%. In the case of not reaching one's minimum goal, there are no charges for the project promoter (Goteo, 2013).

For ONGAWA, Goteo would only be a small potential input in the overall investment. As it is a no-return required money donations, more of the profit generated from the hydro power plant would go to the villagers as well as other investors. Based on other projects promoted on Goteo, a realistic goal to set for ONGAWA would be between is between €5000 and €10 000 (Goteo, 2013).

*Trustpency*: is a Spanish crowdfunding platform that highlights the storytelling of the social impact of the programs supported. What this mean is that the projects will keep their funders updated on the progress of the project and let them see how their contributions are making progress possible. By doing this Trustpency is creating more long term relationships, increases the transparency of the use of the money and goes beyond pure donations. Trustpency has to be contacted in regards to setting up a project. Once approved, a financial analysis has to be submitted in order to estimate how much funding is required. Following the financial submission the process of e-funding and communication with funders can begin. They help projects reach their goal by sharing the project with social media, apps etc.

The process may be more complicated and time consuming than other platforms, but the rewards can potentially be higher in the rewards of the connections created. The process of reporting back to funders, may also create pride in the project and strive for progress (Trustpency, 2013). Just like the other crowdfunding websites, Trustpency if free of charge, yet does charge a small commission of the total funds acquired through their site.

One of the main recommendations for using crowdfunding platforms would be to set reasonable goals. ONGAWA wants to reach an overall budget of \$960 000. Although an American NGO was able to raise \$16 million in one day, this is not the norm and should not be ONGAWA's goal either (Thorpe, 2013). ONGAWA is looking for an alternative partnership model, and the crowdfunding would therefore only be a small portion of the overall funds. It would be possible to be present on several platforms simultaneously, a realistic estimation of the combined funds would therefore be, depending on the amount of crowd funding platform utilized, between \$10 000 and \$20 000. For the purpose of demonstration \$ 15 000 was the number used for crowdfunding in the Excel Tool. This is a conservative number based on what previous projects have been able to achieve. As there are no returns required there are no payback period or requirements mentioned in the tool. Donations can be increased with good use of the platforms. It would be recommended that this would be pleaded for over a 90 day period, on the platforms that has this option. This is the

longest period possible, which is not always positive, as it is often in time of urgency that people donate the most. However, it is believed that if a close communication is kept with the community, throughout the process, the time frame would be an opportunity.

## Beneficiaries

**Vumba, Lugulu and Kanza Villagers:** Approximately a population of 7000, the three villages are located in Same district, Tanzania. Off-grid, with limited access to water and sanitation as well as poor access to economic and other basic services. Their proximity to a natural protected area further limits their access to the forest to collect firewood for energy production. Therefore, the villagers of Vumba, Lugulu and Kanza will have to play a role in this partnership even though there will not be any monetary contribution coming from them. If this project is about looking at partnerships in a different light and seeing the “end user” as something more than just “customers” then having a clear stakeholder engagement plan is more than crucial.

The purpose of the MHP is to give as much as possible back to the local community. They are not required to invest, but will be receiving profit shares to be reinvested in sustainable development. Once the investors and the partnership savings has been satisfied, the remaining profits will go towards the villages and further development.

**Tanzanian government:** can be represented by the Same District. No funding will come from them; however, they are responsible for giving ONGAWA the license to operate by approving construction.

**The environment:** A stakeholder that is often forgotten, but important nonetheless. Furthermore, in this case, it is a stakeholder that will benefit from this project. If done properly, water, forest and land management will improve, through the environmental services offered by the villagers. Agriculture yields and post-harvesting results can be improved as less food will go to waste if proper cooling facilities can be powered. Carbon will be offset through this project, which is a step in the right direction when it comes to transferring to low carbon economies. The environment is a voiceless stakeholder, but in this case would be represented by the organisation paying the villagers for their environmental services.

**TANESCO:** By entering a business agreement with the main electricity provider, TANESCO will be a customer of the MHP.

**ONGAWA:** is one of the main stakeholders, as it is the project initiator and leader. Their relationship to the partnership is described further below in the partnership model. When it comes to organising the funding of the project ONGAWA will also be the main player.

## Influenced

### EWURA

“The Energy Water Utility Regulatory Authority is responsible for technical and economic regulation of the electricity, petroleum, natural gas and water sector in Tanzania. They do, amongst other things, licensing, tariff review, and performance and standards monitoring in regards to quality safety health and environment (EWURA, 2013).” EWURA will receive 1% of total revenue from the hydropower plant. Within the partnership section one of the suggestion is to include them in the senior advisory board of the partnership.

### Pangani River Basin Authority

“Their mission is to ensure that water resources are managed sustainably through water governance and integrated water resource management principles” (Pangani River Water Board, 2013). As will be discussed further on in the partnership chapter there is the possibility of including the Pangani River Basin Authority within the core of the partnership structure or keep them on the advisory board. Regardless of which direction is subsequently chosen by ONGAWA, the authority will be positively influenced by the creation of this partnership as their main work is related to the management of the river, the activities taking place there, as well as promoting proper resource management within the area.

### LM Investment

LM Investment factory is using water from the Yongoma river to turn its turbines for the production of fiber from the sisal plant. It is a 100% Tanzanian enterprise with headquarters in Tanga. Their production site is at Ndungu, not far from the three villages, which are being electrified through this project. Their main challenge is that during the dry season (from September to



November) the water flow is reduced considerably or even becomes unavailable. Apart from that their equipment is quite old and they miss labourers in October, November, June and July when people are tending to their farms instead. Moreover, the factory is having financial constraints; the directory has denied the purchase of a tractor due to missing financials. Therefore, it is very unlikely that LM Investment will be able to contribute financially to the MHP project. They will, however, be a part of the partnership because the MHP will rely on their water right, and because the two projects will be sharing the water from the river. In order to assure that both enterprises can keep working smoothly a collaboration has to be entered so that “no competition” for water arises.

More than just identifying stakeholders it is important to set up a strategy when it comes to stakeholder engagement and how this will contribute positively to the partnership model described further below. Stakeholder engagement is defined as “the **process** used by an organisation to engage relevant stakeholders **for a purpose** to achieve accepted outcomes” (Accountability, 2011). Engagement is about having the capacity to listen, comprehend and satisfy the legitimate expectations of different stakeholders that contribute to its development. (Instituto Ethos, Brazil) Stakeholder engagement should not be undervalued when it comes to the success of any given project. Having a strategy based on a sound understanding of material issues and stakeholder issues as well as concerns will help the partnership establish measurable goals. By disclosing the information above to the relevant stakeholders they will be able to base their actions on reliable information, helping the overall project succeed.

## The Partnership

The Tanzanian Government approved the Five Year Development Plan for 2011/2016, consisting of “fast-tracking broad-based and pro-poor growth with particular emphasis on collaboration between public, private and non-state actors, the scaling up of the private sector contribution to economic growth and social development, and the promotion of strengthened leadership and governance systems” (Stott, *The Partnering with Governments Navigator*, 2010). The importance that partnerships will have to play in order to achieve the Development Vision 2025 is well understood by this Five Year Plan. Thus the PPP Policy Act was approved in 2010 outlining the overarching partnership framework. The Act includes: “The provision of institutional frameworks for the implementation of public private agreements between public and private sector entities; and the establishment of rules, guidelines and procedures governing public-private procurement, development and implementation of public private partnerships. The Act stipulates that



partnerships can be developed between the private sector, individuals, public institutions or non-state actors and outlines specific roles and functions for each sector.” (Tanzania Government, 2011)

However, there have been some well known PPP failures in Tanzania and caution should prevail, as the word “partnership” might still leave a bad taste in people’s mouths. The Graft Taints Power Purchasing Agreement of 1995 between TANESCO and Independent Power Tanzania Limited (a joint venture between a Malaysian company and local investor) caused big economical strains on the local economy of Tanzania. The outcome was a rise in electricity prices, minimal improvements and upon further investigation it became clear that no proper feasibility study or consultation with necessary stakeholders had been performed (Stott, Weir, Lema, & Shaba, 2011).

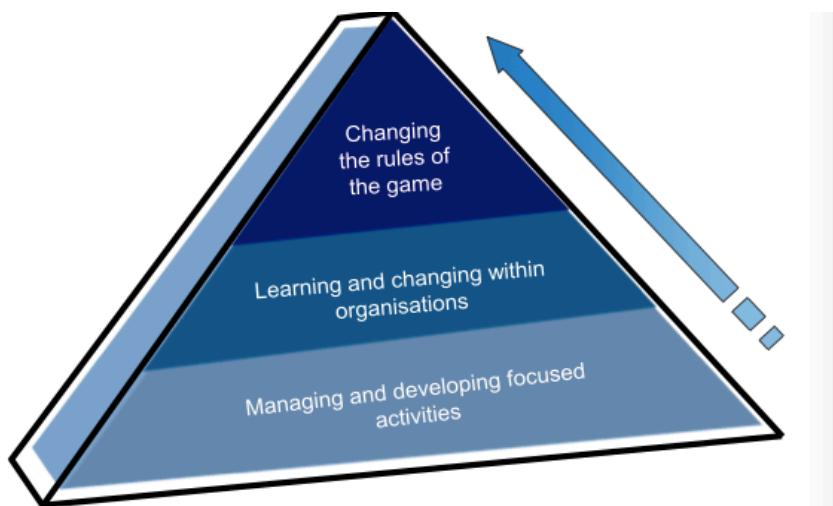
A Public-Private Partnership (PPP) is a “contractual relationship between the public and private sector, where the private sector would provide an upfront investment in return for fees for the provision for the goods or services (Bracey & Moldovan , 2006). The partnership outlined below, however, would rather take on the shape of a cross-sector partnership, as there are many more actors involved than just public and private partners. “Cross-sector partnerships involve organisations from government, businesses and civil society working together in areas of mutual interest to achieve common - or at least complementary goals. These relationships tend to be informal and ad hoc and rely on wider stakeholder involvement than PPPs. In addition, because they do not result in a business profiting directly by providing public goods, they are not heavily regulated or subject to lengthy tendering procedures.” (Stott, The Partnering with Governments Navigator , 2010) The following chapter outlining the partnership model is not written as a step by step guide, but rather as a set of ideas and recommendations to have in mind.

The aim is to build a partnership involving all the relevant parties that could contribute to the long term sustainable operation and management of the power plant and the redistribution of the income generated by selling the electricity to the national grid. Investors will have to be paid as well as the upstream communities for their environmental services provided. The river, as well as other natural resources will have to be cared for and protected, as people’s livelihoods depend on it and to ensure proper management by all activities using the water from the river. Therefore, the business model of this project is based on the idea that environmental services are tied to the partnership. The example of having villagers dedicate time and effort towards this while the partnership facilitate their grid connection has already been stated as one possible use of the revenue.



A partnership is not a voluntary commitment but rather is formed because partners need each other in order to achieve their goal. Forming a partnership is not an end in itself, but is a means of reaching something greater. The most important lesson is that “partnerships are not meant to be permanent but a transitional mechanism until practices become institutionalised or transaction-based.”

(Building Partnerships for Development) The triangle by Simon Zadek shows how partnerships could aim for being a change agent and strive for changing the rules of the game in order to contribute to the sustainable



Simon Zadek, AccountAbility

development of our world. At this stage of the project this definitely has air of grandeur to it and perhaps almost sounds presumptuous, yet the end aim of all the efforts is not the partnership in itself.

It is crucial that transparency, accountability as well as participation are well understood by all partners and performed seriously. Good and serious behaviour leads to trustful relationships, which again strengthen the relationship among partners in order to deliver measurable results and hopefully to future collaboration opportunities (Tennyson , Harrison , & Wisheart , 2008). If this is not the case then the misuse of funds is hard to avoid.

When it comes to looking at the partnership model, there are several important aspects that have to be considered before the set up. The main ones will be covered below, highlighting their importance and explaining the reasoning behind certain decisions suggested or aspects to consider before making a final decision.

## Partners

*“Partnerships are rarely simple and often involve an understated competition between partners.”*

It is crucial that the right organisations as well as their individual representatives are well grounded choices and each is capable of performing its role effectively. At this point a comment

about government participation should be made, as there are two sides to this issue. On the one hand, involving the government in the partnership through their village representatives could promote close collaboration with the official representation of the country. There are different levels of government participation. If local government representatives are present in the villages, they might be a good partner as they know the local context as well as have direct contact with the “beneficiaries”. On the other hand, this is also a great opportunity to promote engagement and empowerment of the villagers and give them a chance to represent themselves. In any case, the best possible outcome for the villagers is what should be aimed for, and revenue earned is for village development. ONGAWA should therefore aim to have a good evaluation of possible local representatives before deciding whether they want to promote low-level governmental representation for the villagers or the people themselves.

Certain main partners have been identified as indispensable when it comes to the structure of the partnership. These are: ONGAWA, a representative from each of the 4 villages, (Ndungu, another downstream village, will also have to be part of the environmental services provision), LM-investment, a representative for the Tanzanian micro investors, as well as a representative for the international micro investors.

