Knowledge Transaction: Reducing Energy Costs in Water Supply Operations

Activity Completion Report
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006/06

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

PURPOSE

The Energy Sector Management Assistance Program (ESMAP) is a global technical assistance partnership administered by the World Bank and sponsored by bi-lateral official donors, since 1983. ESMAP's mission is to promote the role of energy in poverty reduction and economic growth in an environmentally responsible manner. Its work applies to low-income, emerging, and transition economies and contributes to the achievement of internationally agreed development goals. ESMAP interventions are knowledge products including free technical assistance, specific studies, advisory services, pilot projects, knowledge generation and dissemination, trainings, workshops and seminars, conferences and roundtables, and publications. ESMAP work is focused on four key thematic programs: energy security, renewable energy, energy-poverty and market efficiency and governance.

GOVERNANCE AND OPERATIONS

ESMAP is governed by a Consultative Group (the ESMAP CG) composed of representatives of the World Bank, other donors, and development experts from regions which benefit from ESMAP's assistance. The ESMAP CG is chaired by a World Bank Vice President, and advised by a Technical Advisory Group (TAG) of independent energy experts that reviews the Programme's strategic agenda, its work plan, and its achievements. ESMAP relies on a cadre of engineers, energy planners, and economists from the World Bank, and from the energy and development community at large, to conduct its activities.

FUNDING

ESMAP is a knowledge partnership supported by the World Bank and official donors from Belgium, Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom. ESMAP has also enjoyed the support of private donors as well as in-kind support from a number of partners in the energy and development community.

FURTHER INFORMATION

For further information on a copy of the ESMAP Annual Report or copies of project reports, please visit the ESMAP website: **www.esmap.org**. ESMAP can also be reached by email at **esmap@worldbank.org** or by mail at:

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Summary

The trip gave the WUP a good insight into the Energy Monitoring and Targeting (M&T) program being pursued by some privately-managed water and sewerage companies. There is evidence of substantial savings that can be made in energy use, if management will commit itself to a conscious and well-defined programme to cut costs. Deregulation of water provision in Brazil allowing municipalities to engage private operator in concessions, desire of companies to cut costs to assure profitability and meet obligations in their concession contracts, differential pricing of power in peak and off-peak times, among others, have provided the enough justification for these companies to adopt the Energy M&T. In one case energy costs have reduced from 30% of revenues (1999) to 13%, signifying the tremendous impact the program is making.

It will be very useful to replicate the project in selected African utilities. Energy costs are certainly a major cost item in most African water utilities. Whilst there is a broad range of ownership and management arrangements that have a bearing on how energy bills are treated, there is no doubt that the replication of the project in Africa will be a great step towards improving utility performance.

A number of actions to be undertaken towards replication of the project within African utilities have been identified and are indicated in the last section of the report. These include the preparation of a Concept Note, creating adequate awareness for the project among water African water utilities to solicit interest, identification of supporting/partner institutions and roles and the preparation of a project document for funding

It is hoped that this report on the visit by the team from WUP provides a basis for moving forward.

1

Introduction

Background to Visit

1.1 A proven management tool for curbing energy costs is energy monitoring and target setting, or Energy M&T. The fundamental objective of Energy M&T is to put management firmly in control of energy use and to motivate managers to ensure that energy resources are used to maximum economic advantage. Energy M&T enables commercial enterprises, especially those that have a large number of sites (such as water utilities) to manage energy use as a controllable resource. The World Bank's Energy Sector Management Assistance Program (ESMAP) has been sponsoring a learning-while-doing approach to transfer knowhow and on-the-ground experience with Energy M&T to developing country clients, such as ABCON members in Brazil. In so doing, ESMAP hopes to replicate it elsewhere in Brazil and in other countries.

1.2 The Water Utility Partnership for Capacity Building in Africa (WUP), which has as its sponsors the Union of African Water Suppliers (UAWS), some ITNs and Donor organisations, is dedicated to improving the management capacities of African water producers. In June 2003, a Special Meeting of some WUP constituents held in Nairobi endorsed a proposal for the WUP to undertake a study to improve energy management in water utilities in Africa, based on earlier informal discussions with Armarquaye Armar of the World Bank's ESMAP. It was subsequently agreed that ESMAP would fund a two-man study team to:

- see how an Energy M&T programme being undertaken by members of ABCON, a group of local private water and sanitation utilities, has succeeded in reducing energy-related costs in municipal water and sewerage delivery systems.
- investigate the possibility of implementing such a project in selected African utilities.
- Develop an action plan on how the project could possibly be undertaken in the utilities in Africa.

