We mean waterworks, which makes power, all construction and machinery which is necessary for the use of hydropower in a certain section of the watercourse and its conversion into mechanical work. Waterworks has a natural flow of energy to the maximum extent possible reuse. This transformation, however, occurs only in the water engine (water wheel turbine). The task of the rest of the water project is to deliver to this engine, without resistance, the required amount of unpolluted water, and at the same time we must not lose anything from the resulting drop.

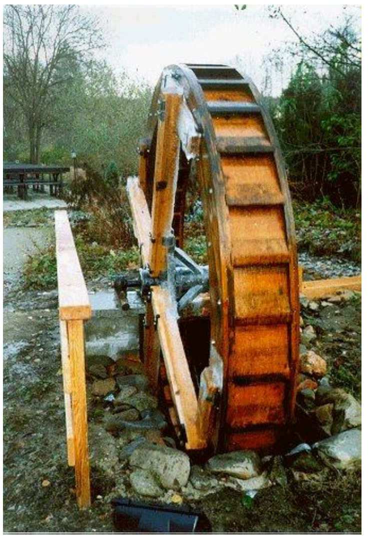
The possibility of doing this depends on the building layout and the way of a water management:

1) **Waterworks located in the main flow:**

- naval - floating
- coastal
- coastal diluvial
- stream work
- weir work
- dams

2) **Derivative waterworks**:

- a low-pressure
  - flow
  - with an accumulation
- a low pressure with the pressure conduit
  - flow
  - with accumulation
- a high pressure
  - flow
  - with and accumulation
- combined



Energy of the flow equals to the product of a drop and a flow rate.

While the flow is a variable quantity and more or less dependent on the weather, the drop can be considered a constant given by the shape of the terrain. Both quantities are equally important. It depends on the local circumstances, which one is easier to obtain. In the mountains and in the highlands it is certainly easier to get fairly quickly a sufficient gradient and thus a decent output at a lower flow rate flows. Conversely, in the lowlands we meet up lazily flowing water with a large flow, but the chance for greater gradient is negligible. For waterworks with the accumulation of water is always necessary to use the greatest possible gradient. This reduces the amount of water that must be accumulated and the tank is reduced. If circumstances allow, we choose a place to set up the waterworks near uneven terrain, where the natural flow decreases sharply (rapids, sharp bend, rock step) in a way that the place of an extraction is over this place and the water returns underneath. Such a solution will save a lot of meters of a race and it achieves the same gradient.

Power of the water motor shaft is given by an instantaneous flow, clean water drop on the water engine and by the effectiveness of the water motor at a given flow:

output **P** [watts] = 0,0981 × flow **Q** [ltr./sec.] × gradient **H** [metres] × effectiveness [%]

The gradient "H " installed in the calculation of the gradient is clean. It is the original contrast of the level along the creek section, reduced by the decrease in the level of take-off screenings, pipe and gutters. It is created by the necessary losses, which are necessary for the water flowing into the engine. When the machine is stuck, the level stabilizes above. Therefore, we have to expect this difference.

Flow " Q " installed in the calculation is the actual flow of water through the motor - minus the prescribed remediation flow (if there is any) and any unwanted leakage .

Achilles heel of the whole calculation is the fact that the efficiency of water motor at different flow rates is not the same, but with decreasing flow rate (loading) decreases.

To know the output even in the dry season of the year, you will need to calculate the output even there is another filling than the nominal is and you will have to put and appropriate efficiency corresponding to the filling.

You have received the calculation and its value did not meet your expectations? Attention, water works 24 hours a day, 365 days a year, so even a small power can do a good job.