The question arises whether to have partners within the partnership structure that do not contribute financially or receive a share of the revenue earned. Overall, the partnership could take on two forms, yet at this point it cannot be decided upon which option is preferred and should be pursued. Thus, both are outlined below, and it will be up to ONGAWA’s team and the subsequent partnership to take the final decision. The Pangani River Basin Authority is an organisation that could contribute with valuable knowledge regarding legal, environmental and natural resource management, yet they are neither investors nor receivers of funds, and regarding the issue

There might be a need to support the villagers and empower them in this new role. At times, there might also be a need for a broker role when it comes to negotiations and problema solving.

If ONGAWA does not feel confident in taking on this role or would prefer to have a more active voice in the partnership itself, then it could consider partnering with a local NGO that has experience in this area or capacity-build one to perform this role.

of costs (not just monetary, but also time and decision-making wise) this could lead to unnecessary complexity. The two scenarios therefore are where on the one hand, the “core” of the cross-sector partnership only includes organisations receiving revenue from the MHP and other, valuable organisations such as the Pangani River Basin Authority, the Energy and Water Utility Regulatory Authority (EWURA) and the Rural Energy Agency (REA) could perform the role of a senior advisory board. EWURA due to the fact that they are the regulatory authority and so can also contribute

with valuable knowledge from their expertise. The same applies for REA, as they are a body under the Ministry of Energy and want to facilitate rural electrification in mainland Tanzania. The other scenario includes the River Basin Authority in the core, leading to a more “holistic” structure of the partnership. Both options have their pros and cons, and ultimately the structure should be decided upon by the partnership itself.

It is undeniable that all seven groups have valuable knowledge and assets to contribute with and should have a voice in the partnership. However, there can be an issue of power imbalance between different actors. It is challenging to build a partnership across a wide diversity, ranging from financial power, status/authority, influence and cultural diversity, (Tennyson , Harrison , & Wisheart , 2008) thus it is up to ONGAWA to ensure this is addressed before it becomes a problem.

The Tanzanian individuals should have a voice in the partnership as they have invested money into the project and have an interest in the partnership progress and in the project. The villagers’ participation is very important, as their local knowledge has to be drawn upon, as well as ensure that through their participation they are empowered and will have a say in their future. International investors and impact funds contribute with a very valuable asset, namely the funding that enable this project to materialise. However, the hope is to showcase that participation can be on a “deeper” level than just monetary. Even though impact funds are based on a theory that investment should be sustainable and help those most in need, it is unlikely that they will want a deeper role within the partnership. Regarding the international micro investors, it became clear after the meeting with ECOOO that their investors are keen on having a “voice and vote” (voz y voto) within the partnership. This then leads to the excellent opportunity to engage them in an “Education for Development” program (“Educación para el Desarrollo”, or “EpD”), a very worthwhile initiative performed regularly by ONGAWA. The reasoning behind an EpD is that unless policies and attitudes of “the North” change, then any development project will only have a limited impact. EpDs take place at university level, as well as within companies and other partners engaged with ONGAWA in order to knowledge build the citizens of the developed world and raise awareness to the problems existing in developing countries. Nurturing a conscious global society that does not sit back and just accepts poverty and

injustice as a given is a common thread running through all the work ONGAWA does.

Ultimately, it is about building a society that understands the underlying causes of the current reality and is ready to fight for a better future for everyone on this planet.

## Needs, Wants, Resources, Motivation

*“Partners may not have same beliefs or vision but they must have a common definition of the project”*

In order for the partnership to function, the essential needs, wishes, resources as well as motivations of each partner have to be outlined and be open to everyone. Furthermore, the risks for all the partners have to be less than what they get will potentially “earn” from the partnership. If their central motivation for being in the partnership is not met than the whole thing will most likely cease to function properly.

Using this chart in blank form and discussing it as well as filling it out during the first meetings would encourage transparency from the beginning as well as clarify and address everybody’s issues in an open manner right from the start. As a model, the chart below has been filled out according to best knowledge, however, we strongly recommend doing this as a “partnership activity” is a valuable idea.

| Who?   | Needs                             | Wants  | Resources  | Motivation   |
|--|-----------------------------------|--|--|--|
| ONGAWA   | Partnership to work               | All of the below to become a reality   | Knowledge<br><br>Financial resources mobilization                            | Provide electricity & development;<br><br>better resource management;<br>explore innovative strategies for development cooperation |
| Villagers  | Electricity & payment             | Economic & community development<br><br>Being heard  | Local knowledge  | Possibility of achieving access to electricity & development   |
| TNZ ind. investors                                   | Partnership to work               | Return on investment to be a success   | Local middle-class connection  | See their country and people thrive  |
| LM-Investment  | Voice within partnership          | Return on investmet (if managed to receive any)<br><br>Good management of all enterprises on the river basin | Knowledge from private sector activities, as well as river working knowledge | Sharing of common responsibilities and future job insurance  |
| International Micro investors (based on ECOOO model) | Return on investment              | “Voice and vote” within partnership dealings   | Investment   | Interested in development and innovative investment projects   |
| ((Possible))<br><br>PRBA                             | Help with management of the river | Close cooperation with companies, organisations and individuals affecting the river                          | Bring legal regulatory knowledge about resources, management etc             | Better resource management   |

## Communication & Meetings

It is suggested that meetings are held on a regular basis, preferably 4-5 times a year. It is challenging at this point to decide on a location for the meetings, especially when considering that some partners, whether directly in the partnership or on the advisory board are relatively far away. The Pangani River Basin Authority has its main office in Moshi, and EWURA and REA are even farther away. These are issues that should be taken into consideration. A certain rotation system could be put in place, so that no partner is favoured and to avoid situations where it is always the same partners that must travel. Furthermore, it will facilitate the bonding process between all members if they travel to each other's "home base" as well. Similarly, certain places favour certain partners as well as put others in perhaps uncomfortable situations. It has been noted in other partnerships that locals from poor, rural backgrounds are at unease in corporate meeting rooms and might feeling inferior, inhibiting their ability to effectively participate in the meetings. However, if enough capacity building and trust among partners is built up beforehand this problem is manageable.

The broker should at all times be observant and note if a certain power inequality starts arising. The facilitator, whether this role is performed by ONGAWA or not, should facilitate the meetings as well as have an empowering and supporting role.

There is an issue to the structure of foreign micro investors' participation. It seems unfavourable to try including them through some sort of webinar or online access, as this is probably too much of a foreign concept in rural Tanzania, nevermind the obvious language barrier. Yet through the discussions held with ECOOO the hope is to set up a new enterprise in Spain whose role it will be to channel the micro investments. This entity then deals with information dissemination as well as the collection of votes for upcoming decision at meetings. Initially close cooperation between this enterprise and ONGAWA will be the link to get the information from Spain to Tanzania. ONGAWA is not expected to stay in the partnership longer than two-three years, therefore a new, trustworthy partner has to be identified to take on this role. From the beginning the PPP should set up the communication coordination, externally as well as internally, and should become independent from ONGAWA as quickly as possible. Needless to say, the first important communication tool that should be worked out between all the members is the partnership agreement that has to be signed between all partners.

### The Broker Role

1. "Active listening"
2. Observe people's reactions
3. Keep opinions to yourself
4. Be clear and think fast
5. Manage without being dictatorial
6. Be decisive when necessary
7. Keep meetings focused

*More tips on the brokering role can be found in "The Brokering Guidebook"*

## Management Model, Roles & Responsibilities

Certain “classical” roles should be present in the partnership model such CEO, treasurer, communications director , secretary and administration. Whether these should be paid or unpaid positions is debatable, however it seems that a job remunerated is usually a job better performed. A certain amount of money should be set aside to make sure that management costs are covered. If the partnership chooses to follow the rotation system described above then no office space would have to be rented, however costs will emerge related to internet, travel expenses, phone calls, as well as salaries for the members, or allowances for board members. Management costs for one full time employed have been accounted for in the “Tool”, consisting of salary, communication and travel expenses, totalling annually \$2335. An agreement with some of the partners (notably LM Investment) could contain that they pay their employee for the job done within the partnership. Regardless, all partners should receive the same kind of benefits, not forgetting the representative of the local and international micro investors.

Another role sometimes forgotten within partnerships is a person for grievances. Partners should feel that their issues or concerns can be heard and will be addressed accordingly. A “grievance box” might suffice in this case, but a person responsible for dealing with complaints should be decided upon, as well as time to address them. However, every partner might not be literate and a grievance person instead of a box seems to be a good alternative. Another “coordination” position should be created for coordination between all the different partners, as well as with TANESCO, overlooking bank transfers, payments and so forth. Whether it will be a part-time job or will require a full-time position will have to be seen.

When it comes to institutions such as The River Basin Authority, EWURA and REA as well as the private company LM-Investment it is important to ensure the partnership has *institutional buy-in* from their side. This refers to the fact that senior management is first of all aware of the partnership’s existence and secondly supports it fully. The representative of each institution has to have enough power to make decision regarding the partnership and not always having to “refer back to management”. Otherwise, this can be a very tedious situation for everyone else and lead to deadlocks in the partnership progress.

### Skills needed by the individual partners

Advocacy, Brokering/Intermediary, Capacity building, Communication, Leadership/Management, Monitoring/Evaluation, Negotiation, Networking

Roles assigned in the partnership should be tied to what each partner brings to the partnership table. This can be discovered through the initial meetings held, because it is impossible to assume

skills possessed by individual members. Furthermore, certain personal skills, such as leadership can be present in “untypical” candidates. Enough time should therefore be spent on getting to know everyone and not rush through the initial meetings. The initial phase of the partnership should take advantage of the fact that all partners understand the importance of these meetings and of the partnership in general and so will be open to spending lengthy hours discussing.

Perhaps the most important step, yet easily forgotten about are the monitoring and evaluation process. Monitoring and evaluation processes should be built in from the start and mechanisms should be put in place that observes how partners work together, the impact the partnership is having and so forth.

## How to leave/join partnership?

*“Partnerships are not meant to be permanent but a transitional mechanism until practices become institutionalised or transactions-based”*

A partnership is not an endless project, but has a clear start and end date. A partnership set to last “forever” might fail, as members become disillusioned and lose focus. ONGAWA will be an initial partner but will leave the partnership after 2-3 years once the partnership structure is working properly and partners capable to continue the work.

On an individual level clear terms should be set regarding joining as well as leaving the partnership. These terms have to be well defined and understood by all partners involved and should be stated in the partnership agreement. A system should be thought of where, if a partner leaves, his or her successor can quickly be informed about the partnership, his/her role, and other important aspect regarding the partnership so delays caused by this transition can be kept to a minimum. Meticulous meeting-minutes and record keeping should be kept.

Whatever the reason behind the person leaving, these exits should be well-managed. Discussing amongst partners why a certain partner left and how the partnership should proceed in order to maintain a strong structure should be the focus in those cases. Also, remember to celebrate achievements or milestones that have been met and spend enough time on debriefing.

When thinking about the partnership several key words came to mind, such as good governance, engagement, transparency as well as accountability. These characteristics should not be taken lightly as they are essential to the success of the partnership. However, the members themselves could at the beginning decide together what it considers essential to the partnership.



upon words that it feels are important to their partnership. If these are agreed on together then the likelihood of success is higher.

## What to do with profits & next steps

The people receiving money from the power plant are all the representatives working within the partnership as well as the investors receiving their share of revenue. After the payments have been transferred, the remaining revenue has to be re-invested into the village development.

How the money is used is one of the big aspects of this project. The main point is to promote a shift to more sustainable production activities rather than the ones currently being executed. Assisting villagers to pay for their connection fee is only one step. However, the villagers should also receive a payment for the environmental services they are providing by taking care of the river and forest. Thus, an idea emerges where the villagers will be connected to the grid in return for their environmental service. It can be estimated that after a few months their service will have contributed enough for them to become connected to the grid. If they continue their environmental service after this, they will receive a payment in TZS instead.

The business case for the payment of environmental services is rather straightforward: If you do not invest in the environment then the sustainability of the whole project is not being respected. Agriculture is the centre of their livelihood, therefore the care for the environment and the natural resources their survival depends on is a must.

If the aim of this project is to change the status-quo of the current situation then it has to look at widening and deepening itself. It is about change within organisations and outside them - so that awareness and change are promoted by partnership connections. If a sort of paradigm shift within the development field is to be achieved then it is necessary to *widen* the concept of partnerships, as well as *deepen* it by making vertical links, between and across organisations. EU's approach regarding vertical and horizontal mainstreaming within development explains this better. Mainstreaming is about "identifying lessons, clarifying the innovative element and approach that produced the results, approaches and key elements elaborated by one or more development projects." (European Commission, 2013) Whereas horizontal mainstreaming means transmitting the lessons learnt to similar organisations, vertical mainstreaming is the transfer of lessons learnt "into policy and practice at the institutional, political, regulatory or administrative level." (European Commission , 2013)

Linking with other issues, such as education, and always remember the scaling up of the project is

where this will have a breakthrough. Spreading the partnerships reach to other villages along the river, and to other regions is what has to be considered. There has to be communication with the wider public to see if this is something that could be replicated elsewhere. Perhaps a partner with certain ‘speaker’ potential could be identified who could promote the partnership both locally and regionally. The aim should always be to reach out to others and progress towards a bigger scale.

The revenue, alongside carbon credits, is money that should be invested sustainably. An idea could be to promote rice husk production for more sustainable cooking. This would help tackle the problem of deforestation which is taking place in the region. Another idea could be improved agriculture through electrified drip irrigation, which would conserve water and prevent land erosion, another current problem in the region.