1.3 The study team comprised Dennis Mwanza (Managing Director of WUP) and Kwabena Sarpong Manu (Consultant to WUP), Michael Hamaide (World Bank) and

Pedro Paulo da Silva (Consultant and Manager of Energy M&T programme in Brazil). The visit took place from 8th -12th December 2003.

1.4 The WUP team is grateful to Armarquaye Armar, Michael Hamaide of the World Bank, and Pedro Paulo da Silva for putting the trip together. We are also grateful to the management and staff of Aguas do Imperador and SANEATINS, the two Brazilian utilities for taking us round their facilities and for their hospitality.

1.5 This report summarises the main findings of the study tour and makes some recommendations on the next steps in a possible replication of a similar project in Africa.

2

Utilities Visited

Aguas do Imperador: Petropolis

2.1 Aguas do Imperador (ADI) is a Brazilian-owned utility, and a subsidiary of Aguas do Brasil. ADI has been given a 30-year concession by the Municipality of Petropolis and has responsibility for both water and sewerage services. ADI is regulated by Companhia de Aguas e Esgotos do Municipio de Petropolis - CAEMP. The visit to Petropolis took us to some of the company's treatment plants and pumping stations in Petropolis on Monday 8th December 2003.

2.2 Petropolis is about an hour's drive from Rio de Janeiro and has a population of 270,000, out of which 220,000 are provided with piped water supply. The unserved population, mainly those living in the outlandish areas, depend on wells and boreholes for their water supply. With respect to sewerage only 30,000 of the population in mainly central Petropolis is connected to the sewerage system, and plans are underway to cover more areas. Due to the topography of Petropolis (very hilly) and the scarcity of land, the main sewerage treatment facility is built right in the centre of the town in a mainly commercial and built up area. The facility was permitted to be built there following assurances that the technology to be used would ensure that all odour will be removed. Indeed such was the case during our visit. The topography of the city and the abundance of water resources from the hills have provided an opportunity for building mini-hydro plants by the water utility to complement what is purchased from the local electric company.

2.3 Since taking over the water and sewerage services in 1998, ADI has made considerable improvements in its operations. Some of the notable achievements since taking over the operations from the municipality in 1998 include:

- Improvement in water treated from 460 litres per second to 815 lps;
- Collection ratio up from 70% to 91% (with sewerage) and 95% (without sewerage);
- Reduction in unaccounted for water from 43% to 22%;

- Increase in coverage from 140,000 consumers to 220,000 out of a total population of 270,000;
- Substantial increase in sewerage service.

2.4 A critical cost centre in ADI's operations has been that of energy costs, the pricing of which it has little control. Thus as it made substantial improvements in its operations and provided better services to consumers, it realised that its energy costs were still increasing, as a result of both external (electric utility's price increases) and internal (energy use) factors. ADI has embraced the Energy M&T program and is beginning to reap some of the benefits. The Energy M&T program is at the moment limited to ADI's operations in Petropolis, but plans are advanced to replicate this in other towns. ADI's Energy M&T is expected to help it reduce its energy bills by 52% of its billing for 2002 through metering all energy cost centres, rising of pumps, managing its pumping hours and power factor correction and complementing its power supply through mini-hydro plants. It has so far achieved a reduction of about 13% in its energy costs since it began the program in January 2002.

2.5 The above improvements have not only benefited consumers but also means that less energy cost is incurred per consumer to deliver water, as less treated water goes to waste.

2.6 The seriousness which ADI attaches to its Energy M&T is expressed in the composition of the Energy Management Team, headed by the General Manager (Operations), Mr Ivan Moura and the appointment of a General Energy Manager, Mr Andre Lermontov.

Saneatins

Visit to Head Office

2.7 The visit to SANEATINS by the team from 9th-11th December took us to treatment plants and pumping stations in Palmas (the State capital) and Porto Nacional. The team was also given presentations on some of the measures being taken by the company to improve its efficiency and reduce wastage (pre-paid metering), as well as its Energy M&T program.

