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## Annual Global Contest to Strengthen Bangladesh

Hosted by the Center for International Development at

**HARVARD UNIVERSITY**

John F. Kennedy School of Government



Propose an innovative and practical idea that would improve the lives of low- and middle-income people of Bangladesh. Proposals will be judged by four Harvard University faculty members, in consultation with scholars familiar with Bangladesh.

This global contest is open to any individual in the world. Any compelling essay that establishes a way to improve the lives of low- and middle-income people of Bangladesh is acceptable for submission. The essays will be rated giving equal weights to (a) innovative nature of the idea; (b) clarity and cogency of argument and writing; (c) ease and practicality of implementation; (d) the size of impact.

The author of the winning essay will be awarded the Anwarul Quadir Prize, USD \$25,000. The deadline for submission is December 31, 2006. For rules, requirements, and the criteria to be judged upon, please go to [http://www.cid.harvard.edu/quadir\\_prize](http://www.cid.harvard.edu/quadir_prize).



**An innovative and practical idea that can improve the  
lives of low- and middle-income people of Bangladesh :**

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**Title : Small - Scale Hydropower : Area-Wide Energy Supply**

Earning / saving money by electric power generation

**Brief summary / abstract :**

A significant precondition for **a better life of people** is characterized by the availability of electric energy in all-to-day need .

**Strengthen Bangladesh** means using its own richness in floating waters in a modern and environmental compatible way .

**A broad size of impact** can be reached by installing mass produced **modern waterwheels** , generating decentralized electric power .

**Modular construction-kits** can be prefabricated in Bangladesh.

Component-parts are easy to handle in transport and distribution all over the country.



**modular waterwheel**

(construction kit)



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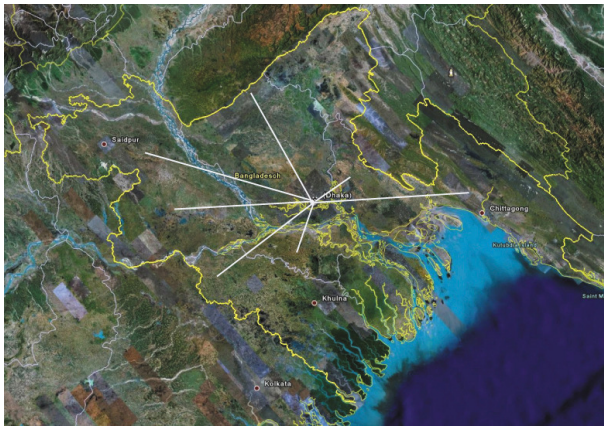
### A better life with electric energy

A significant precondition for a **better life of people** is characterized by the availability of electric energy in all-to-day need .

Electricity can be used for manufacturing , agriculture finishing industry and contemporary communication (Internet commerce) , as well as for education and the running of schools .

Robust **modular waterwheels** are minimum-cost batch sized and a reliable method for generating electric energy in an efficient way .

### Waterwheel manufacturing and distribution



A **broad size of impact** can be reached by installing mass produced **modern waterwheels** .

Modular construction-kits can be prefabricated in Bangladesh.

A small industry (central position) has to be founded , growing by cash-flow.

Component-parts are easy to handle in transport and distribution all over the country.

Transport has to be done by small trailers on the roads or by small vessels on the waterway.

Building up of the waterwheel components - all needed screws have



the same size – can easily be done by manual workers.

They put the waterwheel onto the right place .

The owners paying for the investment can be private users as well as communities.