A social map of future partners along the river should be developed, to see where new projects and partners could come from. A focus on horticulture along the riverbed, as well as educational programs discussed before seems to be paths well worth pursuing. The point is that the partnership should aim to widen itself. New partners have to be looked for and become incorporated. As the partnership becomes more established and the project moves forward, new opportunities can easily be forecasted. For example, as electricity is brought to the villages and schools are provided with light, educational programs including local organisations focused on education could become involved. The promotion of social entrepreneurship is another next step that should be pursued by the partnership.

Future potential partners could include the VICOBA (Village Community Banking) present in

some villages already and starting up in Vumba. Other local organisations and NGOs could be looked for. Furthermore, as there are other SPP initiatives in the area there is value added if a sort of information sharing platform is set up. The partnership has to make this idea of *widening* part and parcel of its vision. It should be bottom up to top down and between institutions; only then will this idea of partnerships consolidate mainstream.

Awareness raising should be practised around the following topics as they are crucial for the overall success of the project:

- 1) the Partnership and its Potential
- 2) the Environment and Environmental Services
- 3) the Possibilities of Electricity

Teaming up with other NGOs in the area can facilitate this process. ACCRA, an Italian NGO in the region has been noted for their work done on awareness raising

## The “Excel Tool”

### Purpose

The purpose of “The Tool” is first of all to analyse the financial viability of the micro hydropower plant in view of different funding and investment sources. It is a flexible instrument, where variables can be altered in order to perform scenario analysis and to reflect the changes to the environment. The tool can be found as a whole in the appendix, while in the report it will be explained section by section with images.

### Information and Assumptions

The different variables and information have been drawn from a range of sources. Some numbers are based on assumptions, such as the investment amount and the required return from investors. This will be explained further in the next section, while the numbers regarding international micro investors were obtained through a meeting with ECOOO in Madrid.

Capital cost of the project has been estimated to \$960 000 by ONGAWA. It has also been estimated that the future production capacity of the plant is 1.035.271 kWh per year. In the tool this is shown with the title line: kWh pr. month in TZS (Tanzanian Shilling). The following line is the feed-in tariff one receives per kWh produced. This information is obtained from EWURA (Energy and Water Utilities Regulatory Authority) and is their rates for the year of 2012 (EWURA, 2012). Carbon credits has also been included in the tool, with a revenue of \$2 175 the first year. This income is then expected to increase in line with the inflation, the following years.

O&M (Operational and Maintenance) cost has been calculated by ONGAWA to be 4% of capital cost. In order to simulate a more real life scenario, management cost has been based on three different variables: salary, communication and travel expenses. These numbers can be found in the tool. They are numbers based on real examples from a variety of companies providing the services included. These variables serve as an example only and can be changed to the more real numbers once decided upon by the partnership structure. The 4% O&M cost and the management cost make up the total cost. Gross profit is the income minus the total cost. Taxes are set to 0%, as partnerships are not required to pay taxes in Tanzania (Tanzania Revenue Authority, 2013). Even though for now the formulas are fixed these percentages can easily be changed if there were to be a change in regulations. Individual partners within the partnership are required to pay income tax on distributed profits. Below is a table illustrating the different thresholds in regards to paying

individual income tax in Tanzania (Tanzania Revenue Authority, 2013). For the local business investing in the power plant, the corporate tax is set to 30% (Tanzania Revenue Authority, 2013). Micro

Investors from Spain will have to pay 2.2% tax in Tanzania. In Spain they will have to pay 1% tax until they have been paid back initial investment amount. Once this has been paid the tax required is increased to 21%, which is information obtained through meetings with ECOOO. Tax payments for other international investors have not been included in a table, as it is expected that they will have a variety of different backgrounds.

| <b>Annual Turnover</b>  | <b>Tax Payable when records are incomplete.</b> | <b>Tax Payable when records are complete.</b>            |
|---|---|--|
| Where turnover does not exceed TSHS. 4,000,000                              | Nil   | Nil  |
| Where turnover exceeds TSHS. 4,000,000 but does not exceed TSHS. 7,500,000  | TSHS. 100,000/=                                 | 2% of the turnover in excess of TSHS. 4,000,000          |
| Where turnover exceeds TSHS 7,500,000 but does not exceed TSHS. 11,500,000  | TSHS. 212,000/=                                 | 70,000+2.5% of the turnover in excess of TSHS. 7,500,000 |
| Where turnover exceeds TSHS 11,500,000 but does not exceed TSHS. 16,000,000 | TSHS. 364,000/=                                 | 170,000+3.0% in excess of TSHS. 11,500,000               |
| Where turnover exceeds TSHS 16,000,000 but does not exceed TSHS. 20,000,000 | TSHS. 575,000/=                                 | 305,000+3.5% in excess of TSHS. 16,000,000               |

The first year analysis is based on the numbers generated from the above sources, while year two and onward are based on year one but changed according to inflation and changes to the feed-in tariffs. Inflation is set to 9%, but this again is a changeable number if the circumstances were to change. This percentage has been calculated as an average of the annual inflation rate in Tanzania since 2000. The number generated as an average was 7.76%. This number has however been rounded up, in addition to taking into account the high recent inflation rate. In the analysis section, certain scenarios will be predicted with a change in the inflation rate.

EWURA set the price floor and ceiling. The price floor is the tariff from the year the PPA (Power Purchase Agreement) is signed, while the ceiling is this price x 1.5. If 2012 were to be the reference year for the price floor, which the tool is based on, the price floor would be 137.29 during the wet season and 183.05 during the dry season. The wet season is from December to July and the dry season is between August and November. The tariff would increase according to

previous years trends. The average annual increase of feed in tariffs was from 2009-2012 at 15.77%. This is a rather short information sample. It has however not been recorded tariffs for small individual microhydro powerplant before 2009. This again makes the analysis not as deep as one might would want. The price floor is multiplied with this annual increase, until it reaches the ceiling.

Once the price ceiling is reached, the price will stay the same until the end of the 15-year contract. After 15 years it is assumed that a new 15-year contract will be signed, as the power plant will exist for much longer than that. However, it has no value to do a longer forecasting than 15 years, as too many speculations would be required for this (i.e. will the contract be signed, what will the new price floor be, change in regulations in Tanzania, will there still be a single currency in Europe, etc)

One section of the tool is dedicated to the different stakeholders and investors. Under the title “investment conditions” the local micro investors, impact funds, international micro investors and Tanzanian private company investment is listed. Under each investor their payback time (after tax) as well as revenue share duration and taxation can be observed. Capital cost is separated into donations and investments, of which the investments require return. As the micro investors as well as the impact funds sought out are specifically interested in sustainable development in low income communities, they are aware that the return on investment is not as high as one would expect from other investments. It is therefore assumed that they will be satisfied with an IRR between 2-5%.

EWURA requires 1% of the profits, while REA requires 3%. The villages have no set requirements, as they have no initial investment. It is, however, one of the main purposes of the partnership to provide as much as possible to the communities, thus how to maximise the outcome for the villages is what this tool hopes to contribute with.

There are certain decisions that have to be made by the partnership in regards to investors and payback terms and conditions. There are likely to be certain requirements from investors. The partnership has to decide whether to pay return annually or to put all profit in a bank, save interest and pay return after X amount of years. For transparency reasons it might be best to pay annually, maybe even every six months. In the tool it has been decided to base the payback on annual returns. Paying after X amount of years does despite this decision still represent another realistic and valuable option.

## Explanation

In the spread sheets there are certain numbers with different colours. The black numbers cannot be changed directly as they are a formula. The green numbers are variables, which the black numbers are based on. These can be changed.

The image below illustrates how year 1 of operation would look financially, based on the numbers explained under heading “Information and Assumptions”, with 2012 as base year.

|                                     | YEAR 0       | Jan     | Feb     | March   | April   | May     | June    | July    | Aug      | Sep     | Oct      | Nov     | Dec     |
|-------------------------------------|--------------|---------|---------|---------|---------|---------|---------|---------|----------|---------|----------|---------|---------|
| Capital Cost USD                    | - 960,000.00 |         |         |         |         |         |         |         |          |         |          |         |         |
| Currency Exchange                   |              |         |         |         |         |         |         |         |          |         |          |         |         |
| kWh/ month produced                 |              | 87927   | 79418   | 87927   | 85091   | 87927   | 85091   | 87927   | 87927    | 85091   | 87927    | 85091   | 87927   |
| Feed in Tariffs pr TZS/kWh          |              | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 183.05   | 183.05  | 183.05   | 183.05  | 137.29  |
| Income pr month from TANESCO [ USD] |              | \$7,610 | \$6,891 | \$7,610 | \$7,370 | \$7,610 | \$7,370 | \$7,610 | \$10,086 | \$9,766 | \$10,086 | \$9,766 | \$7,610 |
| Carbon Credits [USD]                |              | \$181   | \$181   | \$181   | \$181   | \$181   | \$181   | \$181   | \$181    | \$181   | \$181    | \$181   | \$181   |
| Total income [USD]                  |              | \$7,791 | \$7,072 | \$7,791 | \$7,552 | \$7,791 | \$7,552 | \$7,791 | \$10,267 | \$9,948 | \$10,267 | \$9,948 | \$7,791 |
| O&M Cost [USD]                      |              | \$3,200 | \$3,200 | \$3,200 | \$3,200 | \$3,200 | \$3,200 | \$3,200 | \$3,200  | \$3,200 | \$3,200  | \$3,200 | \$3,200 |
| Management Cost [USD]               |              | \$195   | \$195   | \$195   | \$195   | \$195   | \$195   | \$195   | \$195    | \$195   | \$195    | \$195   | \$195   |
| Total Cost [USD]                    |              | \$3,395 | \$3,395 | \$3,395 | \$3,395 | \$3,395 | \$3,395 | \$3,395 | \$3,395  | \$3,395 | \$3,395  | \$3,395 | \$3,395 |
| Gross Profit [USD]                  |              | \$4,397 | \$3,678 | \$4,397 | \$4,157 | \$4,397 | \$4,157 | \$4,397 | \$6,873  | \$6,553 | \$6,873  | \$6,553 | \$4,397 |
| Taxes on Gross profit [USD]         |              | \$0     | \$0     | \$0     | \$0     | \$0     | \$0     | \$0     | \$0      | \$0     | \$0      | \$0     | \$0     |
| Levy for Ewura [USD]                |              |         |         |         |         |         |         |         |          |         |          |         |         |
| Levy for REA [USD]                  |              |         |         |         |         |         |         |         |          |         |          |         |         |
| Revenue                             |              | \$4,397 | \$3,678 | \$4,397 | \$4,157 | \$4,397 | \$4,157 | \$4,397 | \$6,873  | \$6,553 | \$6,873  | \$6,553 | \$4,397 |

As mentioned, some numbers are in green, which can be altered in accordance with changes in the environment. The currency exchange used is taken from [www.xe.com](http://www.xe.com), on the 19th of May 2013. The currency exchange rate utilised remains constant throughout the 15 year period. This would naturally not be the case in real life. It is, however, a conservative estimate and changes to the rate are expected to be positive for the MHP investors. It is possible to change this exchange rate on annual basis to reflect the changes in the environment. American dollars have been used as the main currency, to make it clearer for potential investors. The currency can be changed to any other currency if necessary. The bottom line shows the monthly revenue. Month by month financial setup is only done for the first year.