2.8 Water supply and sewerage services in the State of Tocantins are provided by SANEATINS, which is a Brazilian-owned joint venture company between EMSA (51%) and the State (49%). EMSA is one of the leading civil engineering and construction companies in the State. The company has a 30-year concession in a number of cities and now provides WSS services for as many as 117 of the 139 municipalities under separate concession contracts. These concessions are also for 30 years, and in one case is for 50 years.

2.9 The presentation on the company's use of the **Smart Card**, which forms part of its pre-paid metering program, has helped it to monitor water consumption and indeed reduce wastage and ensured almost 100% collection. Water consumption has

reduced by about 20% and this has made it possible to serve deprived communities, and to carry out better planning for extensions. The company plans to meter all government offices to ensure more effective collection from these agencies. In order to remove some of the disadvantages of pre-payments, the company allows a 3-day water consumption on a credit basis.

2.10 The presentation on the Smart Card can be found in the Appendices.

Palmas

2.11 Palmas is the regional capital of Toncantins in the Northern part of Brazil. Palmas is about 800 Km from the Capital City of Brazil –Brasilia and is almost 2,000 km from Rio de Janeiro. It is a relatively new State capital having been literally built from scratch some 14 years ago. With a population of around 150,000 it is served by 3 treatment plants and 3 pumping stations.

Visit to ETA 005 Plant

2.12 This is a relatively small treatment plant, but is one of the many treatment plants serving Palmas. This particular plant has 5 sand round filters made of fibreglass with a diameter of about 3 metres. The filter media is about 2 metres deep. Water is pumped from the intake works about 2 km away and pumped to the treatment plant over a head of about 40 to 45 metres.

2.13 The treatment plant has a total of 3 duty pumps. One for backwashing, one for recycling the water used for backwashing back into the treatment process and the last one for pumping treated water to the reservoir. Backwashing is done once every day. The plant operates on a 24/7 basis and has a total staff compliment of 5. It has been in operation for over 5 years though it received a facelift about 18 months ago. This was with the addition of a contact tank to the system.

2.14 The plant is ISO9001 certified and they have to make sure that they maintain a very high operational standard in order to adhere to the ISO9001.

With respect to energy saving measures:

2.15 The plant has an automatic pressure differential mechanism which makes it possible to have pumps switching off when not needed automatically.

2.16 Previously water from this plant was being pumped directly to consumers. This resulted in a big waste especially that the pumping was the same whether during peak or non-peak hours. Energy-wise there was no saving with this approach. However after the renewal of the station and in view of the project of ESMAP it was felt that pumping water to the main reservoir in Palmas was more cost effective. Water is therefore pumped to the large reservoir from this treatment plant.

Visit to ETA 006

2.17 This is a huge treatment plant – it is the largest treatment plant in the whole of SANEATINS Company. Apart from its size, ETA 006 is a standard treatment

plant with all the necessary treatment processes that you would find for treating highly turbid water.

2.18 The source is barely 100 meters to the pumping station for raw water. The water receives primary screening before entering sand boxes where all the particles weighing more than water (higher density than that for water) remain. The water flows by gravity in an open channel to the pumping station. The water then enters the main pumping station, which has three pumps with two duty-pumps. Each pump is 75 HP and pumps raw water to a head of 18 m. The two duty pumps are in parallel. The capacity of the treatment works is 500 litres per second (approximately 43,000 m^3/day).

2.19 The system is highly automated and pumps are timed to switch on or off as they may be needed. The timing is in such a way that the pumps are not on during peak period (in terms of energy) as this results in great energy saving. **It costs over 6 times as much for off peak period power.**

2.20 From the pumping station the water is pumped to the treatment plant within the same premises. Flocculants and coagulants are introduced to the water – calcium hypo chloride and aluminium sulphate are utilised for this purpose. In this respect the plant has 2 large decanting tanks and 2 large flocculation tanks. After this process water is then introduced to the filtration process. There are a total of six filtration tanks on the plant.

2.21 There is no recycling of the water used for backwashing. However the loss of the water as a result of backwashing is very insignificant to justify the costs of recycling. It is estimated that only 1 and half percent of the treated water is actually lost through backwashing. For backwashing water as well as compressed air are utilised.

