

MAJOR HYDRO POWER DEVELOPMENT

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Major hydro power development sites are located on the Mahaweli Ganga and its tributaries, Kelani Ganga, Walawe Ganga, Kalu Ganga, Gin Ganga and the Nilwala Ganga.

The Mahaweli Ganga and its tributaries provide some of the

best sites such as Kotmale (225 MW, 376 GWH) Victoria (210 + 210) MW, 686 GWH). Randenigala (122 MW, 686 GWH) and Rantambe (49 MW, 158 GWH) which are due for commissioning under the Accelerated Mahaweli. The most promising remaining sites are located on the Kotmale Oya, Amban Ganga

(e) Mini-hydro

The use of Mini-hydro power plants should be considered in its proper place and perspective. A recent assessment has indicated that the total mini-hydro potential available in the country is in the region of only 75 Megawatts. To obtain this, 75 MW several hundreds of small sites will have to be developed. It would thus never replace the requirement for major hydro, whose potential is estimated to be in the region of 2,000 MW. However, where found economical and suitable for the particular location and environment, mini-hydro power

plants to be taken later based on further research and development study.

(j) Nuclear power: to be reviewed in about 2 years for possible uses in the 1990's.

It is clear that during the next ten years or so, firewood, electrical energy and oil products would continue to dominate the energy usage field in Sri Lanka. Proper pricing, education and propaganda, physical constraints and other technical controls will have to be used to modify energy usage in keeping with the ideas expressed above. To specify optimum targets for the different types of energies is difficult. A tentatively suggested set-of targets for the major energies are given below.

Year	Firewood Gwh. electrical equivalent (%)	Oil Products Gwh. electrical equivalent (%)	Electricity Gwh. (%)	Total Gwh. elect. equivalent (%)
1977	6000 (60%)	(23%) 3150	(30%) 4093	(100%) 13613
1990	6370 (47%)	(28%) 2800	(12%) 1200	(100%) 10000

plants may be developed.

(f) Solar-photo and volta applications

Small houses with very small electric lighting requirements may find this useful in coming years. Five fluorescent lamps each of 6 W capacity may require a total capital of only Rs. 5000/- to cover the cost of solar cells, batteries, invertors, wiring, etc.

(g) Limited use of wind power: for water pumping in irrigation, etc.

(h) Bio-gas: Limited use for heating and lighting needs depending on location.

(i) Fuel alcohol and ocean thermal energy: Decl-

These figures do not include solar-electric, bio-gas, wind and other forms of energy expected to play a minor role.

The above is consistent with the hydro energy resources which should be rapidly developed, and the desirability to shift certain types of energy consumption, from oil to electricity. It is also consistent with the power potential of the accelerated Mahaweli development and other hydro-power programmes now under way. It also takes into account the fact that the per capita firewood consumption for domestic cooking needs can be reduced to less than half. However, it is only a very tentative proposal, which must be further studied and modified. Further, it would need periodical modification and updating depending on local and international developments.

and the Uma Oya.

With the completion of the Canyon power plant the Kehelgamu-Maskell Oya development on the Kelani gets completed. However, some development is possible downstream of Polpitiya.

The well known Samanala-wewa project located on the Walawe Ganga is one of the best projects with a possible power output of 180 MW. firm energy of 400 GWH and considerable secondary energy. This project is best implemented soon after the Accelerated Mahaweli power projects.

Another very attractive power project is the Kukule on the Kalu Ganga with around 100 MW of power and 445 GWH firm energy. This has to be given priority for commissioning in the early 1990s.

Annex (1), gives a summary of the major hydro potential (882 MW, 3073 GWH) which could be developed in the future after the Accelerated Mahaweli power projects. The power and energy capabilities indicated are tentative and are based on existing preliminary investigations. The power capabilities in particular could be increased when feasible to provide peaking capability for the system because hydro plants are eminently suitable for peaking purposes. The major hydro electricity potential in Sri Lanka, including those already developed (329 MW, 1500 GWH) and those being developed (876 MW, 1838 GWH) then, amounts to around 1900 MW, 6400 GWH.

PROSPECTS FOR MINI HYDRO POWER DEVELOPMENT

Mini-hydro projects fall into two usual categories. Namely, the run of the river plants at water fall sites and storage plants at dam sites. In a recent study the promising water fall sites and the location of possible small scale storage schemes in the Wet Zone were identified. The relatively large existing Dry Zone reservoirs and proposed irrigation reservoirs where mini-hydro potential could be developed were also located. In this study around 70 water fall sites, 20 mini dams in the Wet Zone, 30 existing irrigation reservoirs and 30 proposed reservoirs in the Dry Zone were identified. The total potential from these sites is of the order of 95 MW at 395 GWH on a rather optimistic basis.

Considering the very large amount of work involved in these numerous projects, it would take

a considerable length of time for their realisation. Therefore, from the point of view of impact on the national energy problem their contribution would be extremely small. However, it is recommended that the more beneficial mini-hydro projects should be implemented and, wherever it is economically and technically possible, the

power developed should be injected to the national grid. An application diagram for choosing suitable turbines for mini-hydro projects is shown in Figure (2). The tube and bulb turbines in particular are now available in attractive packages which could be installed with a limited amount of civil engineering work.

Annex (1) ESTIMATED POWER AND ENERGY FROM THE FUTURE MAJOR HYDRO DEVELOPMENT SITES
(The estimates are subject to revision after detailed studies)

Cascade and Power Plants	Installed Power (MW)	Annual Energy (GWH)
1. Mahaweli Ganga (Main River) Cascade		
Rozella	2.6	7.4
Trafalgar	9.5	34.2
Carolina	12.5	42.9
Koladeniya	6.0	22.8
Ulapane	21.0	59.6
Hololuwa	17.3	60.4
Sub Total	68.9	227.3
2. Kotmale Oya Cascade		
Agra	5.1	20.0
Tillicoultry	11.4	40.7
Talawakelle	40.0	132.0
Yoxford	43.5	138.8
Palmerston	2.2	5.6
Sub Total	102.2	337.1
3. Amban Ganga Cascade		
Kiula	22.3	98.9
Makeliwewa	15.0	68.2
Kumbaloluwewa	40.0	151.2
Moragahakanda	40.0	150.0
Sub Total	117.3	468.3
4. Uma Oya Cascade		
Bomurella	6.5	27.5
Puhulpola	7.3	22.3
Ettampitiya	22.1	70.4
Upper Uma Oya	25.5	100.4
Dematepelessa	21.5	85.5
Lower Uma Oya	30.0	117.7
Madulu Oya	6.9	28.2
Needankanda	5.9	24.3
Sub Total	125.7	474.3
5. Badulu Oya and Loggal Oya Cascade		
Andeniya	14.1	35.2
Kalawelpota	6.1	14.6
Taldena	14.5	49.9
Pallewela	10.0	36.3
	44.7	136.0
6. Other tributaries of the Mahaweli	43	140
7. Kelani Ganga		
Below Polpitiya	15	80
8. Kalu Ganga		
Kukula	100	445
Ratnapura	20	82
9. Walawe Ganga		
Samanalawewa	180	400
10. Kalu Ganga, Gin Ganga and Nilwala Ganga		
Jasmine Complex	65	283
TOTAL	881.8	3073.0