In the spread sheet below, one can see a year by year overview of total income, cost and revenue. Year 1 is taken from the year 1 analysis above. Year 2, however, is based on the total cost and total income from year 1. The total cost has been increased with the assumed inflation of 9%, while the income is increasing in line with the feed-in tariff. The feed in tariff increase with 15.77% annually,

|                                  | YEAR 0     | YEAR 1    | YEAR 2    | YEAR 3    | YEAR 4    | YEAR 5    | YEAR 6    | YEAR 7    | YEAR 8    | YEAR 9    | YEAR 10   | YEAR 11   | YEAR 12   | YEAR 13   | YEAR 14   | YEAR 15   |
|----------------------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Capital Cost USD                 | -\$960,000 |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| Currency Exchange                |            | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      | 1625      |
| kWh/ month produced              |            | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 | 1,035,271 |
| Feed in Tariffs pr TZS/kWh       |            |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| Annual Income from TANESCO [USD] |            | \$99,385  | \$112,541 | \$127,871 | \$143,201 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 | \$145,816 |
| Carbon Credits [USD]             |            | \$2,175   | \$2,197   | \$2,219   | \$2,241   | \$2,263   | \$2,286   | \$2,309   | \$2,332   | \$2,355   | \$2,379   | \$2,403   | \$2,427   | \$2,451   | \$2,475   | \$2,500   |
| Total income [USD]               |            | \$101,560 | \$114,737 | \$130,089 | \$145,442 | \$148,079 | \$148,102 | \$148,124 | \$148,148 | \$148,171 | \$148,194 | \$148,218 | \$148,242 | \$148,267 | \$148,291 | \$148,316 |
| O&M Cost [USD]                   |            | \$38,400  | \$41,856  | \$45,623  | \$49,729  | \$54,205  | \$59,083  | \$64,401  | \$70,197  | \$76,514  | \$83,401  | \$90,907  | \$99,088  | \$108,006 | \$117,727 | \$128,322 |
| Management Cost [USD]            |            | \$2,335   | \$2,545   | \$2,774   | \$3,024   | \$3,296   | \$3,593   | \$3,916   | \$4,268   | \$4,653   | \$5,071   | \$5,528   | \$6,025   | \$6,568   | \$7,159   | \$7,803   |
| Total Cost [USD]                 |            | \$40,735  | \$44,401  | \$48,397  | \$52,753  | \$57,501  | \$62,676  | \$68,317  | \$74,465  | \$81,167  | \$88,472  | \$96,435  | \$105,114 | \$114,574 | \$124,886 | \$136,125 |
| Gross Profit [USD]               |            | \$60,825  | \$70,336  | \$81,692  | \$92,689  | \$90,578  | \$85,426  | \$79,808  | \$73,682  | \$67,004  | \$59,722  | \$51,784  | \$43,129  | \$33,693  | \$23,405  | \$12,191  |
| Taxes on Gross profit [USD]      |            | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |
| Levy for Ewura [USD]             |            | \$608     | \$703     | \$817     | \$927     | \$906     | \$854     | \$798     | \$737     | \$670     | \$597     | \$518     | \$431     | \$337     | \$234     | \$122     |
| Levy for REA [USD]               |            | \$1,825   | \$2,110   | \$2,451   | \$2,781   | \$2,717   | \$2,563   | \$2,394   | \$2,210   | \$2,010   | \$1,792   | \$1,554   | \$1,294   | \$1,011   | \$702     | \$366     |
| Revenue                          |            | \$58,392  | \$67,523  | \$78,424  | \$88,981  | \$86,955  | \$82,009  | \$76,615  | \$70,735  | \$64,324  | \$57,333  | \$49,712  | \$41,403  | \$32,345  | \$22,469  | \$11,703  |



from the year of signing the PPA, until it reaches the ceiling, which is the floor X 1.5. The year when it reaches the ceiling can be seen when the revenue becomes constant. Below this can be observed in year 5. This number will however change if certain variables were to change. The revenue at the bottom of each year will also change as the different variables change, such as the inflation and increase or decrease of tariffs.

To the right is the section which describes the general data included in the tool. These numbers can be altered in order to do scenario analysis. It also illustrates the different stakeholders, their payback periods and revenue share time. Partnership savings have been included at the bottom, in order to be prepared for unexpected events. It is currently set to 5% of the revenues, but can be altered if found necessary.

The illustration below shows the different stakeholders and investors, and their return each year. It is based on each year's profits, as seen in the table on previous page. These revenue numbers are again split between the investors based on the investment conditions outlined in the table to the right. These numbers have also been included in an identical table below, only in Tanzanian Shilling, in order to identify the tax threshold. The exact tax number will then be found in the tax table included under the heading "Information and Assumptions".

| General Data                         |            |          |  |
|--------------------------------------|------------|----------|--|
| Capital Cost                         | 960,000.00 | USD      |  |
| Initial feed-in-tariff wet season    | 137.29     | TZS      |  |
| Initial feed-in-tariff dry season    | 183.05     | TZS      |  |
| Feed in Tariff yearly variation      | 15.77%     |          |  |
| PoA (year 1)                         | 2,175.00   | USD      |  |
| PoA yearly variation                 | 1%         |          |  |
| O&M Cost % of capital cost           | 4%         | per year |  |
| Management Cost                      | 2,335.00   | USD/year |  |
| Taxes on Gross profit for Government | 0%         |          |  |
| Levy for Ewura on the gross profit   | 1%         |          |  |
| Levy for REA on the gross profit     | 3%         |          |  |
| Inflation Rate TNZ yearly variation  | 9%         |          |  |
| Investment Conditions                |            |          |  |
| Local Micro Investment               |            |          |  |
| Payback time (after taxation)        | 2.00       | years    |  |
| Revenues share duration              | 4.00       | years    |  |
| Taxation from Tanzania               | 3.5%       |          |  |
| Impact fund                          |            |          |  |
| Payback time (after taxation)        | 12.00      | years    |  |
| Revenues share duration              | 15.00      | years    |  |
| Taxation from Tanzania               | 4.0%       |          |  |
| Taxation from the origin country     | 15.0%      |          |  |
| Micro Investment International       |            |          |  |
| Payback time (after taxation)        | 12.00      | years    |  |
| Revenues share duration              | 15.00      | years    |  |
| Taxation from Tanzania               | 2.5%       |          |  |
| Taxation from Spain (until payback)  | 1%         |          |  |
| Taxation from Spain (after payback)  | 21%        |          |  |
| Tanzania Private Company             |            |          |  |
| Payback time (after taxation)        | 6.00       | years    |  |
| Revenues share duration              | 10.00      | years    |  |
| Taxation from Tanzania               | 30.0%      |          |  |
| Revenues distribution data           |            |          |  |
| Partnership savings over the revenue | 5%         |          |  |

| Revenues Share                 | YEAR 0   | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10  | YEAR 11  | YEAR 12  | YEAR 13  | YEAR 14   | YEAR 15  |
|--------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|
| Partnership-Savings [USD]      | \$2,920  | \$3,376  | \$3,920  | \$4,447  | \$4,345  | \$4,096  | \$3,825  | \$3,530  | \$3,209  | \$2,858  | \$2,476  | \$2,059  | \$1,605  | \$1,110  | \$571     |          |
| Local Micro Inv. [USD]         | \$11,000 | \$11,000 | \$11,000 | \$11,000 | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0       | \$0      |
| Impact Fund [USD]              | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637 | \$21,637  | \$21,637 |
| Micro Invest [USD]             | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$6,450  | \$7,700  | \$7,700   | \$7,700  |
| Tanzania Private Company [USD] | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$1,500  | \$0      | \$0       | \$0      |
| Villages [USD]                 | \$14,886 | \$23,360 | \$33,896 | \$43,905 | \$52,960 | \$48,240 | \$43,096 | \$37,488 | \$31,376 | \$24,714 | \$17,452 | \$9,537  | \$1,159  | -\$8,245 | -\$18,496 |          |

Below is the investors' cash flow, which illustrates their initial investment and the profit shares they receive from year 1-15. Once the cash reaches \$0 they're investment requirements have been met and they are no longer receiving profit shares

| Investors cash flow            |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|--------------------------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Partnership-Savings [USD]      |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Local Micro Inv. [USD]         | -\$20,000  | \$10,000 | \$10,000 | \$10,000 | \$10,000 | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      |
| Impact Fund [USD]              | -\$240,000 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 | \$18,462 |
| Micro Invest [USD]             | -\$75,000  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  | \$6,250  |
| Tanzania Private Company [USD] | -\$10,000  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$1,250  | \$0      | \$0      |
| Villages [USD]                 |            |          |          |          |          |          |          |          |          |          |          |          |          |          | \$0      |

## Analysis

The numbers described above are only an example of what might occur. The scenario illustrated above is considered to be a realistic, with inflation set to 9%, yearly increase of tariffs at 15.77% and a set of criteria from different investors. The variable "Partnership Savings" has been included in the sheet, in order to safeguard for future unexpected events. This post has no set requirements for return. The profits will however go downwards from year 5. From this year the feed in tariffs have reached the ceiling and is no longer increasing. The cost is still increasing in accordance with the inflation, hence reduced profits. At the end of the 15-year contract the villages will no longer receive profits, as inflation and costs are taking too much of the income.

Tariffs have been set by EWURA and are, all things considered, a relatively stable variable compared to other variables in the tool. If the law is not altered, the price floor is set and the price ceiling will be the floor multiplied with 1.5. The 15.77% annual increase in tariffs is considered to be a realistic scenario. This is based on historic trends. If this were to change however, the tool would generate different results. A pessimistic view on this would be an annual increase of 10%. This would make the MHP reach the tariff ceiling in year 5, instead of 4. It would also have an impact on the overall 15-year income for the MHP. It is however not a drastic change that would have a serious impact on the viability of the plant. Below one can see how it would impact the profit shares. It would first of all affect the villages as well as the partnership and its economic strength.

| Revenues Share                 |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|--------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|                                | YEAR 0   | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10  | YEAR 11  | YEAR 12  | YEAR 13  | YEAR 14  | YEAR 15  |
| Partnership-Savings [USD]      | \$2,920  | \$3,107  | \$3,383  | \$3,641  | \$3,881  | \$4,100  | \$3,831  | \$3,537  | \$3,216  | \$2,867  | \$2,486  | \$2,070  | \$1,617  | \$1,123  | \$585    |          |
| Local Micro Inv. [USD]         | \$7,763  | \$7,763  | \$7,763  | \$7,763  | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      |
| Impact Fund [USD]              | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 |
| Micro Invest [USD]             | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$6,175  | \$6,175  | \$6,175  |
| Tanzania Private Company [USD] | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$0      | \$0      | \$0      | \$0      | \$0      |
| Villages [USD]                 | \$26,577 | \$30,135 | \$35,376 | \$40,290 | \$52,608 | \$56,775 | \$51,651 | \$46,065 | \$39,974 | \$33,333 | \$27,177 | \$19,283 | \$9,678  | \$296    | -\$9,932 |          |

On an optimistic note one could expect the increase to be of 20%. With this rate the ceiling would be reached a year earlier than the realistic scenario and the MHP would benefit from an extra year with maximum tariffs. This would increase the overall profit, as well as the revenue share going towards the villages and the partnership savings. This would improve the financial viability of the



MHP drastically. The last year the villages is in minus. This can however be covered by the partnership savings, with this rate of tariff increase. This can be seen in table below.

| Revenues Share                 | YEAR 0 | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10  | YEAR 11  | YEAR 12  | YEAR 13  | YEAR 14  | YEAR 15  |
|--------------------------------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Partnership-Savings [USD]      |        | \$2,920  | \$3,574  | \$4,316  | \$4,575  | \$4,348  | \$4,100  | \$3,831  | \$3,537  | \$3,216  | \$2,867  | \$2,486  | \$2,070  | \$1,617  | \$1,123  | \$585    |
| Local Micro Inv. [USD]         |        | \$7,763  | \$7,763  | \$7,763  | \$7,763  | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      |
| Impact Fund [USD]              |        | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 |
| Micro Invest [USD]             |        | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$6,175  | \$6,175  |
| Tanzania Private Company [USD] |        | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$0      | \$0      | \$0      | \$0      | \$0      |
| Villages [USD]                 |        | \$26,577 | \$39,001 | \$53,108 | \$58,021 | \$61,474 | \$56,775 | \$51,651 | \$46,065 | \$39,974 | \$33,333 | \$27,177 | \$19,283 | \$9,678  | \$296    | -\$9,932 |

The project of activity, within carbon credits is set to an annual increase of 1%. The revenue generated from this is rather low and it would not have a great impact on the overall image if this were to change, either positively or negatively.

Inflation is one of the variables that will have the greatest impact on the revenue and the viability of the MHP. Above, the realistic scenario with 9% was presented. If this number were to be 15%, which has been the reality in Tanzania in the past, the MHP would not be viable. This can be seen in the table below, where the villages go in minus from year ten already.

| Revenues Share                 | YEAR 0 | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10   | YEAR 11   | YEAR 12   | YEAR 13   | YEAR 14    | YEAR 15    |
|--------------------------------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|------------|------------|
| Partnership-Savings [USD]      |        | \$2,920  | \$3,259  | \$3,658  | \$4,007  | \$3,688  | \$3,176  | \$2,587  | \$1,910  | \$1,131  | \$235     | -\$796    | -\$1,981  | -\$3,344  | -\$4,912   | -\$6,716   |
| Local Micro Inv. [USD]         |        | \$7,763  | \$7,763  | \$7,763  | \$7,763  | \$0      | \$0      | \$0      | \$0      | \$0      | \$0       | \$0       | \$0       | \$0       | \$0        | \$0        |
| Impact Fund [USD]              |        | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875  | \$14,875  | \$14,875  | \$14,875  | \$14,875   | \$14,875   |
| Micro Invest [USD]             |        | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175   | \$5,175   | \$5,175   | \$5,175   | \$6,175    | \$6,175    |
| Tanzania Private Company [USD] |        | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083   | \$0       | \$0       | \$0       | \$0        | \$0        |
| Villages [USD]                 |        | \$26,577 | \$33,022 | \$40,614 | \$47,246 | \$48,939 | \$39,213 | \$28,025 | \$15,157 | \$355    | -\$16,670 | -\$35,169 | -\$57,691 | -\$84,594 | -\$114,387 | -\$148,651 |

With this inflation one would go in minus in year 11 and onwards. This is when inflation has caught up with the increase in revenue. Not even the partnership savings will be able to save the MHP from going under, if this were to be the case. It is however a highly pessimistic scenario, which is unlikely to occur. It is not unlikely for the inflation levels to reach this level within the 15 year contract, but not as an average for the whole period.

