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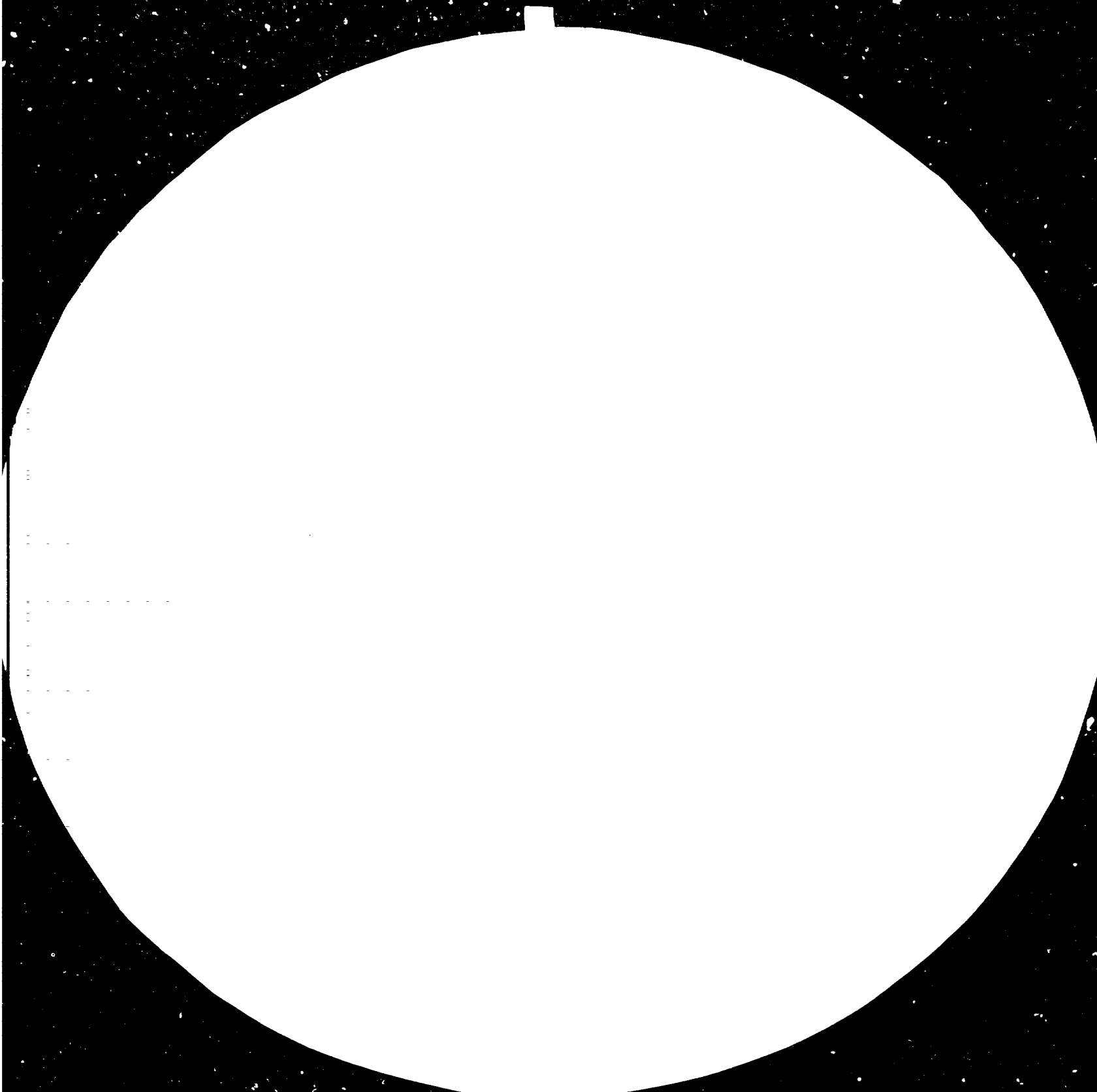
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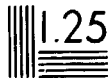
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MINI HYDRO POWER DEVELOPMENT in
United Republic of Tanzania *

by

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INTRODUCTION

Tanzania has an abundant potential of hydropower sources spread throughout the country. Since the early 50s the country started exploiting its hydropower potential when three mini hydropower plants with an installed capacity of 3.8 MW were commissioned. In the early 60s two small hydropower plants with a capacity of 45 MW were commissioned bringing the total hydropower capacity in the country by 1968 to 49MW.

In the early 70s the need for firm low cost energy in the country was realised. Due to the high cost of oil it was decided to meet this demand by hydropower generation. Feasibility studies of the numerous potential sources was undertaken and the Kidatu site on the Great Ruaha River in Tanzania was selected as the most economically feasible location for a 200 MW hydropower plant. It was decided to develop this potential in two phases. The first phase involved the construction of a regulating dam with a capacity of $125 \times 10^6 \text{ m}^3$, the installation of 2 generating units 60 MVA each and the construction of a 350 km long 220 KV transmission line to Dar-es-Salaam which is the heart of the industrial development in the country. The second phase of the development involved the construction of a $3000 \times 10^6 \text{ m}^3$ storage reservoir 134 km upstream of Kidatu and the installation of 2 more 60 MVA each generating units at Kidatu to bring the total installed capacity of hydropower in the country by 1980 to 249 MW.

