COMPUTATIONAL MODEL OF A SMALL LAC

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ABSTRACT : A hydro scheme with a small hydro is –MHC- towards achieving maximum fall towards the lake of electricity aval.and maxim.

KEY WORDS: small hydro, hydropower, turbines.

1.INTRODUCTION

It shows the general layout of water intake facilities from the lake downstream to produce and distribute energy through processing stations. The general scheme of a small hydro hydropower is shown in Figure 1.

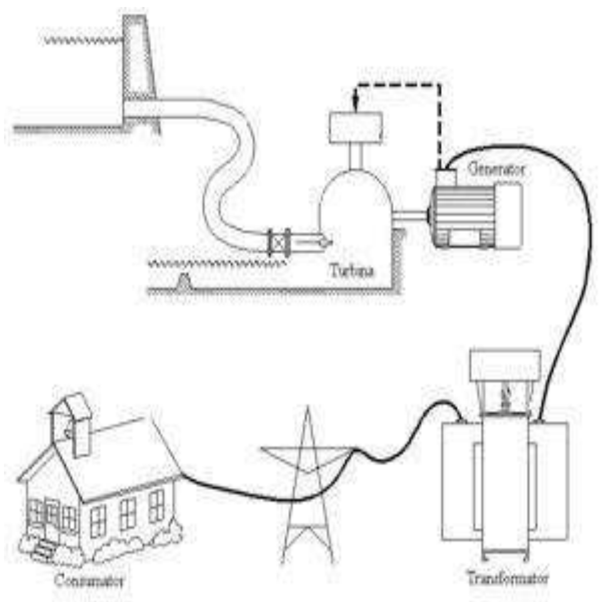

Figure 1. General scheme of hydropower with PHC

Always energy is lost when it is converted from one form to another. Small water turbines rarely have efficiencies greater than 80%. Power will be also lost water pipe through which the turbine due to friction losses. Through careful design, this loss can be reduced but a very small extent.

In a rough approximation, for small systems

of a few kW, overall yield 60% can be considered. As such, the theoretical power is calculated (estimated hydropower potential) multiplied by 0.60 to get a result more realistic about what it can get electrical power from hydropower developments that.

The generators, there are two basic types generally used in small hydro namely synchronous and asynchronous (induction). A synchronous generator can operate isolated time. Small hydropower can be equipped with:

• Kaplan turbines, small H = 10-70 m drop and high flow Q = 700-800 m3 / s;

• Fracis turbines, falling midway between H = 70-600 m and middle flow;

• Pelton turbines, dropping huge H 1000- 2000 m and very low flows Q = 15 m3 / s.

Features General energy for these types of turbines are shown in Table 2

Table 2. Characteristics turbines

Turbine type	*Fastness* n_s	*Maxim power* MW	*Maxim falling* m
Pelton	< 70	180	1766
Kaplan	600-1200	500	70
Francis	70 - 450	508	522

Landscaping PHC version

Between the hydraulic turbine and the working conditions there is a functional inerdependenţă to be considered when ordering the turbine and its operation to get the results dorite.În fitting considering alternative power supply possibility of a cottage and its outbuildings Figure 2 on the river.