On the positive side one could see an inflation rate of 5%. This is as unrealistic as an average of 15%. It would however increase the profits over the 15-year period as well as the return for the villages. This can be seen in the table below.

| Revenues Share                 | YEAR 0 | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10  | YEAR 11  | YEAR 12  | YEAR 13  | YEAR 14  | YEAR 15  |
|--------------------------------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Partnership-Savings [USD]      |        | \$2,920  | \$3,454  | \$4,089  | \$4,718  | \$4,731  | \$4,613  | \$4,490  | \$4,360  | \$4,223  | \$4,080  | \$3,930  | \$3,771  | \$3,605  | \$3,431  | \$3,248  |
| Local Micro Inv. [USD]         |        | \$7,763  | \$7,763  | \$7,763  | \$7,763  | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      |
| Impact Fund [USD]              |        | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 |
| Micro Invest [USD]             |        | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$6,175  | \$6,175  |
| Tanzania Private Company [USD] |        | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$0      | \$0      | \$0      | \$0      | \$0      |
| Villages [USD]                 |        | \$26,577 | \$36,737 | \$48,787 | \$60,741 | \$68,758 | \$66,521 | \$64,171 | \$61,703 | \$59,111 | \$56,388 | \$54,611 | \$51,607 | \$47,452 | \$44,139 | \$40,659 |

The African Development Bank, Reuters and other news agencies are reporting a decrease of inflation, due to slowdowns in the food prices (African Development Bank Group, 2013) (Reuters, 2013). The rate has had a steady decrease since January 2012 and in May 2013 it was recorded at 8.3%. 9% is therefore not considered to be an unrealistic inflation rate. It is, however, challenging to predict or make comments and recommendations, because of its past fluctuations. This would affect the return for the investors, who would still get a return on their investment, but reduced or over a longer period.

As the tool is set in the explanation the total amount of donations consists of 64.06% of the capital cost, while the investment represent 35.94%. Investors are crucial for the project to become a reality. They bring diversity, knowledge as well as a sense of communal ownership to the project. It assists in reducing the risk of relying to heavily on one funding source and contributes to a powerbalance within the partnership. One of the greatest aims of the partnership is to give as much as possible back to the local community, while still holding on to these benefits. If the ownership solely end up in the hands

| Capital cost                    |                   |                |
|---------------------------------|-------------------|----------------|
| Donations                       |                   |                |
| Traditional Donors [USD]        | 600,000.00        |                |
| Crowd-donations [USD]           | 15,000.00         | 64.06%         |
| Investments                     |                   |                |
| Local Micro Inv.                | 20,000.00         |                |
| Impact Fund                     | 250,000.00        |                |
| Micro Invest                    | 70,000.00         |                |
| Tanzania Private Company        | 5,000.00          | 35.94%         |
| <b>Total Capital cost [USD]</b> | <b>960,000.00</b> | <b>100.00%</b> |

| Capital cost                    |                   |                |
|---------------------------------|-------------------|----------------|
| Donations                       |                   |                |
| Traditional Donors [USD]        | 705,000.00        |                |
| Crowd-donations [USD]           | 25,000.00         | 76.04%         |
| Investments                     |                   |                |
| Local Micro Inv.                | 15,000.00         |                |
| Impact Fund                     | 150,000.00        |                |
| Micro Invest                    | 60,000.00         |                |
| Tanzania Private Company        | 5,000.00          | 23.96%         |
| <b>Total Capital cost [USD]</b> | <b>960,000.00</b> | <b>100.00%</b> |

| Revenues Share                 | YEAR 0 | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10  | YEAR 11  | YEAR 12  | YEAR 13  | YEAR 14   | YEAR 15   |
|--------------------------------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| Partnership-Savings [USD]      |        | \$2,920  | \$3,376  | \$3,921  | \$4,449  | \$4,348  | \$4,100  | \$3,831  | \$3,537  | \$3,216  | \$2,867  | \$2,486  | \$2,070  | \$1,617  | \$1,123   | \$585     |
| Local Micro Inv. [USD]         |        | \$10,350 | \$10,350 | \$10,350 | \$10,350 | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0       | \$0       |
| Impact Fund [USD]              |        | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792 | \$24,792  | \$24,792  |
| Micro Invest [USD]             |        | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$6,038  | \$7,204   | \$7,204   |
| Tanzania Private Company [USD] |        | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$0      | \$0      | \$0      | \$0      | \$0       | \$0       |
| Villages [USD]                 |        | \$13,210 | \$21,884 | \$32,241 | \$42,269 | \$50,695 | \$45,996 | \$40,872 | \$35,286 | \$29,195 | \$22,554 | \$16,398 | \$8,504  | -\$1,268 | -\$10,650 | -\$20,878 |

| Revenues Share                 | YEAR 0 | YEAR 1   | YEAR 2   | YEAR 3   | YEAR 4   | YEAR 5   | YEAR 6   | YEAR 7   | YEAR 8   | YEAR 9   | YEAR 10  | YEAR 11  | YEAR 12  | YEAR 13  | YEAR 14  | YEAR 15  |
|--------------------------------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Partnership-Savings [USD]      |        | \$2,920  | \$3,376  | \$3,921  | \$4,449  | \$4,348  | \$4,100  | \$3,831  | \$3,537  | \$3,216  | \$2,867  | \$2,486  | \$2,070  | \$1,617  | \$1,123  | \$585    |
| Local Micro Inv. [USD]         |        | \$7,763  | \$7,763  | \$7,763  | \$7,763  | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      | \$0      |
| Impact Fund [USD]              |        | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 | \$14,875 |
| Micro Invest [USD]             |        | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$5,175  | \$6,175  | \$6,175  |
| Tanzania Private Company [USD] |        | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$1,083  | \$0      | \$0      | \$0      | \$0      | \$0      |
| Villages [USD]                 |        | \$26,577 | \$35,251 | \$45,607 | \$55,636 | \$61,474 | \$56,775 | \$51,651 | \$46,065 | \$39,974 | \$33,333 | \$27,177 | \$19,283 | \$9,678  | \$296    | -\$9,932 |

of international investors or are purely achieved through donations, it will be challenging to bring the local communities on board. This again will not be viable in the long run for the partnership. With too much investment on the other hand, the MHP will not be able satisfy all its stakeholders. Therefore, In order to achieve this, there should be a balance between donations and investors. It is believed that the ratio should be between 65:35 to 75:25, when it comes to donors and investors. Above one can see two examples that illustrate the different outcome for the villagers, depending on this balance. In the first scenario the balance is 35:65, while in the second it is 25:75. With these scenarios one can see the return for the villages are increased drastically in the second example, where the donations have increased. All investors are still kept on board, which is important, but more end up in the hands of the villages.

When it comes to the payback time of initial investment, the requirements from the local micro investors are set to 2 years, which is not likely to change. For the international micro investors the payback time is set to 12 years, while receiving profit shares over 15 years. They expect a return of

3%. Their payback time is set to 12 years, which is a number obtained through meetings with ECOOO. What may differ is the payback period for the impact funds and the local private company. If the impact funds require a higher return than 5%, a ten year payback period will ensure this. This will reduce the amount returned to the villages, but is likely to increase the satisfaction level of the impact funds.

For the local private investor, the payback period is in the explanation set to 8 years and revenue share receiving to 12 years, which will give them a return of 7%. If one wanted to hike this, as 7% is a rather low return over 12 years, one could reduce the payback period to 6 years and revenue share over 10 years. With these numbers, the local company would get a return of 11%, which is more likely to be accepted as a reasonable return. The amount they have invested is not as high as the others and the issue of paying back in a shorter amount of time should not represent a challenge for the MHP and the partnership.

Production capacity is a critical variable that will have an effect on the power plant. The Same district has suffered from droughts in the past, and is something which is likely to reoccur. The climate in the area is discussed further under the heading “*Weather and Climate*” in the risk analysis.

## Investment Conditions in Tanzania

Investment conditions differ in regards to the sector invested in. For a business selling its products and/or services the country represents a great opportunity regarding access. Not only is Tanzania a rather large market in itself, but it has trade agreements within the East-African region (Tanzania, Uganda, Kenya), which combined represents a market of more than 90 million people.

What makes Tanzania a great potential investment regarding the hydro power plant, compared to many other African nations, is stability. Tanzania is one of the more peaceful and stable countries in Africa.

On the other hand Tanzania does struggle with infrastructure, governance and human resources. It is also often looked upon as a slow moving country, so patience is an essential quality to have.

## Carbon Credits

### Potential Future Pursuits

Climate change is one of the greater challenges currently facing planet Earth. Not only does it create uncertainties in regards to temperature, extreme weather events and rainfall, but there are additional consequences such as food insecurity, health risks, environmental degradation and people displacement, all with negative effects on the global economy. (United Nations, 2010) The Kyoto Protocol from 1997 is an international agreement created and adopted under the United Nations Framework Convention on Climate Change (UNFCCC) is an attempt to reduce the world greenhouse gas (GHG) emissions, one of the main contributors to climate change. The signatory countries have bound themselves to individually set emission reduction targets, which entered into force in 2005. During the December 2012 conference in Doha, the delegates managed to extend the Kyoto Protocol and its underlying mechanisms. Within the framework there are three mechanisms that countries can use in order to cut their emissions in the most cost-effective way: The Joint Implementation Mechanism (JI), the Clean Development Mechanism (CDM) as well as International Emissions Trading. The first two, namely JI and CDM are mechanisms allowing the most developed countries (also referred to as Annex 1 countries) to offset their emissions in another country by supporting clean energy programs and activities that contribute to a smaller global carbon footprint. JI programs take place within developed countries, and CDM within developing countries (or non-Annex 1 countries). The Emissions Trading Mechanism is an artificial market where carbon credits are sold. Companies are usually given emission allowances by their country. It is then up to the company to see what is financially and strategically in their interest; to invest in reducing their emissions or enter the carbon trading market, and purchase allowances from companies that have reduced their carbon footprint and so have a surplus of allowances (United Nations, 2013).

The carbon trading market can be separated in to two parts; the voluntary and the regulatory market. In the regulatory market credits are generated through mechanisms approved by the United Nations Framework Convention on Climate Change, such as Clean Development Mechanism (CDM). Credits that are created through CDM are called Certified Emissions Reduction (CER). In the voluntary market, on the other hand, the credits are generated through projects that are certified by independent international standards. These standards are called Verified Emission Reductions (VER) (Carbon Trade Xchange, 2013). One of the companies providing verification of projects and

their emission reductions are Gold Standard. Voluntary offsetting is usually performed in sectors or countries that do not yet face emission reduction obligations, as this avoids the problem of double counting emission reduction units. The following paragraphs will further look into different options within Gold Standard as well as CDM, as both have developed their processes to accommodate for small projects wishing to take advantage of these mechanisms as well.

### Gold Standard

By getting one's project Gold Standard (GS) certified, carbon credits can be sold at the carbon trade exchange. (Carbon Trade Exchange, 2013). GS is one of the leading certification standards. Operating in both the voluntary and regulatory market, they certify renewable energy, energy efficiency and forest carbon offset projects, amongst other activities. Their standards are strict, meaning a project is not just supposed to offset carbon, but it also has to benefit the local communities sustainably. A positive impact has to be noted in regards to economy, health, welfare and environment. Additionality is also an important aspect of the certification, referring to the fact that there has to be a positive difference in carbon emissions that are occurring after implementation of project versus the status quo situation. (The Gold Standard, 2013)

Within Gold Standard there is a specific section focusing on micro-scale project, namely projects that offset less than 5000 tonnes of emissions per year (European Commission and The ACP-EU Energy Facility). The emissions reduction capacity of this micro hydropower plant has been estimated to be roughly 276 tonnes (see calculation below) Steps to be pursued in order to register do not differ much from the VER or CDM application. However, the project can never claim more than 5000 tCO<sub>2</sub>, and has to be located in a least developing country (LDC), land-locked developing states (LLDS), or small island developing states (SIDS). The project can be implemented either as a standalone or as a part of a Programme of Activities, described further below. As mentioned before, additionality has to be proven in order for the project to be considered. Even though the Gold Standard claim validation time of projects to lie between three to six months, actual project developers have complained about the time being much longer (ibid.), resulting in a real problem for projects this size.