In 1975 a detailed power sector study for the country was undertaken in order to determine the potential of hydropower capacity in the country. Other alternative renewable sources of energy in the country were also looked into, the aim being to harness these in order to replace all the thermal plants in the country.

MINI HYDRO DEVELOPMENT

Whereas from the early 50s mini hydropower development in the country has not been seriously looked into, both the Tanzanian Government and the Power Company in the country have decided to seriously go into mini hydropower development for the following two main reasons.

- (1) Since 1973 the oil prices have been going up. Tanzania has no oil of its own and as a result 60% of its foreign exchange earnings is utilised in the purchase of oil the bulk of which is used in power generation.

- (2) Due to the vastness of the country the transportation of the oil from the port in Dar-es-Salaam to the rural areas up country is a very difficult task on account of the poor communication links existing in the country.

Bearing in mind that more than 90% of the Tanzanian population lives in the rural areas the government decided way back in 1967 when the villagisation program was embarked upon to embark on a major rural electrification program.

From 1967 a number of diesel driven generators were put up in rural areas in order to encourage small scale industries in the rural areas. Already by 1980 more than 5000 permanent villages had been established.

In order to be able to supply cheap but reliable power to these villages and the other towns not fed by the national grid the government decided in 1980 to embark on a major mini hydropower development in the country. At present a number of teams have been commissioned to carry out feasibility studies of several potential sources. Already some reports to this effect have been presented and implementation of some of these projects is expected to commence early next year. The following potential hydropower sources are at present being studied.

- (1) Tundrou/Masasi Townships: Feasibility studies have been completed and reports presented to the parties concerned.
- (2) Tabora/Vigoma/Rukera regions: Feasibility studies have been completed and reports are at present being prepared.
- (3) Mbulu township: Being undertaken by the UN.
- (4) Bukoba - Feasibility studies are expected to commence towards the end of the year.

Totally about 15 sites are at present being investigated and as soon as funds are made available execution of these will be undertaken. Already we have received promising offers of loans and grants from the Italian, Norwegian, West German and Swedish governments towards meeting the cost of implementation of these projects. Meanwhile efforts to exploit other potential mini and large hydropower sources are being vigorously pursued the aim being to gradually replace all existing diesel power plants throughout the country. Tenders have already been invited for the construction of an

80 MW hydropower plant at Mtera on the Great Ruaha River about 134 km upstream of the Kidatu power plant. This coupled with the ongoing extension of the National grid South-West and North-West will by the year 1988 have eliminated a total of 8 existing diesel power plants with an installed capacity of over 50MW. This will go a long way towards reducing the oil import bill for the country.

CENTRALISED/DECENTRALISED SYSTEM

In Tanzania the Government is a centralised one and hence the planning policy is also a centralised one. However the implementation of mini hydropower plants will be decentralised in order to reduce the costs of implementing these projects. The regional authorities will be in charge of the implementation of these projects.

LOCAL MANUFACTURE

Whereas facilities at the moment for local manufacture of complete units do not exist in the country, some parts such as penstocks, gates control panels and transformers can be fabricated locally in Tanzania. However at the moment we lack the expertise and experience to manufacture some of these parts locally. In due course of time we hope to be in a position to manufacture these and other parts. As regards civil works on the other hand facilities exist in the country to undertake civil works for mini hydropower projects locally.

FEASIBILITY STUDIES

At this point of time most of the feasibility studies for mini hydropower in the country are undertaken by foreign experts. Efforts are however at an advanced state to involve local consulting groups and engineers in undertaking feasibility studies for mini hydropower development. The power utility in the country is at this point of time looking seriously into the preparation of a simple methodology to be adopted in carrying out feasibility studies for the mini hydropower projects.

On the broader side we have always insisted that the technology to be adopted in mini hydropower development in the country should be as simple as possible and should be compatible with technology already existing in the country. This will help in ensuring smooth operation and maintenance of these stations most of which will be in rural areas where technological know-how is at a low level. While we still struggle for self sufficiency in the technological field we will continue to order equipment from developed nations who will also continue to finance both the feasibility studies and the construction.

We further recommend that the feasibility studies for mini hydropower development should not be as thorough as those for large hydros.

CONCLUSION

As I have pointed out in this report the Government of Tanzania has decided to meet all future generation increments with hydropower. Efforts to extend the grid to cover the whole country and later to be interconnected to all the mini hydropower plants to be constructed are in full swing. The development of mini hydro power and further research into other renewable sources of energy have been given top priority in the country. Self sufficiency in local design and manufacture is what the country is aiming at in the near future. The goal being to be able to reduce the costs of implementation of the mini hydropower development as low as possible.