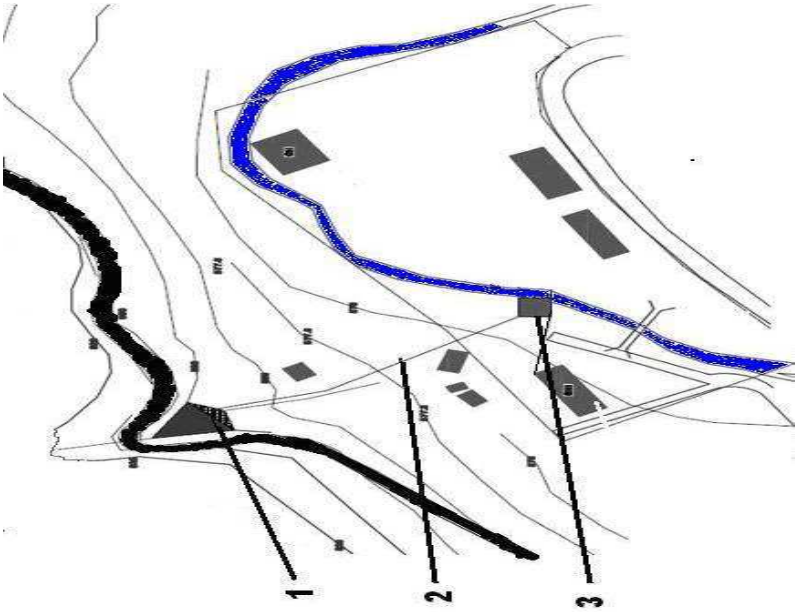

Figure 2. The small lac

1- lac; 2 - adduction pipe 3 - small Hydropower

Landscaping involves the formation of a storage pool for the microhidrocentralei whose volume is determined by the relationship::

V = 1/6(L x l x h)= 987 [m^3]

The calculations are established medium quantities of energy flow hydrometric station data:: Q_{med}. = 0,03 m^3/s.

Lake give power storage available:

$P_t = 9810 \times Q_{med} \times H \times \eta$ [W]

Where: H- fall of turbine;

Q med - mean flow;

η - 63% yield for a very small MHC.

P_t = 9810 x 0,04 x 42 x 0,63 = 8,05 [kW]

Choose a hydraulic turbine with a lower flow rate:

$Q_t = 0.02$ m^3/s

The necessary power is:

P_t = 9810 x 0,04 x 42 x 0,63 = 6,65 [kW]

Bief accumulation, can provide turbine operation:

$$T = \frac{V_{lac}}{D_t} = \frac{0.5 \cdot 637 m^3}{0.007 \frac{m^3}{s}} = 38285 s = 10{,}52 h$$

Lake will provide a turbine operation for about 14 hours, accumulating in the lake will be restored by the water flow rate. Water flow rate is a variable size over time and can not be accumulated in large quantities.

2. THE CALCULATION OF THE HYDRAULIC ENERGY

Landscaping solution leads to the possibility of ordering a slow turbine, it lake water accumulation necessary for energy supply to consumers in the cottage. The flow rate through the pipeline flow calculation:

$$V = \mathbf{4\ Q} / \pi\ d^2$$

$$V = 4 \text{ x } 0{,}117 / 3{,}14 \text{ x } 0{,}55^2 = 0{,}4\ m^3/s$$

The power output of the turbine shaft that turns into electricity is a shedding useful, H_u.

$H_u = H - h_p = 28$ [m]

The useful power from the turbine shaft is calculated:

$P_u = 9{,}81 \text{ x } Q_{med} \text{ x } H$ [kW]

$P_u = 9{,}81 \text{ x } 0{,}055 \text{ x } 28 = 13{,}24$ [kW]

Useful energy that produces energy by giving water after contact with the turbine

$E_u = 9{,}81 \text{ x } Q_{med} \text{ x } H \text{x } \eta$ [kWh/an]

blades can be calculed by **η – 60**%, a small turbines efficiency:

$E_u = 9{,}81 \text{ x } Q_{med} \text{ x } H \text{x } \eta$ [kWh/an]

$E_u = 9{,}81 \text{ x } 0{,}01 \text{ x } 24 \text{ x } 0{,}6 = 14{,}12$ [kWh/an]

The electricity produced by the generator depends on the energy yield useful generator, according to the literature found 70% with the relationship:

$E_u = 9{,}81 \text{ x } Q_{med} \text{ x } H \text{x } \eta \text{ x } \eta g$ [kWh/an]

$E_{el.} = 9{,}81 \text{ x } 0{,}01 \text{ x } 24 \text{ x } 0{,}6 \text{x } 0{,}7 = 9{,}08$ [kWh/an]

3.CONCLUSION

Plants ready to come into operation recently may be a lifetime even longer and serve consumers for several generations without polluting the atmosphere; Investments in small hydro proved to be safe for several decades. To assess the location PHC must have some data:

- about precipitation;
- apelorşi about leakage flow regime;
- The terra

4. BYBLIOGRAPHY:

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