It is worth looking into Gold Standard and VER in regards to this project in order to generate more profits which could go towards village development. Any source of income which helps to reduce the payback period for investors increases the return for the local communities. The process of verifying the project can be long and starts from its design to stakeholder engagement, reviews and audits. Therefore, if carbon credits are to be considered for this project, first steps should be initiated soon, as they are an important part of the verification. At the moment Gold Standard is

sold at approximately €6. In order to calculate the offset potential of the micro hydropower plant in Same, one has to multiply the electricity produced (kWh) by the electricity specific factor for Tanzania and then multiply the outcome by the price of CO<sub>2</sub>. The estimated electricity production per annum of the hydropower plant is 1035271 kWh. The electricity specific factor for Tanzania amounts to 0.26675705 kgCO<sub>2</sub>/kWh. (Brander , Sood, Wylie, Haughton, & Lovell, 2011)

Therefore;  $1035271 \times 0.26675705 = 276165.83791055$ , where the price of 1 ton of CO<sub>2</sub> = €6

Thus;  $276165.83791055 \times 6 = \text{€ } 1657$

### Programmes of Activities (PoA)

*“PoA can bring sustainable development to people and places that have barely benefited from carbon finance, particularly rural communities and poor households.”*

Technically, applying for a CDM (Clean Development Mechanism) in order to receive carbon credits for a project is a lengthy procedure and can pose more problems and hurdles for a small energy project than benefits. “PoAs are an especially relevant carbon finance tool for small-scale clean energy systems. They facilitate large-scale emission reductions by bundling hundreds, thousands and even millions of individual similar activities that, by themselves, are too small to apply the often costly carbon credit certification process.” (UNDP, 2012)

Having realised this difficulty, the United Nations has developed clear procedures on how to set up and manage a PoA in CDM, JI and the voluntary market. “A Program of Activity (PoA) provides the organizational and methodological framework for component project activities (CPAs) with the same stated goal to operate within a single registered CDM program activity.” (<http://cdmrulebook.org/452>)

A few benefits of the PoA can be highlighted in the case of ONGAWA’s project: Firstly, It takes two weeks for a project to be included in the CDM through a PoA rather than years. This is noteworthy because any given project can only start generating credits once they are registered, and so time lost equals a loss in revenue. Secondly, PoA allows for the development of CPAs in different host countries. Theoretically, this is also possible under a CDM, however, this has hardly been executed and is limited to countries that share a border. For a PoA on the other hand, geographical expansion through unlimited replication is no problem. Therefore, ONGAWA’s project can be included as a new CPA within an already existing PoA. This is especially interesting when seeing that registering a new PoA under the CDM may take over a year, but including a new CPA within an already set up PoA should not take longer than a few weeks. ONGAWA should research which PoA to

join, as this would be helpful since they are hoping to start construction of the power plant soon. Quick access to carbon finance is the key here, and since collecting credits can only be done once the project is registered, the PoA scheme is proving valuable for their project (UNFCCC, 2013). PoAs found suitable for this project are (PoA 6386): Renewable Energy Carbon Program for Africa (REPCA) as well as (PoA 9059): Small Scale Renewable Energy Carbon Programme (SREC). All PoAs can be reviewed under the Clean Development Mechanism's website under: <http://cdm.unfccc.int/ProgrammeOfActivities/registered.html>

On a side note, if the path of carbon credits is pursued, it might be of interest to expand the talks and include MicroEnergy Credits, a social enterprise focused on connecting microfinance institutions to carbon markets. Through their help, projects receive funding by selling carbon credits when a customer of the microfinance institution switches from kerosene to a clean source of energy, for example (The Economist, 2010). This does not work to increase revenue for the local Tanzanian investors SACCO, as they are not the ones receiving the clean energy. Yet, if the local SACCO helps the villagers with paying the connection fee, the SACCO could apply for microenergy credits which would go towards the partnership. However, one should make sure that it is possible for ONGAWA to register its hydropower plant under a PoA as well as the SACCO for microenergy credits, as there might be a problem of double accounting of carbon credits otherwise.



## Conclusion & Recommendations

This paper provides ONGAWA with a pre-feasibility study and potential innovative ideas regarding their new micro hydropower plant in Same, Tanzania. It addresses the major risks involved in this project, as well as offers mitigation strategies when possible. It looks at many different sources of funding, both donation and investment based. Crowdfunding platforms, impact funds, possible international business participation and local private sector participation as well as the promotion of local and international micro investments have all been discussed as well as how to engage them in this development project, leading to an innovative new approach.

Next a partnership model was outlined. The partnership chapter is not written as a guidebook, or as a step-by-step lists to be followed, but rather as a set of ideas and recommendations to be kept in mind once the project is more underway. Building a partnership around the micro hydropower plant project is an important step. It seems that without this kind of structure including all relevant stakeholders, the village development and environment care would not receive the kind of attention and importance wished for in development projects. The partnership will deal with the working of the power plant, the distribution of revenue, the environmental services provided; all the while having a maximised outcome for the villages as the main objective. By being members of the partnership, the villagers are given the opportunity to be active participants in the decision-making around their village and environment development.

An Excel Tool has been created to first of all calculate the financial viability of the hydropower plant, as well as assist in calculating the different requirements set by the different investors, predicting potential profits for each one and project overall financial outcomes to see how much money can be directed towards the sustainable development of the villages. A short section describing the potential of carbon credits follows the description of the Tool and the financial analysis. The financial analysis was executed through looking at the different variables and how they individually and together affected the outcome of the MHP, partnership and its stakeholders financially.

Overall, the limited amount of time available to work on this project has been a major drawback in its development. It has limited our depth of analysis as well as our knowledge of the local reality. Due to this, the risk analysis is at times based on assumptions concluded from our research, but not from actual research performed locally. The same is true for the partnership model. It is still very hypothetical, even if we received a lot of feedback regarding the Tanzanian reality from



professionals having worked there. Many times, we encountered obstacles in our research. For example, even after several attempts, we were still not able to receive information from TANESCO, from any of the impact funds discussed, or from UNIDO in Tanzania regarding local private sector involvement potential for the project. These kind of sources have invaluable information regarding the reality of this project and would have contributed with a more realistic outcome. Initial contact is hard to make and discussions are very fruitful indeed, as was demonstrated through the meeting with ECOOO regarding Spanish micro investments. Therefore, we encourage close and frequent communication with potential players in order to keep exploring these possibilities.

General ground work and research has been delivered, such as identification of donors and investors, as well enterprises that can help in the organisation of micro investors, both in Tanzania, as well as internationally. Yet more time should be devoted to the potential of carbon credits. It is a very new area, yet we feel that it has potential, even if right now the price of carbon is very low. New ways of allowing small projects to tap into the carbon market are evolving constantly, as demonstrated by the example of the Gold Standard micro scale projects, as well as the PoA under the CDM mechanism. After the Kyoto Protocol received continued international recognition through its extension after the Climate Conference in Doha in December 2012, the international community showed it was aware of the importance of tackling climate change. Therefore, one can hope for future new developments within the carbon market and the possibilities for projects focused on renewable energy, like this one. Close monitoring of its evolution will therefore be beneficial for this project, as well as future projects by ONGAWA.

Regarding the Excel Tool, even greater flexibility would always be preferable. However, due to time constraints, we could only construct a first model, and many numbers are still based on assumptions. With more concrete numbers, which can be acquired through future meetings held between ONGAWA and potential partners, a more realistic estimate could be obtained.

Overall, we hope that this study can support ONGAWA during future pursuits of this project. We hope that ONGAWA, with this project can assist with fresh, new ideas when it comes to the development field. Designing projects that really do contribute to the socio-economic development of people, without harming the environment, will perhaps never be easy. Furthermore, it is imperative to target the *real* needs of the local communities. We believe that there is no other way to know and address these needs unless they themselves are given the chance to be a part of their own development. Ultimately, this project is a lot more than just the construction of a hydropower plant.

**Asante sana!**

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EXECUTIVE SUMMARY  
PARTNERSHIP PROJECT FOR ONGAWA  
HYDROPOWER PLANT IN SAME DISTRICT,  
TANZANIA

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Final Project for International Master in Sustainable  
Development and Corporate Responsibility 2013

*“If you want to see things you’ve never seen before, you have to do things  
you’ve never done before”*

# Executive Summary



The business plan and partnership model have been developed by Julia Thérèse Senninger and Silje Guldal Hassel, in close cooperation with ONGAWA and under the supervision of Nicola Bugatti. ONGAWA is a Spanish NGO, dedicated towards addressing rural communities' needs by providing sustainable solutions.

The specific project aim is to develop a micro hydropower plant in Same District, within the Kilimanjaro region of Tanzania. The villages Lugulu, Kanza and Vumba, (approximately 6000 people) are currently not connected to the national electricity grid. Energy poverty is a pressing issue worldwide, as 1.4 billion people still do not have access to electricity. For some countries, extending the power grids to rural areas can turn out to be financially unachievable, as it is not cost-effective enough if consumption levels are low. However, it is not just a matter of grid extension, as an additional encountered problem in Tanzania is a high connection fee for each household. Even through government subsidies, the connection fee still amounts to \$90 USD (TANESCO, 2012), an unachievable price for many. Apart from the lack of energy, the villagers have limited access to water, sanitation and economic opportunities. They are facing more obstacles, as the nearby forest has been declared a nature reserve and their access to the woods has been restricted; an area which constituted their main source of livelihood.

Thus, the idea arose to use the hydropower project and address several of the local problems through the creation of a partnership model that would involve all relevant stakeholders and ensure that the villagers will be the main beneficiaries of the project outcome. For example, one idea is to use part of the revenue earned from selling the electricity to the main grid and assist the households wanting to connect to the grid with paying the above-mentioned connection fee. Access to energy means improved livelihoods, as they will be able to power their households, improve current businesses or set up new ones, improve their agriculture yield and post-harvesting methods. The result will be reduced pressure on natural resources, like the nearby forest and the Pangani river, by involving the community through an environmental services provision to conserve their natural environment, as deforestation, land slides, poor water and other natural resource management have become an increased issue in the area.

The hope, however, is two-fold. On the one hand, the local environment and the villagers' livelihoods will improve through the creation of a partnership that is looking to maximise their benefits. Without a partnership structure aimed at this goal, the revenue earned from the energy sold would go back to the investors, and neither the local community, nor the environment would benefit from it. On the other hand, the project also includes a new plan for funding development projects, which until now has evolved relatively little and is still mostly donations based. This



project hopes to contribute with an innovative approach. Instead of relying on the traditional means of donations, it will draw on many different funding sources. The idea is to pool from impact funds, crowdfunding, private company investments, as well as spur local Tanzanian micro investments and micro investments from other countries, in order to accumulate enough capital. Encouraging Tanzanian micro investments would give the local population a chance to invest in their country and its sustainable future, as well as allow that profits remain in the country. Promoting international micro investments gives people an opportunity to support a development project and the use of renewable energy, while being rewarded for their support. Yet at all times, the focus will be to try and maximise the outcome for the local inhabitants of Lugulu, Kanza and Vumba.

The paper has several sections: First, a risk analysis was performed where the main political, economic, social, technological, environmental and legal risks were analysed and possible mitigation strategies were proposed. After that follows a description of several sources of funding that could be tapped, apart from the classical EU donations. Several crowdfunding platforms are proposed, along with the example of international private investment, as well as the possibility of encouraging local private investment through the example of LM Investment. Several impact funds are described as well as the newer idea of micro-investments, both locally and internationally. In order to prepare the partnership a stakeholder analysis was performed. Thereupon follows a description of the purpose of the partnership, along with who should be partners and an analysis of their needs, wants, resources, as well as motivations. How communication and meetings should be structured and how the management mode, roles and responsibilities should be divided is what follows. The relationship to important stakeholders yet non-members within the partnership is also discussed. Several options of what could be done with profits earned are outlined along with possible future ventures of the partnership. Lastly, a short description of how to join and leave the partnership is discussed. The next section of the paper is the description of the Excel Tool created for calculating the different investment conditions per investor. Finally, the potential pursuit of carbon credits is analysed where Gold Standard and Program of Activities are the main recommendations for this project.

This executive summary will only outline the main points of each part. The complete partnership proposal and funding structure can be found in the full report of this project.

# Stakeholders, Donors & Investors



Senninger/Hassel

All investors are stakeholders but not all stakeholders are investors. They are however equally important for the success of the power plant and partnership. Below, a stakeholder map has been incorporated in order to make it clear who is involved and their roles.

Colour Code:  
Beneficiaries  
Donors  
Investors  
Influenced



## Beneficiaries

The government of Tanzania is getting assistance in electrifying the country. The environment, a “voiceless” stakeholder, will benefit from the project, as there will be less stress on natural resources. TANESCO, the power providing company is aided with its electricity production, and receives revenue from reselling the energy. The villages are getting assistance to connect to the grid as well as a profit share to be used to continue developing the local communities.

## Donors

A range of crowdfunding platforms, such as Indiegogo, Goteo, KissKissBankBank and Trustpency have been included as a source of funding. The European Union has also been included as a source of funding. There are other potential donors, but these are the ones that have been included in this partnership/funding model.

### **Investors**

Under investors fall the local Tanzanian individuals who will contribute to the plant through micro investments, as well as international micro investors and impact funds. The investors' expected financial returns have been calculated depending on their individual requirements. For some investors, estimated rate of returns were the second-best alternative to calculated returns, depending on the availability of figures.

### **Influenced**

This group of stakeholders are the ones who have an interest in the operation, the partnership's position in the community and the outcomes of the power plant. The Pangani River Basin Authority is concerned with the water management and is therefore interested in the operation of the power plant and how it will affect the river stream. The local business LM Investment which also shares the river stream, will supply the hydropower plant with their water right allowing the construction and overall functioning of the plant. The partnership will have to include this business.

The following section will analyse certain outside risks that the micro hydropower plant and the subsequent partnership should be aware of in order to set up certain risk mitigation strategies. It should be noted that not all risks are discussed below, but only the ones assumed to be of high importance have been addressed.

## Economic

The project will face certain challenges related to the current economic environment in Tanzania. Inflation has in the last years fluctuated from 4% to 13.5% in 2012. The inflation rate can have an impact on the feed-in tariffs as well as costs. Inflation rates are unpredictable and unfortunately cannot be influenced. A way for the partnership to reduce the risk inflation represents is to create a savings account to face possible extra cost. Currency exchange rates also constitute a risk. As the project is counting on some foreign investors, currency exchange rates will have an impact on their revenues. Fluctuations have an impact on international investors' return earned. Close monitoring of the financial markets will be important. The possibility of hedging currency exchange risks through various instruments have not been considered as part of this project.