2.22 After filtration the water is then directed to the main reservoir by gravity. The reservoir has a capacity of 5,000 m^3 and serves a total of around 23,000 connections (approximately a total population of 90,000 people).

2.23 The output from the reservoir is pumped to two places by a total of 5 pumps with 3 duty pumps and 2 on standby. The arrangement is that at any one-time one-pump pumps 130 l/s to a reservoir south of the city Palmas and another two pumps pump up to 230 l/s

2.24 The pumps have a capacity of 350 HP each.

In relation to energy saving measures:

2.25 This plant has the highest individual cost centre energy costs. It contributes up to about 15% of the total company (SANEATINS) energy costs. On this basis this was the first place to tackle the problem of energy costs.

2.26 The plant has been programmed in such a way that there is almost a total plant shut down during the peak period as defined by the energy company – this is usually between 19.00 and 21.00 Hours. The pumps and all other gadgets switch off at exactly 18.45 and will come on at around 21:15. This measure results in a very big saving

on energy costs. During off peak time the plant uses up to 700 KWH but during shut down only 100 KWH is retained, and saves saves up to 6 times in energy costs.

2.27 In order to assist management in monitoring energy use, the plant was separated into 5 sub-cost centres. The energy use is monitored in these five places which include:

1. The intake works
2. Pumping for water used within the premises as well as energy use for other equipment including the workshop, laboratory, offices e.t.c.
3. flocculation and decanting channels
4. The filtration area –backwashing
5. Main pumps at the reservoir

2.28 The other interesting feature of the plant is the level of automation. All the equipment is linked to a network. One can monitor what is happening anywhere on the plant, even a reservoir about 10 km away. This monitoring includes details of even security and any intruder can be noticed and appropriate action taken.

Porto Nacional

2.29 On Wednesday a visit was made to the branch office of SANEANTIS in Porto. Porto is a small town with a population of 40,000 people. SANEATINS has a total of 11,000 connections in the town. This can be worked on an average of about 4 persons per household. The 11,000 connections includes public places i.e. schools, shops, industries e.t.c. This represents 90% coverage of the population. Those that are not connected to the system receive their water through other means i.e. wells or individual boreholes. They are not connected basically because of the distance to the nearest possible point of connection. There are no water vendors to sell water to those not connected.

2.30 The company is also responsible for supplying up to 12 small settlements (which can be termed as villages). There is an engineer responsible for operations in these areas.

2.31 The tariff system is the same for the whole region of Tocantins. This also means that SANEATINS applies the same tariff which works on a progressive scale to all the consumers under their service area.

2.32 At the moment there is no central sewerage system in Porto but one is under construction. Septic tanks and soak away system is used in the town. It is anticipated that the works would be completed by end of the year and start operations by February 2004. From the start about 20% of the capacity of the sewerage treatment plant will be used as the population will have to move from the current septic tank-soak away system.

2.33 From the cost estimates and revenue situations the company spends a maximum of 8% of its revenue to meet the energy costs. A total manpower of 52 is responsible for all the operations in Porto. The branch is able to meet all its operational costs and so does not need any subsidies from the Headquarters in Palmas.

2.34 The source of water is split as 80% surface and 20% groundwater. For obvious reasons the company would have preferred more of groundwater but the geological situation does not permit a high drawing of groundwater.

2.35 The interesting situation for Porto however is a very high unaccounted-for-water (UFW). Currently they estimate that the UFW is in the range of 45 to 50%. Reasons for this include the fact that the system is very old and the distribution network is not efficient. The company is now in the programme of revamping the entire network system with a hope of reducing this rather difficult problem. All consumers are however metered. So the losses are therefore genuine as one can measure them.

2.36 The system in Porto comprises of intake works, treatment plant, network distribution and branch offices. The intake works is situated about 2 km from the treatment plant. An earth fill dam was constructed to provide for storage. The dam height is about 14 metres with a crest length of about 100 metres. A six-metre spill way provides for over flow. During the visit the water was about 3 metres below the spill level. We were advised that since this was the dry season this was certainly the lowest level.

2.37 Two pumps of 175 HP each are at the station with one duty pump at a time. The pump is controlled from the treatment plant so it is not switched on and off automatically. There was an automatic system in place but it is not working very well. It is about to be replaced. Raw water is therefore pumped through a 300 mm GI pipe to the treatment plant over a head of about 100 metres.