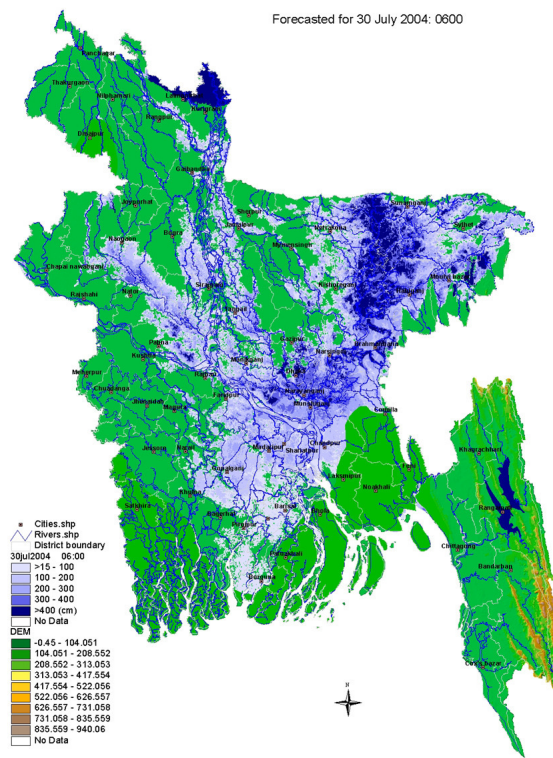
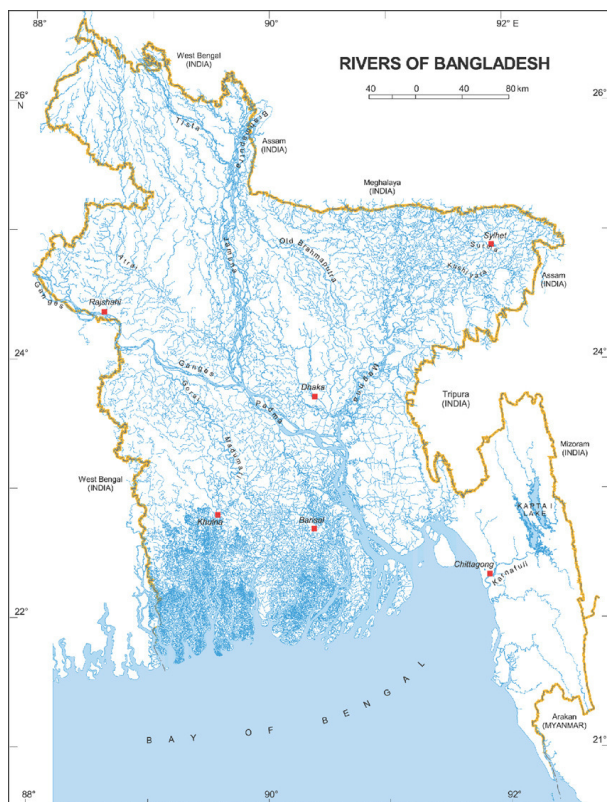
Producing electricity means producing money. A part of the profit is amortization.

### Geographical conditions

Bangladesh is rich in floating waters that implicates the **use of hydropower**.

Because of the missing descents worth mentioning it is impossible to build large and high reservoir dams with big hydroelectric turbines .

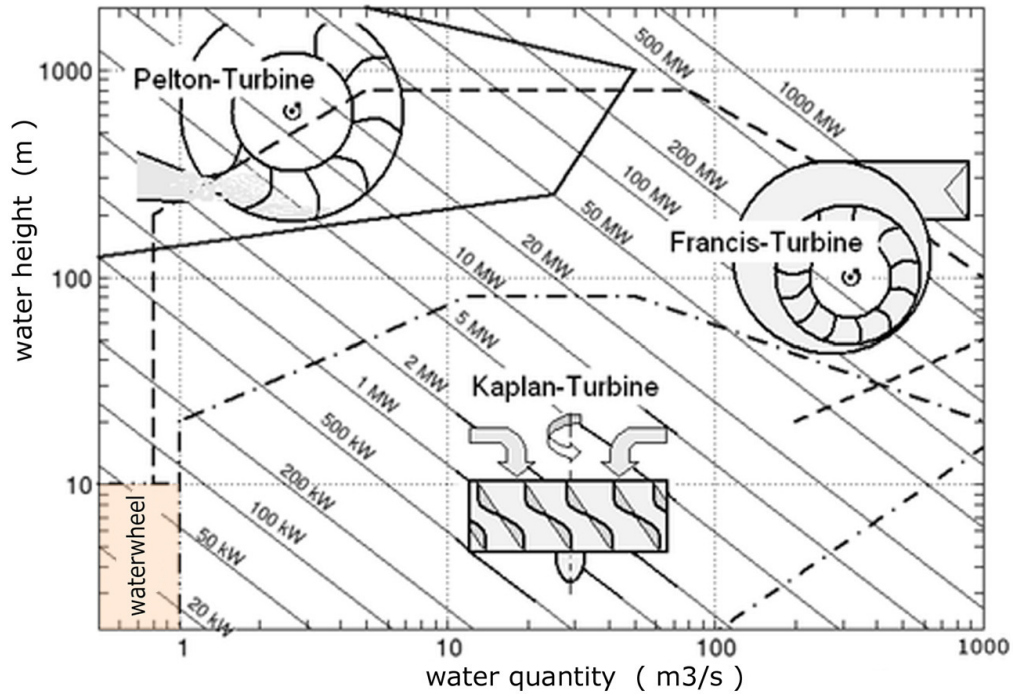
**Decentralized small-scale hydropower** seems to be a key-technology for Bangladesh .



Around the area with periodical overflowing there are hilly regions rich in crossing smaller rivers with altitude differences adequate for **waterwheels** .