TANESCO is another major economic risk. The electricity produced by the hydropower plant will be sold to the electricity provider and infused into the main grid, making TANESCO a customer of the plant. The overall picture of TANESCO is a little disheartening, and cases of nepotism, illegal consumers, corruption, mismanagement, fines and debt far beyond their capacity amount. The contract between TANESCO and the partnership should be clear, available, read and understood by everyone. Incorporating some form of checks and balances in regards to decision-making and handling of profits may also assist in the prevention of unlawful activity. Credit risk is the risk of a borrower failing to make payments on debt. For the hydropower plant project this could affect the power plant itself, as well as the investors and local community. The risk of TANESCO defaulting on payment constitutes a serious risk. As this would be the main source of revenue it is crucial for the partnership to find a way to mitigate this risk. As the risk of TANESCO arises, so does the risk of the partnership defaulting on their investors. If TANESCO does not pay, the partnership will not be able to pay and becomes a credit risk to its stakeholders.

## Social

Both the micro hydropower plant as well as the partnership around it depend upon people's awareness of the potential of electricity and future impacts. With regards to the plant, awareness raising around the topic of energy and the potential of electricity has to become a central theme of the development work performed. The potential of having direct access to electricity is much greater than just being able to charge a mobile phone. Kerosene, an unclean and unhealthy source

of light can be substituted. Electricity can also contribute to improving existing businesses or spurring new ones. A case study done by ONGAWA in February 2013 shows that in general the villagers have not yet realised the potential uses of electricity. When it comes to the partnership itself it is also imperative to capacity build the individual partners. Simple issues such as attitudes towards the different members have to be foreseen and addressed before this impedes on good collaboration. “Although attitudes are changing, there is still an atmosphere of mistrust between the public and private sector.” (Stott, Weir, Lema, & Shaba, 2011)

### Technological Risks

Several technological risks have to be evaluated before the start of this project, including construction risk, development and completion risk. All three are out of scope of the paper, yet ONGAWA should be aware of these and make sure they have the right expertise and knowledge of how to manage them should they arise. Technological risks also include operational risks which link to supply risks, as failure of the plant will stop production, therefore limit supply and so revenue.

### Political

Tanzania is unfortunately still a country where corruption is wide spread. The issue of corruption is further complicated if it is already engrained in societal practice and affecting all sectors. It has, however, received a lot of public attention and the government has made strong commitments to fight corruption, including new laws, regulation and overseeing institutions. Addressing the problem of corruption can be difficult, especially when “people seem to have accepted it as a part of the culture.” (Makoye, 2013) Yet, an anti-corruption stance should be a top priority in all talks with engaged members of the partnership. Lengthy response time of government in Africa emerges consistently as a key challenge. “Slowness” of the public sector is a problem in many countries, and Tanzania is no different in this regard. (Stott, 2010) Both options of including the government in the partnership through local representatives, as well as limiting government participation have been discussed in the paper, discussing the benefits of both.

### Environmental

The weather and climate may perhaps represent one of the greatest risks for the project, because of its unpredictable nature. The region has experienced droughts in the past. The most challenging period will be from June to August, where there is a three month period that has had an average of less than 40 mm rainfall, over the last twenty years. This will have an effect on the production capacity and the profit gained from the hydro power plant.

A Public-Private Partnership is a “contractual relationship between the public and private sector, where the private sector would provide an upfront investment in return for fees for the provision of goods or services. The partnership outlined below, however, would more take the shape of a cross-sector partnership, as there are many actors involved. “Cross-sector partnerships involve organisations from government, businesses and civil society working together in areas of mutual interest to achieve common goals.” (Stott, 2010) The aim is to build a partnership involving all the relevant parties that could contribute to the long term sustainable operation and management of the power plant and the redistribution of the income generated. Investors will have to be paid as well as the upstream communities for their environmental services provided. The river, as well as other natural resources will have to be cared for and protected, as people’s livelihoods depend on it and to ensure proper management by all activities using the river. Therefore, the business model of the plant is directly linked to the environment. For example, villagers, through their environmental services performed, are sponsored in their wish to connect to the grid.

The roles assigned in the partnership have to be tied to the characteristics, knowledge and ability of each partner. These will have to be discovered under the initial meetings held. Members that have to be in the partnership are ONGAWA, representatives from each of the concerned villages, a representative for the local micro investors, as well as for international micro investors, the private company LM Investment, as well as the Pangani River Basin Authority. A possibility is also to create a sort of “senior advisory board” consisting of EWURA, REA (Rural Energy Agency) as well as other entities that might be helpful in giving guidance to the partnership. There are certain roles that have to be filled by these representatives, such as a CEO, treasurer, communications director, secretary, as well as put in place a grievance system. In order for the partnership to function, the essential needs, wishes, resources as well as motivations of each potential partner have been outlined. ONGAWA will only be part of the partnership for the initial years, but will later leave as the partnership is able to function on its own.

The communication strategy as well as meeting procedures have been described. Issues such as how often they should be held, where and how to communicate information when not every partner will have access to internet or is literate are being discussed. How the relationship with non-partnership members will be is also important. Yet most importantly, what to do with profits earned and how to reinvest them in the local community as well as future possible ventures of the partnership is what has to be discussed at the major meetings. Examples are given within the full project report. Lastly, it is important to have a strategy in place regarding the joining and leaving of partners, as this is bound to happen over the course of the year.

One of the most important lessons is that “partnerships are not meant to be permanent but a transitional mechanism until practices become institutionalised or transaction-based.” (Building Partnerships for Development) A partnership is not an endless project but it has a clear start and end date. Furthermore, if the aim of this project is to change the status-quo of the current situation then it has to look at widening and deepening itself. It is about change within organisations and outside of them, so that awareness and change are promoted by future partnership connections.

# Financials



Senninger/Hassel

In order to develop different financial scenarios and funding models an Excel Tool has been developed. It is a flexible instrument with variables that can be altered in accordance with changes in the environment. This executive summary will mention the main variables considered and illustrate what could be a likely scenario. The tables illustrated below were taken during the development, and so all numbers are estimates in order to show the working of the Tool. The numbers do not represent reality, as they are hypothetical. Future meetings with potential investors such as the meeting held with ECOOO in Madrid can give more feasible numbers that can then be inserted in the tool and forecast different future scenarios.

Variables that can affect the running of the power plant as well as the partnership and its ability to meet the requirement from the investors are diverse and would affect different parts of operation. The ones considered of interest are inflation, currency exchange, TANESCO and weather/climate. Below the main parts of the Tool will be explained, whereas the full report contains a more detailed explanation.

The Excel Tool is divided into three work sheets, named the following: First Year Analysis & Revenue, Trends and Stakeholder & Payback.

The first section of sheet one can be seen below. The different colours show which numbers are changeable (green) and which ones are fixed (black). Changing the green numbers will have an effect on other numbers in the spread sheet. The black numbers are formulas and cannot be changed directly, as they are based on other numbers. This itemised financial setup is only done for year one.

| YEAR 1                                | Other   | Jan     | Feb     | March   | April   | May     | June    | July    | Aug      | Sep     | Oct      | Nov     | Dec     | Total \$  |
|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|----------|---------|---------|-----------|
| Capital Cost USD                      | 960,000 |         |         |         |         |         |         |         |          |         |          |         |         |           |
| Currency Exchange From USD1 (19/5/13) | 1625    |         |         |         |         |         |         |         |          |         |          |         |         |           |
| kW/h pr month produced                | 87927   | 79418   | 87927   | 85091   | 87927   | 85091   | 87927   | 87927   | 85091    | 87927   | 85091    | 87927   | 87927   | 1,035,271 |
| Feed in Tariffs pr TZS/kw/h           | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 137.29  | 183.05   | 183.05  | 183.05   | 183.05  | 137.29  | 1830.52   |
| PoA                                   | 2175    | \$181   | \$181   | \$181   | \$181   | \$181   | \$181   | \$181   | \$181    | \$181   | \$181    | \$181   | \$181   | \$2,175   |
| Income pr month in USD                |         | \$7,610 | \$6,891 | \$7,610 | \$7,370 | \$7,610 | \$7,370 | \$7,610 | \$10,086 | \$9,766 | \$10,086 | \$9,766 | \$7,610 | \$99,385  |
| O&M Cost % of capital cost            | 0.05    | \$4,000 | \$4,000 | \$4,000 | \$4,000 | \$4,000 | \$4,000 | \$4,000 | \$4,000  | \$4,000 | \$4,000  | \$4,000 | \$4,000 | \$48,000  |
| Management Cost                       |         | \$195   | \$195   | \$195   | \$195   | \$195   | \$195   | \$195   | \$195    | \$195   | \$195    | \$195   | \$195   | \$2,335   |
| Total Cost                            |         | \$4,195 | \$4,195 | \$4,195 | \$4,195 | \$4,195 | \$4,195 | \$4,195 | \$4,195  | \$4,195 | \$4,195  | \$4,195 | \$4,195 | \$50,335  |
| Gross Profit                          |         | \$3,415 | \$2,696 | \$3,415 | \$3,176 | \$3,415 | \$3,176 | \$3,415 | \$5,891  | \$5,572 | \$5,891  | \$5,572 | \$3,415 | \$49,050  |
| Taxes                                 | 0       | \$0     | \$0     | \$0     | \$0     | \$0     | \$0     | \$0     | \$0      | \$0     | \$0      | \$0     | \$0     | \$0       |
| Revenue                               |         | \$3,415 | \$2,696 | \$3,415 | \$3,176 | \$3,415 | \$3,176 | \$3,415 | \$5,891  | \$5,572 | \$5,891  | \$5,572 | \$3,415 | \$49,050  |

The capital cost of the whole hydropower plant is estimated to be \$960 000. The currency has been set to USD, but this can be changed to another currency according to needs. Income is calculated as the production multiplied with feed-in tariffs, as well as the possible revenue of carbon credits. The total costs are operation and maintenance cost which is set to 5% of capital cost, and as well as



management cost, calculated on numbers found in regards to salary, communication and travel expenses.

Below is the development of the feed-in tariff. The Energy and Water Utility Regulatory Authority (EWURA) sets the price. The price floor is the price of the year the contract was signed, while the ceiling is the floor times 1.5. Contracts are set to 15 years. It has been assumed that it is possible to renew this contract and a 30 year prospect has therefore been developed. Again, it is important to remember that the following numbers are just an example.

The dark blue numbers are the signing of a new contract, while the brown numbers are the year in which the feed in tariff reaches the ceiling. Here, one can see that the ceiling is reached in year four of the contract.

| Tariff | Year 1   | Year 2   | Year 3   | Year 4   | Year 5   | Year 6   | Year 7   | Year 8   | Year 9   | Year 10   |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
|        | 152.40   | 176.43   | 204.26   | 228.60   | 228.60   | 228.60   | 228.60   | 228.60   | 228.60   | 228.60    |
|        |          |          |          | 236.47   | 273.76   | 316.93   | 366.91   | 424.77   | 491.76   | 569.31    |
|        |          |          |          |          |          |          |          |          |          |           |
|        | Year 11  | Year 12  | Year 13  | Year 14  | Year 15  | Year 16  | Year 17  | Year 18  | Year 19  | Year 20   |
|        | 228.60   | 228.60   | 228.60   | 228.60   | 228.60   | 1,370.65 | 1,586.80 | 1,837.04 | 2,055.97 | 2,055.97  |
|        | 659.09   | 763.03   | 883.36   | 1,022.67 | 1,183.94 |          |          |          | 2,126.74 | 2,462.12  |
|        |          |          |          |          |          |          |          |          |          |           |
|        | Year 21  | Year 22  | Year 23  | Year 24  | Year 25  | Year 26  | Year 27  | Year 28  | Year 29  | Year 30   |
|        | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97 | 2,055.97  |
|        | 2,850.40 | 3,299.91 | 3,820.30 | 4,422.76 | 5,120.23 | 5,927.69 | 6,862.49 | 7,944.71 | 9,197.59 | 10,648.05 |

The section below illustrates the yearly income, costs and revenue. Year one is based on the detailed Year One section described above. Year two and onwards are based on the previous year's costs altered in accordance to the assumed 8% inflation. The revenue is based on production capacity and the new feed in tariffs.