2.38 The treatment plant is a typical standard design plant with one or two unique features. It works on a principle of double filtration. Double filtration has been found to be more cost effective in terms of energy saving and also backwashing is much faster. One filter tank is divided into two sub-filtration tanks. Water enters from the bottom in one sub-filtration tank and then enters from the top in the second tank. This therefore means that filtration is from the bottom in one tank and from the top in the other tank.

2.39 While the plant does not have any algae problem, the filtration tanks have been painted black as a preventive measure against any possible algae problem. The tank was designed to produce 175 litres per second of treated water which is then pumped to a huge reservoir. From the reservoir the water is distributed to various secondary reservoirs before further distribution to individual consumers by gravity system.

In relation to energy saving:

2.40 The double filtration is one way by which the company has managed to reduce on energy costs. A second interesting initiative is automation of backwashing. Previously backwashing depended on how one manager saw the need to do it and how

frequent. An example was given how one manager could suggest backwashing every 10 hours another manager says backwash every 8 hours. The more frequent the backwashing the more costly it is in terms of energy. A system was therefore developed whereby an indication was made that implied a need to backwash.

2.41 Since the amount of water used for backwashing is so small (approximately 1%) the water is not recycled back into the treatment system. Part of the backwashing is done by compressed air.

2.42 The treatment plant also comprises of a laboratory for checking the water quality.

2.43 Each operations centre –termed as the cost centres. Each cost centre therefore receives a bill from the energy company. The electricity company is a private operator. The individual bill enables the energy manager within SANEATINS to monitor energy costs and use and can therefore propose measures to reduce on any costs resulting from this.

2.44 According to the information made available to the team, energy use is about 3.5 Million Kwh per month. This energy use is for the whole of SANEATINS and is not specific to Porto. The company serves a total of 1 Million consumers in the whole state of Tocantins.

2.45 The afternoon of Wednesday 10th December was spent on visiting two treatment plants and also a presentation. The two treatment plants visited are the ETA 005 and the ETA 006. The presentation that was made was in reference to the energy saving initiatives that the company has undertaken.

Presentation on Energy M&T Programme in Brazil

2.46 The presentation was basically highlighting or confirming what we saw in the field visits. This made things more clearly and the figures were evident that the project has been of great benefit to the Company.

2.47 A copy of the presentation is attached herewith.

3

Findings

3.1 The following findings and observations were developed by the study team from the wrap-up discussions held on Friday 12 December 2003.

Motivating Factors for Energy M&T

Deregulation of the Water Sector

3.2 The deregulation of the water sector transferred power to the municipalities and this allowed private companies to emerge. The municipalities had the choice of continuing with the state institutions in the running of their water and sewerage utilities or they could source out to private operators.

Private sector's active participation

3.3 The Energy M&T program has been embraced by the private utilities principally because they see a need to cut their operational costs and improve efficiency. Given that they have long term contracts to achieve certain results, it is incumbent on them to identify areas in which costs can be reduced in order to improve profitability, without necessarily passing on their costs to consumers. They are therefore ready to take those measures and to make those capital expenditures that will help to achieve their objectives and meet their operational targets. Given that energy costs range from 20-30% of their operating expenditures, any reduction in this area could have an impact on service delivery and profitability. Savings in energy costs have been recognised in two areas:

- Savings as a result of reduction in unaccounted for water (and therefore less costs incurred in treating water that would otherwise have gone to waste);
- Savings made as a result of energy-related measures - power factor correction, system automation, reuse of filter back wash water; better pump/reservoir system strategy and reduction of pipe pressure loss

3.4 Top managements of the utilities have all been involved in the scheme, signaling the importance attached to reducing energy costs.

Achievements

3.5 The involvement of the private companies in the operation of the private utilities visited has seen very positive results as improvements have been made in all areas of their operations. The Energy M&T programme has made modest to significant savings (depending on when the utility started the scheme) and there appears a very strong commitment to make the extra expenditures needed to achieve greater savings. In the case of SANEATINS from a level of 24% of revenue (1999), energy now takes up only 13% (2002), and most of the results achieved did not require any major investments. The pay-back period for some of the interventions have been no more than a few months. It is also noteworthy that the utility companies now carry out a cost-benefit analysis on energy-related capital expenditures.