**Waterwheels** need only few altitude differences . Even the water quantity may alter in a wide range .

### Characteristics of hydroelectric machines

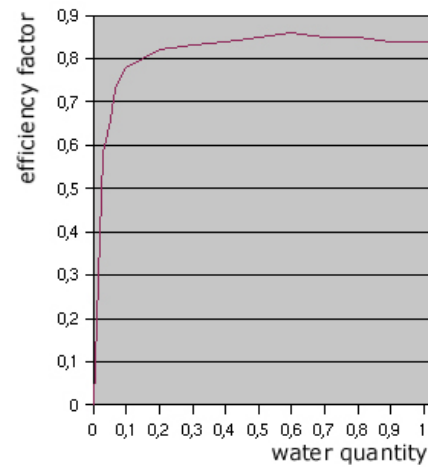


The upper diagram shows the characteristic working areas of hydropower machines .

**Waterwheel** application is predestined for altitude differences up to 10 meters (pink field).

Right diagram :

**Waterwheels** reach the full efficiency already at a filling grade of 20 % .

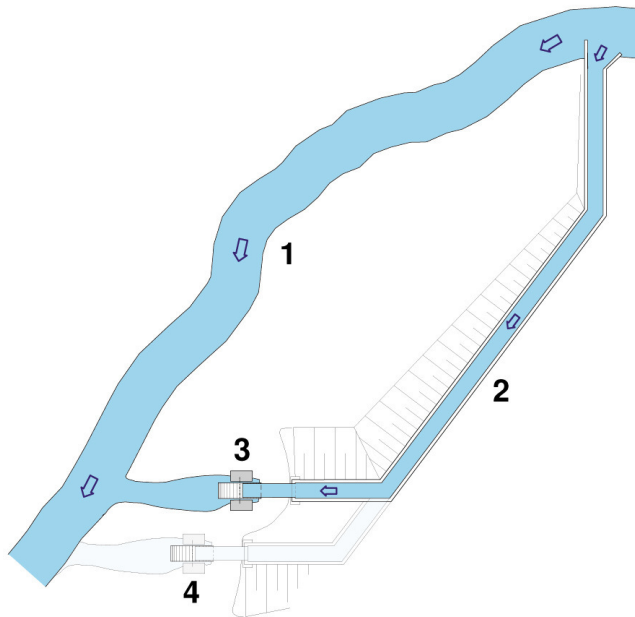


characteristic curve : waterwheel





## Building a small channel



Upper channel (2)

A small river (1) is needed to build an upper channel (2) leading to the waterwheel (3) .

Difference of water-levels about 4,5m .



Waterwheel (3)

In case of plenty water-quantity , there can be installed a second waterwheel (4)



**System of Prefabrication**

The waterwheel-moduls will be fabricated in a central workshop on the territory of Bangladesh .

With the author`s support some 3D-Cad-files have to be given to a small laser-machine , that will cut and weld the thin sheets of stainless steel automatically.

By this way of producing a high quality standard is guaranteed.

The accuracy of fitting is very important concerning a successful installation.

Other components of this construction will also be prefabricated and completed.

Special construction parts like gear and generator will be bought in addition.

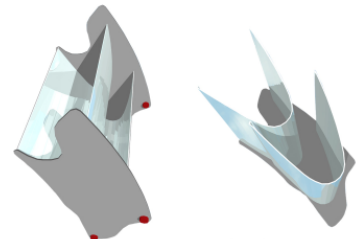
3D-CAD-file



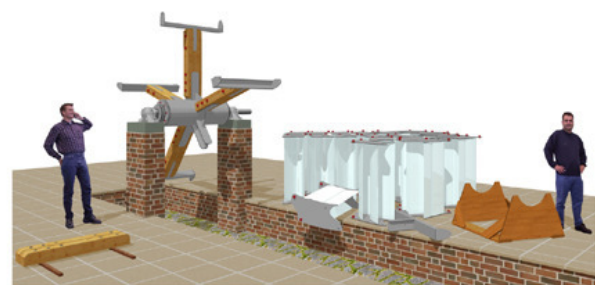
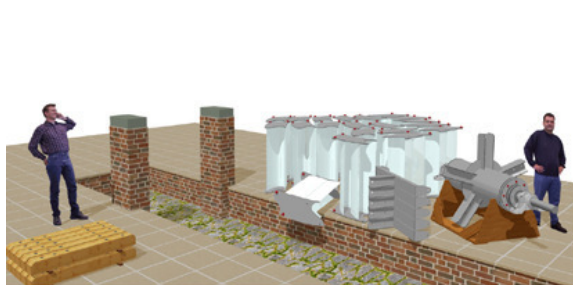
laser-machine



rim segments



installation



Look at : [www.wasserrad-drehs.de](http://www.wasserrad-drehs.de)