|         | Year 1       | Year 2      | Year 3      | Year 4      | Year 5      | Year 6      | Year 7      | Year 8      | Year 9      | Year 10     |
|---------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Income  | 99,385       | 112,404     | 130,130     | 145,639     | 145,639     | 145,639     | 145,639     | 145,639     | 145,639     | 145,639     |
| Cost    | 50,335       | 54,362      | 58,711      | 63,408      | 68,481      | 73,959      | 79,876      | 86,266      | 93,167      | 100,621     |
| Revenue | 49,050       | 58,042      | 71,419      | 82,231      | 77,158      | 71,680      | 65,763      | 59,373      | 52,471      | 45,018      |
|         |              |             |             |             |             |             |             |             |             |             |
|         | Year 11      | Year 12     | Year 13     | Year 14     | Year 15     | Year 16     | Year 17     | Year 18     | Year 19     | Year 20     |
| Income  | \$145,639    | \$145,639   | \$145,639   | \$145,639   | \$145,639   | \$873,225   | \$1,010,933 | \$1,170,357 | \$1,309,837 | \$1,309,837 |
| Cost    | \$108,670    | \$117,364   | \$126,753   | \$136,893   | \$147,845   | \$159,672   | \$172,446   | \$186,242   | \$201,141   | \$217,232   |
| Revenue | \$36,968     | \$28,275    | \$18,886    | \$8,745     | -\$2,206    | \$713,553   | \$838,486   | \$984,115   | \$1,108,696 | \$1,092,605 |
|         |              |             |             |             |             |             |             |             |             |             |
|         | Year 21      | Year 22     | Year 23     | Year 24     | Year 25     | Year 26     | Year 27     | Year 28     | Year 29     | Year 30     |
| Income  | \$1,309,837  | \$1,309,837 | \$1,309,837 | \$1,309,837 | \$1,309,837 | \$1,309,837 | \$1,309,837 | \$1,309,837 | \$1,309,837 | \$1,309,837 |
| Cost    | \$234,611    | \$253,380   | \$273,650   | \$295,542   | \$319,186   | \$344,721   | \$372,298   | \$402,082   | \$434,249   | \$468,989   |
| Revenue | \$1,075,226  | \$1,056,458 | \$1,036,187 | \$1,014,295 | \$990,652   | \$965,117   | \$937,539   | \$907,755   | \$875,589   | \$840,849   |
|         |              |             |             |             |             |             |             |             |             |             |
|         | Total        |             |             |             |             |             |             |             |             |             |
| Income  | \$20,862,148 |             |             |             |             |             |             |             |             |             |
| Cost    | \$5,702,154  |             |             |             |             |             |             |             |             |             |
| Revenue | \$15,159,994 |             |             |             |             |             |             |             |             |             |

|                                    | Local Micro Inv. | Crowd-donations | Impact Fund | Donations | Micro Invest | Ewura     | REA       | Villages    | Partnership-Savings | Stakeholder X | Total   |
|------------------------------------|------------------|-----------------|-------------|-----------|--------------|-----------|-----------|-------------|---------------------|---------------|---------|
| Amount Invested                    | 20,000           | 15,000          | 250,000     | 600,000   | 75,000       | 0         | 0         | 0           | 0                   | 0             | 960,000 |
| % of Total Investment              | 2.08%            | 1.56%           | 26.04%      | 62.50%    | 7.81%        | 0.00%     | 0.00%     | 0.00%       | 0.00%               | 0.00%         | 1       |
| % of annual revenue, First Period  | 0.06             | 0               | 0.58        | 0         | 0.18         | 0.01      | 0.03      | 0.1         | 0.035               | 0             | 1.00    |
| % of annual revenue, Second Period | 0.41             | 0               | 0           | 0         | 0            | 0.01      | 0.03      | 0.50        | 0.05                | 0             | 1.00    |
| Year 15 Return                     | 0                | 0               | 0           | 0         | 0            | 0         | 0         | 0           | 1.00                | 0             | 1.00    |
| \$ Return if payed over lifespan   | \$840,063        | \$0             | \$8,120,612 | \$0       | \$2,520,190  | \$140,011 | \$420,032 | \$1,400,106 | \$490,037           | \$0           | #####   |
| Payback period                     |                  |                 |             |           |              |           |           |             |                     |               |         |
| Return Year 1                      | 14.72%           | 0.00%           | 11.38%      | 0.00%     | 11.77%       | #DIV/0!   | #DIV/0!   | #DIV/0!     | #DIV/0!             | #DIV/0!       |         |
| Return Year 5                      | 99.59%           | 0.00%           | 77.01%      | 0.00%     | 79.67%       | #DIV/0!   | #DIV/0!   | #DIV/0!     | #DIV/0!             | #DIV/0!       |         |
| Return Year 10                     | 178.99%          | 0.00%           | 138.42%     | 0.00%     | 143.20%      | #DIV/0!   | #DIV/0!   | #DIV/0!     | #DIV/0!             | #DIV/0!       |         |
| Return Year 15                     | 256.10%          | 0.00%           |             | 0.00%     |              | #DIV/0!   | #DIV/0!   | #DIV/0!     | #DIV/0!             | #DIV/0!       |         |
| Return Year 20                     | 9,638.78%        | 0.00%           |             | 0.00%     |              | #DIV/0!   | #DIV/0!   | #DIV/0!     | #DIV/0!             | #DIV/0!       |         |
| Return Year 30                     | 27,704.29%       | 0.00%           |             | 0.00%     |              | #DIV/0!   | #DIV/0!   | #VALUE!     | #DIV/0!             | #DIV/0!       |         |

The above section illustrates the different investors/stakeholders and their investment, requirements and payback periods. EWURA requires 1% of profits while REA 3%. Partnership savings has been incorporated in order to be able to face unexpected costs. The two first lines are self-explanatory, while the third and fourth represent the percentage of the annual revenue that is distributed to each investor. It is separated into two, assuming some of the investors will be satisfied after 10 years. After this the distribution of profits will change.

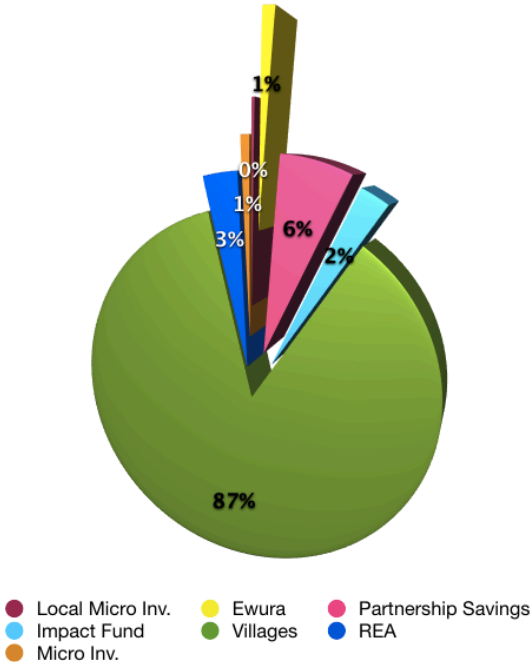
It illustrates the annual distribution of revenue to each investor/stakeholder, in accordance with the annual percentage of revenue explained in previous section. In the line below one can see the accumulated amount for each year. This has been done over all thirty years, which can be seen in the full report.

The payback period for the investors is set to 10 years, and it is not realistic for this number to be any less. As they will be paid with sufficient interest after 10 years, it is not in the partnerships interest to keep them on board after this period runs out either. After a very interesting meeting

|                  | YEAR 1   | YEAR 2   | YEAR 3    | YEAR 4    | YEAR 5    | YEAR 6    | YEAR 7    | YEAR 8    | YEAR 9    | YEAR 10   |
|------------------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| PROFIT           | \$49,050 | \$58,042 | \$71,419  | \$82,231  | \$77,158  | \$71,680  | \$65,763  | \$59,373  | \$52,471  | \$45,018  |
| Local Micro Inv. | \$2,943  | \$3,483  | \$4,285   | \$4,934   | \$4,629   | \$4,301   | \$3,946   | \$3,562   | \$3,148   | \$2,701   |
| Accumulated IRR  |          | \$6,426  | \$10,711  | \$15,644  | \$20,274  | \$24,575  | \$28,521  | \$32,083  | \$35,231  | \$37,932  |
| Crowd-donations  | \$0      | \$0      | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |
| Accumulated IRR  |          | \$0      | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |
| Impact Fund      | \$28,449 | \$33,664 | \$41,423  | \$47,694  | \$44,752  | \$41,574  | \$38,142  | \$34,436  | \$30,433  | \$26,110  |
| Accumulated IRR  |          | \$62,113 | \$103,536 | \$151,230 | \$195,982 | \$237,556 | \$275,698 | \$310,134 | \$340,568 | \$366,678 |
| Donations        | \$0      | \$0      | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |
| Accumulated IRR  |          | \$0      | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |
| Micro Invest     | \$8,829  | \$10,448 | \$12,855  | \$14,802  | \$13,888  | \$12,902  | \$11,837  | \$10,687  | \$9,445   | \$8,103   |
| Accumulated IRR  |          | \$19,277 | \$32,132  | \$46,933  | \$60,822  | \$73,724  | \$85,562  | \$96,249  | \$105,693 | \$113,797 |
| EWURA            | \$491    | \$580    | \$714     | \$822     | \$772     | \$717     | \$658     | \$594     | \$525     | \$450     |
| Accumulated IRR  |          | \$1,071  | \$1,785   | \$2,607   | \$3,379   | \$4,096   | \$4,753   | \$5,347   | \$5,872   | \$6,322   |
| REA              | \$1,472  | \$1,741  | \$2,143   | \$2,467   | \$2,315   | \$2,150   | \$1,973   | \$1,781   | \$1,574   | \$1,351   |
| Accumulated IRR  |          | \$3,213  | \$5,355   | \$7,822   | \$10,137  | \$12,287  | \$14,260  | \$16,041  | \$17,616  | \$18,966  |
| Villages         | \$4,905  | \$5,804  | \$7,142   | \$8,223   | \$7,716   | \$7,168   | \$6,576   | \$5,937   | \$5,247   | \$4,502   |
| Accumulated IRR  |          | \$10,709 | \$17,851  | \$26,074  | \$33,790  | \$40,958  | \$47,534  | \$53,471  | \$58,719  | \$63,220  |
| Partn.-Savings   | \$1,717  | \$2,031  | \$2,500   | \$2,878   | \$2,701   | \$2,509   | \$2,302   | \$2,078   | \$1,837   | \$1,576   |
| Accumulated IRR  |          | \$3,748  | \$6,248   | \$9,126   | \$11,826  | \$14,335  | \$16,637  | \$18,715  | \$20,552  | \$22,127  |
| Stakeholder X    | \$0      | \$0      | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |
| Accumulated IRR  |          | \$0      | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       | \$0       |

with ECOOO in Madrid to explore the possibility of micro investments from Spain, a study was made assuming that the payback period would be 12 years, and the revenue earned would be 8.3%. More scenarios, however, can be read in the full report.

The pie chart on the right shows the possible distribution of revenue, and how the power plant has a potential to benefit the local community. More than 85% goes to the local communities and more than 95% stay within Tanzania's borders.



# Conclusion & Recommendations



Senninger/Hassel

The full report provides ONGAWA with a pre-feasibility study and potential innovative ideas regarding their new micro hydropower plant in Same, Tanzania. It addresses the major risks involved in this project, as well as mitigation strategies or prevention, when possible. It looks at many different funding sources, both donation and investment based: Crowdfunding platforms, impact funds, possible international business participation as well as local private sector participation, as well as the promotion of local micro investments and international micro investments. How to apply to the different platforms, how to reach out to the impact funds and businesses, as well as how to find new opportunities have been discussed in the report. Next a partnership model is outlined, as it is important to set up a structure that includes all the relevant stakeholders and that can deal with the working of the power plant, the distribution of revenue, the environmental services provided, all the while trying to maximise the outcome for the villagers. By being members of the partnership, the villagers are given the opportunity to be active participants in the decision-making around their village and environment development. An Excel Tool has been created to first of all calculate the financial viability of the hydropower plant, as well as assist in calculating the different requirements set by the different investors, predicting potential profits for each one and project overall financial outcomes to see how much money can be directed towards the sustainable development of the villages. A short section describing the potential of carbon credits follows the tool in the full report.

Generally, the limited amount of time available to work on this project has been a major drawback in its development. It has limited our depth of analysis as well as our knowledge of the local reality. Due to this, the risk analysis is at times based on assumptions concluded from our research, but not from actual research performed locally. The same is true for the partnership model. It is still very hypothetical, even if we received a lot of feedback regarding the Tanzanian reality from professionals having worked there. Many times, we encountered blockages in our research. For example, even after several attempts, we were still not able to receive information from TANESCO, from any of the impact funds involved, or UNIDO in Tanzania regarding local private sector involvement potential for the project. It seems hard at first, yet once the initial contact is made, discussions are very fruitful indeed, as was demonstrated through the meeting with ECOOO in Madrid regarding Spanish micro investments. Therefore, we encourage close and frequent communication with the potential players in order to keep exploring these possibilities.

General ground work and research has been done, such as identifying donors and investors, as well as enterprises that can help in the organisation of the micro investors, both in Tanzania, as well as internationally. Yet, more time should be devoted to the potential of carbon credits. It is a new area, yet we feel it has potential, even if right now the price of carbon is very low (around 6

euro/ton CO<sub>2</sub>). Regarding the Excel Tool, even greater flexibility would be preferable. However, due to time constraints, we could only construct a first model. With more concrete numbers, which can be acquired through future meetings that ONGAWA should have with potential partners, a good estimate, however, can be obtained.

Overall, we hope that this study can support ONGAWA during future pursuits of this project. We hope that ONGAWA, with this project can assist with fresh, new ideas when it comes to the development field. Making sure that projects really do contribute to the socio-economic development of people, without harming the environment, will perhaps never be easy. Furthermore, it is imperative to target the *real* needs of the local communities'. We believe that there is not other way to know and be able to address these needs unless they are given the chance to be a part of their own development. Ultimately, this project is so much more than just the construction of a hydropower plant.

Asante sana!

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