Collaboration between ABCON and World Bank

3.6 Members of ABCON, which is an association of private water and sanitation utilities have been active participants in the project and have worked closely with the World Bank. Funding support has come from ESMAP but the operators have been willing to undertake some of the expenditures to meet their energy-saving objectives.

3.7 In relation to the implementation of the project, dedicated consultants and the involvement of the Director-General of ABCON have assured success.

Differential pricing by Power Utilities

3.8 The system of differential energy pricing in Brazil has helped a great deal as there is incentive to conserve the use of power during peak times. Whilst this may not exactly be an initiative of the power companies, the role played by regulators in making this possible needs to be stressed.

Role of regulators

3.9 The role of utility regulators (water and energy) in ensuring the adoption of schemes such as the one is important as consumers are the ultimate beneficiaries of any savings and efficiency improvements. It is noteworthy that the Head of the water regulatory body in the State of Tocantins, who until recently was the head of the utility, has been very supportive of the scheme and was with us during most part of our visit to the State. Enforcement of efficiency requirements imposed in the concession contracts, setting the rules for energy pricing and creating greater flexibility for big users has encouraged the private water utilities to adopt cost-saving measures to improve profitability and their efficiency.

Replicability

3.10 The scheme definitely needs to be replicated within some of Africa's water utilities given that energy costs form a significant proportion of their expenditures.

But there are peculiar differences between Brazil (as one country, with several states) and Africa as a continent with several countries. Regulatory regimes are different from country to country, local private participation is not well developed (and where available is within very small towns), most energy and water utilities are publicly-owned and are undergoing reforms, public assumption of utility's losses does not provide adequate incentive for managers to be cost-conscious etc. However the keen interest shown by some utilities in similar projects undertaken by WUP e.g. reduction of UFW in some utilities in Africa, is an indication that there will be a lot of interest from the over 130 utilities that belong to the Union of Africa Water Suppliers. Indeed a WUP special meeting held in Nairobi in June 2003 endorsed the need to look at energy use within African utilities

4

Action Plan for Replication of Project in African Utilities

4.1 The team agreed the following Action Plan to assist in the replication of the Energy M&T Programme in Africa.

Development of a Concept Note

4.2 The first activity should be to develop a concept note of a possible project on reducing energy costs in municipal water supply systems. This concept note would utilise the outcomes from the visit as an example of a successful project, the information contained in the outputs of the project implemented in Brazil and any other information which could be provided by the ESMAP team or the project team in Brazil.

- The concept note should identify the main motivating factors for utilities. What would utilities gain out of such a project, what would be their input in terms of time (personnel), financial commitments and any other resources.
- It should further clarify the roles that different players would play in the project i.e. develop a kind of organisation chart for the implementation of the programme.
- What level of financing would the project be seeking from the World Bank and any other potential donors.
- Possibly develop a kind of selection criteria for utilities to participate in the project just in case of an overwhelming response from utilities.
- Resource requirements for the implementation of the project i.e. the WUP might need to hire consultancy services –how many and what levels are we talking about. Areas of speciality or expertise of such consultancy. Any backstopping support from the experts in the World Bank i.e. ESMAP
- Identify any potential linkages with ongoing initiatives i.e. Water for African Cities, investment programmes by the World Bank, the ADB e.t.c.
- In order to develop an adequate concept note, the WUP will require input from a consultant who will work with the Managing Director of the Programme.

WUP as Host Institution of the Project

4.3 The WUP is well placed to host the project in view of its main focus and will have to confirm its interest to the World Bank/ESMAP. Some of the factors considered are:

- The main clients of the WUP programme are water utilities in Africa. The focus of the programme is capacity-building of the utilities to improve on their performance. The programme is further strategically located especially with its strong links with the Union of African Water Suppliers (UAWS). The WUP is in the same offices as the UAWS and the UAWS is represented on the steering committee of the WUP.
- The WUP has experience in implementing a similar project on a pilot basis. This project is termed as *utility management and reduction of unaccounted for water*. Utilities were recruited based on an advert sent out to utilities. A selection criterion was developed and the project is currently in its second phase of implementation.
- The WUP has grown into a kind of reference organisation for urban water services especially issues related to utility management.

