



Possible Applications of the Generbine

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One single generbine put in free circumfluent water

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Generbines are not suited for river regulation

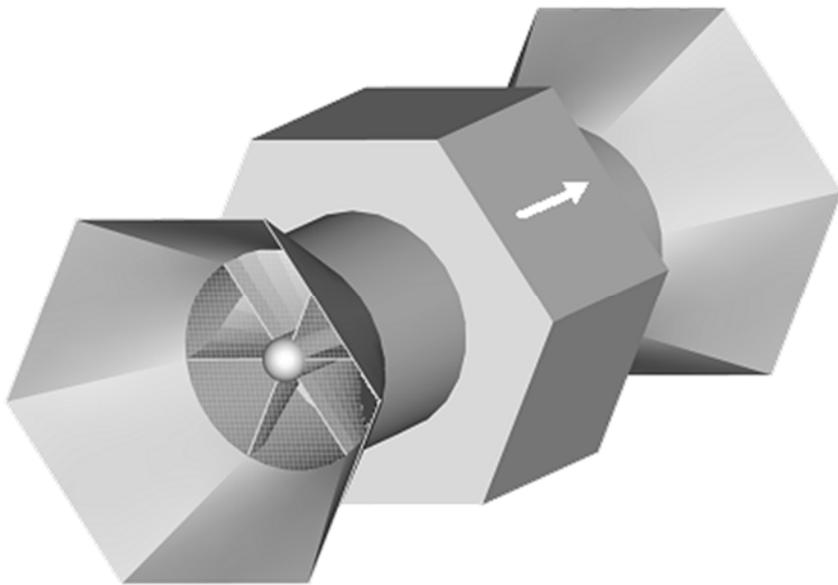
Suggested Application No. 1 – Single Generbine

One single generbine (~100 kW) put in free circumfluent water

A generbine that is installed like that just uses the dynamic pressure difference caused by the flowing fluid, as does a wind turbine. So there is no need for a dam or weir providing a static pressure difference.

By choosing the adequate aperture of the inflow nozzle and the outflow diffuser, the generbine can be adapted to the expected flow velocity range of the water.

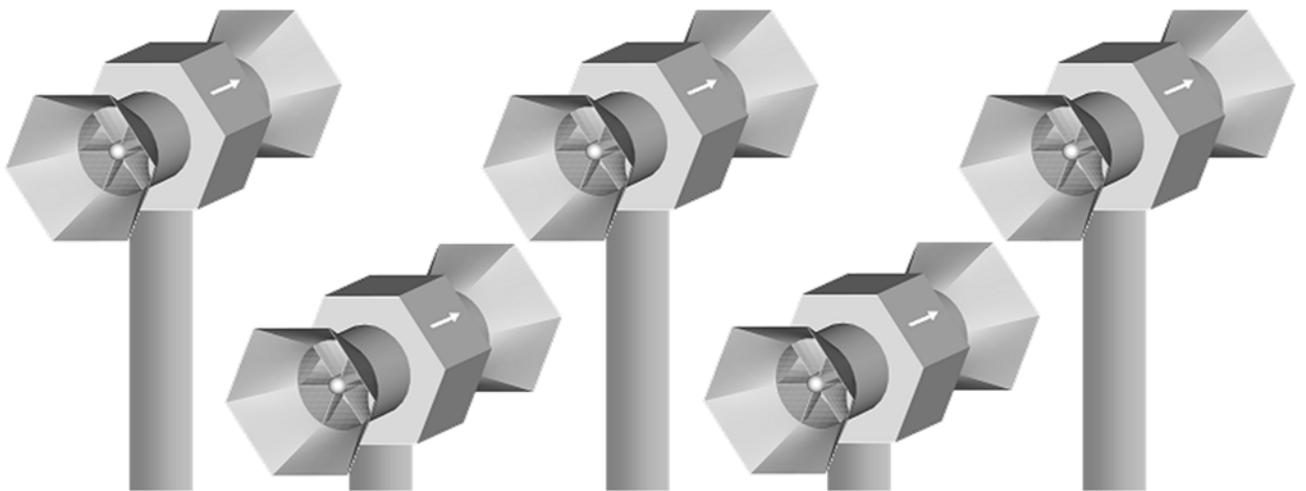
It must be mentioned, however, that the generbine can in this application not use more than $16/27$ of the kinetic energy of the water meeting the aperture area of the generbine inlet (according to the Betz conversion factor known from the theory of wind turbines).



Suggested Application No. 2 - Generbine Farm

Several generbines (~ 100 kW each) put in free circumfluent water, in some distance from one another

The generbine farm works in the same manner as one single generbine, but with multiplied power. Like a wind farm, but in the water!