4.4 Having undertaken a study visit of the two water utilities in Brazil where the project is being piloted, we are convinced that there is great potential for utilities in Africa to benefit from such an initiative.

Creating awareness for the Project

4.5 The first activity would have to be an awareness campaign or kind of publicity for the project and its benefits.

4.6 A number of utilities in Africa (especially public utilities) tend not to meet their energy cost obligations in full. This tends to be the case since most of the energy companies are also public utilities. However in this case it is necessary to create an awareness which would work on an assumption that the energy costs are fully factored into the operational costs. Some utilities (mainly privately managed but as well as selected public utilities) do settle their electricity bills and are struggling on how to reduce their energy costs. This project would therefore come in handy to assist utilities improve on their operational efficiencies.

4.7 An opportunity exists where the proposed project could be presented to gauge the interest of utilities in Africa. This opportunity is provided by the forthcoming UAWS congress-taking place in Accra, Ghana from 16th to 20th February 2003. Efforts can be made to organise a special workshop which would concentrate on this project.

4.8 It would be very useful if funding could be provided for the participation of one person from the Brazilian project in the UAWS congress. The participant will be asked to make presentations during the special workshop which the WUP can organise.

Such a workshop could be a post congress workshop other than during the congress as the programme for the congress is already full.

Develop Project proposal

4.9 The next major activity will be the development of a full-fledged project proposal covering all aspects of the project including the following items:

- Main Goal of the project
- Project objectives
- Activities to be undertaken
- Resource requirements and allocation of roles (including who does what)
- Participating utilities (written interest from utilities should be part of the project proposal).
- Implementation procedures including organisation chart
- Budgetary requirements for the project including any contributions expected from the participating utilities, possible sources of funding e.t.c.
- Linkages with other on-going initiatives. Effort could be made to secure written expressions of interest to collaborate in this initiative.
- Dissemination and up scaling of the project
- Logical framework of the project

Selection of Pilot Utilities

4.10 The project would have to be implemented in phases. The first phase should be implemented on a pilot basis possibly in a maximum of 10 utilities with a reasonable geographical and language spread. The following should be considered in the selection of utilities:

- both publicly/privately operated should be considered
- regional/national, municipal
- water only and water and sewerage, among others
- a utility that actually pays its energy bills and one that doesn't
- utilties with potential for developing alternative energy sources

4.11 Utilities in the following countries were identified as possible candidates. This list will be modified later especially during the congress of the Union of African Water Suppliers taking place in Accra, Ghana in February 2004:

- Uganda -(privately managed small town water systems)
- South Africa -mixed public and private operators
- Zambia -public (Mulonga water supply)
- Togo
- Burkina Faso
- Ghana -public corporation/management contract
- Namibia
- Tunisia
- Mozambique

Fundraising

4.12 Since the first phase of the project will be on pilot basis, the budgetary requirements may not be very big. The first possible funding source would be ESMAP at the World Bank. Efforts could be made to secure funding from other organisations. It is quite likely that seed money could be sought to kick-start the project in selected pilot utilities. For purposes of up-scaling, efforts would then be made to secure funding from other organisations.

Summary of Actions and Dates

Item No	Item	End date	Comments
1.0	Identify funding sources and requirements for project development	31st December 2003	Possibly agree this including levels with ESMAP
2.0	Develop project concept note	31st January 2004	
3.0	Secure support for participation of Brazilian team in UAWS congress	January 15, 2004	
4.0	Organise and advertise the special workshop on the proposed initiative at the UAWS congress	February 2004	
5.0	Secure written confirmation of interest from the proposed host institution of the project –the WUP	March, 2004	
6.0	Draft project proposal	Feb/Mar 2004	
7.0	Fundraising	May 2004	

Appendix 1

List of Persons Contacted

1. **ABCON**
   Antonio Carlos Zuccolo - director

2. **AGUAS DO IMPERADOR**
   Joao Luiz – director
   Ivan Moura – general operations manager
   Andre Lermontov – operations and energy manager

3. **SANEATINS**
   Maria Lucia – operations director
   Dorival Roriz – president
   Andre Michel – operation manager ETA 006
   Rosilene – general operations manager

4. **[OFFICE OF THE REGULATOR, TOCANTINS]**
   Waterloo de Oliveira - director