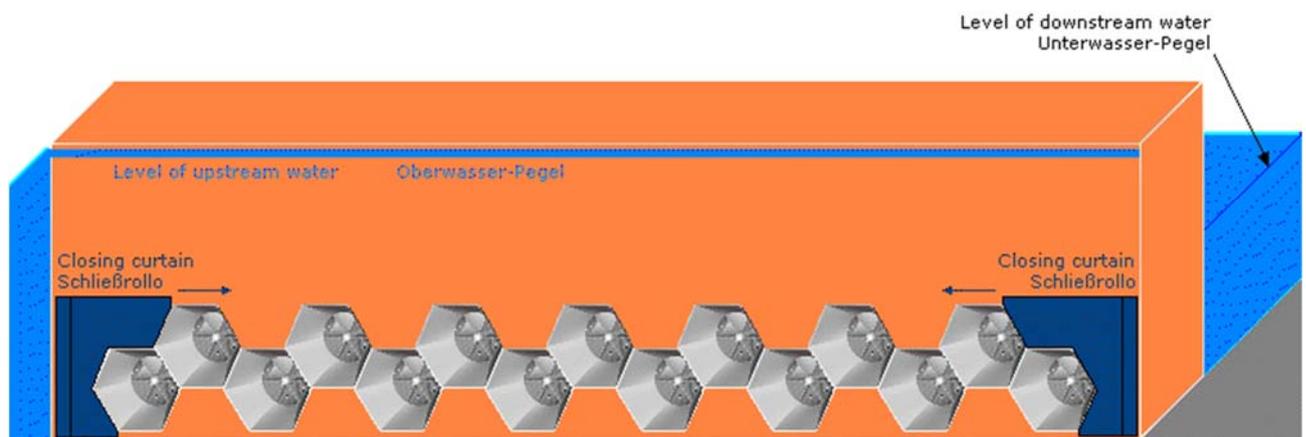
Suggested Application No. 3 – Generbine Dam

Many lined-up generbines (~100 kW each) integrated in a dam

This application is closest to the classic run-of-river plant working usually with Kaplan turbines: The dam causes a so-called head, i.e. a level difference between upstream and downstream water.

In this manner, the power production does not depend on the kinetic energy; the generbines use rather the static pressure difference built up by the head. There is no limitation by the Betz conversion factor, and so a greater amount of the river's energy potential can be used.

As the generbine is not suited for flow regulation, other measures have to be taken to maintain the optimum head also at low flow of water. This can be achieved e.g. by closing curtains that cut off a part of the generbines from the water stream.

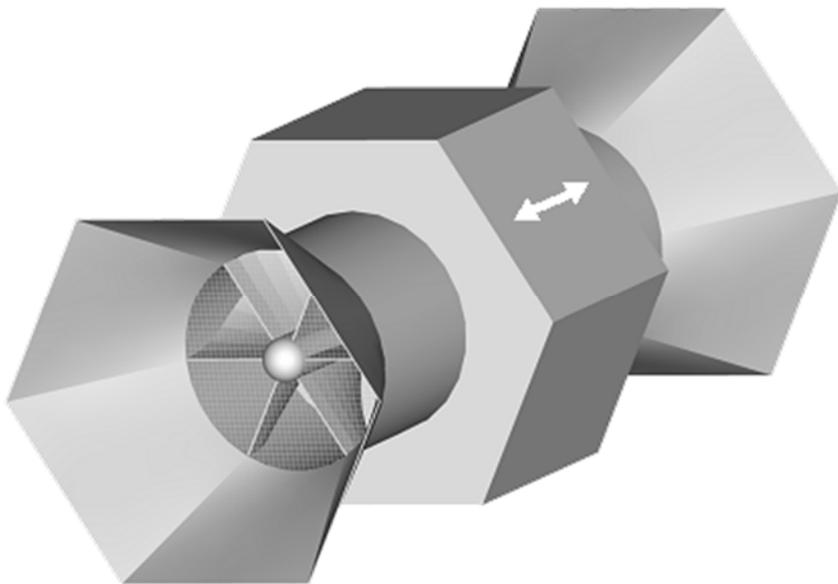


"May-be" Development - Bidirectional Generbine

A symmetrical generbine suited for both flow directions

Of course, rivers usually flow in one direction only. However, generbines work in principle also in tidal currents. These change direction twice or (in most regions) four times a day.

Therefore, the feasibility of a bidirectional generbine should be investigated. If one is lucky, the same stator could be used and only the shape of the blades and the guide vanes changed. (Guide vanes should then be put on both sides of the generbine.)



"No Good" - Generbine as a Regulation Valve

Generbines are not suited for river regulation

It must not be forgotten that the generbine is a device that converts hydraulic into electric energy. It is definitely not a regulation valve!

The rotation speed of the generbine is regulated by varying the electrical load. This should be done by a maximum power tracker, as known from PV power plants. A generbine should never, ever be regulated to a certain volume flow or to a certain upstream water level. This can be done when using Kaplan turbines, because their guide vanes can be closed to a significant amount while the turbines still provide an acceptable efficiency. A generbine, however, could be slowed down to zero (which leads to zero power production) and would still let pass a great fraction of the nominal volume flow.

Application suggestion No. 3 "generbine dam" shows a possibility, how a certain control of volume flow or upstream water level can nevertheless be achieved.

